8.10.9 Pastry

Contents - Previous - Next

Add insect flour to make pastry for a pie crust or empanadas, to which fillings can be added made of fruits or vegetables.

1 � cups	*Flour*
� cup	*Bee flour (prepare as in 8.10.6)*
� teaspoon	*Salt (to taste)*
� cup	*Shortening, fat or cooking oil*
4 tablespoons	*water*

Mix all the dry ingredients well, then add the shortening and mix into a paste. Add the water slowly, to form a fairly dry dough but with all the flour moistened. Flatten the dough on a powdered suiface to a thickness of 3-4 mm and place in a baking form, pie pan or similar. Add a filling prepared according to your own recipe and bake. The baking temperature and time will depend on the filling and

on the size and shape of the pastry.

Empress Barbara Tarts

Pastry:	*� cup*	*Flour*
	� cup	*Bee flour*
	� teaspoon	*Salt*
	� pound	*Butter*
	3 tablespoons	*Heavy cream*

Sift both flours and the salt into a bowl or break up any lumps manually. Cut in the butter with a pastry blender or by stirring with a fork. Stir in the cream with a fork until a ball of dough can be easily formed. Wrap in waxed paper or foil and chill for 2 hours. The cream can also be replaced by 2 tablespoons of butter and 1 tablespoon of milk or water.

Filling:	*� cup*	*Marinated bees (see basic recipe in 8.10.6)*

1	*Egg, beaten*
4 tablespoons	*Melted butter*
3 cloves	*Minced garlic*
2 tablespoons	*Corn starch, potato starch or other thickener*
1 teaspoon	*Salt*
q.s.	*Cayenne pepper to taste (or chili pepper, red peppers, etc.)*

Mix all the ingredients for the filling together. Roll out the dough extra thin and cut into circles of 8 cm diameter. Place a heaped teaspoon of filling in the centre. Bring opposite edges of the pastry to the centre and roll-up overlapping dough, sealing the edges well. Arrange on a baking sheet and cook in a preheated oven at 205 ^{0}C for 15 minutes. Serve with hot mustard.

Cheese tarts

Biscuit dough sufficient for about one dozen biscuits is required. One example of dough can be prepared as follows:

Pastry:	*1 � cups*	*All-purpose Flour*
	� teaspoon	*Salt*
	3 teaspoons	*Baking powder*
	4 to 6 tablespoons	*Chilled butter or shortening (lard, margarine etc.) or a combination of both*
	� cup	*Milk*
Filling:	*� cup*	*Grated cheese (a rich, easy-melting cheese)*
	� cup	*Marinated artichokes, choopped*
	� cup	*Chopped garlic-butter-fried bee larvae, pupae or other insects*
	� cup	*Fresh, minced parsley*
	� cup	*Milk*

Sift the first three ingredients into a large bowl or manually remove lumps, then add the butter by cutting it into the dry ingredients with two knives or a fork until the mixture has the consistency of coarse cornmeal. Make a bowl in the centre of the ingredient mix and add all of the milk at once. Stir until the dough comes away from the sides of the bowl. Place the dough onto a lightly floured board and knead gently and quickly for � to 1 minute.

Roll or pat the dough until it is about 2-3 mm thick. Cut it into squares of 7 cm. Place in the centre of each square one teaspoon of the filling. Moisten the corners of the dough with water, fold up the corners and pinch them together to make a tart shape. Bake the tarts at 2200~235 ^{0}C for about 10 minutes.

Other ingredients that may be added to the biscuit dough include grated cheese, chopped bacon, ham, onions, parsley and other herbs. The artichokes in the filling can be replaced by other chopped, leafy vegetables. The tarts can also be filled with fruit fillings.

8.10.10 Popmoth

Heat some cooking oil and drop fresh (live) or frozen wax moth larvae into the

hot oil. Their skin will break and the proteins will expand, making them look like popcorn. Remove them before they become too dark, let the oil drip off them and salt or flavour them with other spice mixtures similar to popcorn, potato or banana chips. They might also taste good with honey, or quickly turned in the candy mix described below.

This product should be packaged attractively in clear plastic bags for sale in markets or stores. Once fried like this, it may be stored for some time without spoiling.

8.10.11 Bee sweets and chocolate coated bees

The following recipes can be easily adapted to accommodate various, similar ingredients and provide honey-based sweets, with or without bee and insect larvae. They are easily made in any pastry shop or home kitchen and preserve well for sale in markets and shops. Powdered pollen pellets can also be added. Neatly packaged, they provide an attractive and very nutritious snack.

Candybees

� cup	*Butter*
2/3 cup	*Brown sugar*
� cup	*Dark honey*
1 cup	*Cleaned bees (adults or larvae) or other insects*

Mix the butter, sugar and honey. Beat until smooth, then stir in the insects. Place in a baking dish in the oven at 190^{0}C for approximately 30 minutes. After cooling, break or cut into pieces. (See also candy recipes in Chapter 2.)

The butter can be replaced with another cooking oil; for an agreeable flavour try coconut, peanut or sunflower oil. Dark sugar gives a nicely coloured end product and is a little healthier than white sugar, but the latter can be used instead. With a little practice, the candy can also be made in a covered frying-pan over a low fire. Be careftil not to burn the sugar.

Carob Fudge

1 � cups	*Honey*
2/3 cup	*Milk*

2 tablespoons	*Butter*
1/3 cup	*Carob powder*
1 tablespoon	*Vanilla*
1/3 cup	*Dry roasted bees (adults or larvae, chopped)*

Place the honey, milk, butter and carob powder in a heavy saucepan or pot. Heat slowly until the mixture is well blended and then cook without stirring, until the temperature reaches 115 ^{0}C (at this temperature, the mixture will form a soft ball when a drop is placed in cold water). Cool to 50^{0}C and then beat until the mixture loses its glossiness. Add the vanilla and the insects. Pour into a greased pan of approximately 20 x 20 cm size. when set, cut into 5 cm squares or smaller.

The carob powder can be replaced with chocolate powder or instant cacao powder.

<u>Chocolate larvae</u>

1 � cups	*Honey*
2/3 cup	*Cream*
2 ounces	*Unsweetened or bitter chocolate*
1/8 teaspoon	*Salt*
1 tablespoon	*Butter*
1 teaspoon	*Vanilla*
� cup	*Dry-roasted bees (adults or larvae)*

In a saucepan or small pot, mix the honey, cream, chocolate and salt. Cook over a medium heat, stirring constantly until the chocolate is melted and the honey has dissolved. Continue cooking over low heat (stirring occasionally) to a temperature of 112 ^{0}C or until a small amount of mixture forms a ball when dropped into iced water. Remove the mixture from the heat, add butter and cool to 50^{0}C without flirther stirring. Then add the vanilla and beat vigorously with a wooden spoon until candy is thick and no longer glossy - about 7 to 10 minutes. Stir in the insects and spread the mix evenly in a buttered flat pan. Cool until firm

and cut into 5 cm squares.

Toffee

� cup Brown sugar (or � honey plus � white sugar)

� cup Butter

1 cup Dry roasted bees, coarsely chopped

� cup Semi-sweet chocolate, grated

Butter a baking pan (about 20x20x5 cm). Heat the sugar and butter in a saucepan or small pot, to boiling. Boil over medium heat for 7 minutes, stirring constantly. Remove from the heat, stir in the bees and pour into the pan. Sprinkle the chocolate over the hot mixture and cover so that the contained heat will melt the chocolate. After a couple of minutes, spread the melted chocolate over the candy. while still warm, cut into 3-4cm squares. Refrigerate until firm.

This toffee can be sold easily as it is, but unfortunately the chocolate will hot climates or, if left in the sun.

Banana Sicle

� cup	*Peanut butter*
� cup	*Powdered milk*
1 tablespoon	*Honey*
1/3 cup	*Light cream*
4	*Bananas, peeled*
1/3 cup	*Minced, dry-roasted bees*

Place the peanut butter, powdered milk, honey and cream in an electric blender and chop until smooth. Roll the bananas in the mixture and sprinkle with the insects. Freeze. This makes a very nutritious popsicle.

If cream is not available, use regular whole milk and boil slowly until it is reduced to � or ^{1}A of the original volume.

Popcorn Crunch

� cup	*Butter, melted*
� cup	*Honey*
3 quarts	*Popcorn, popped*
1 cup	*Dry-roasted bees, chopped*

Blend the butter (or vegetable oil substitutes) and honey together in a saucepan and heat gently. Mix the popcorn with the insects and pour the butter-honey mixture over

it. Mix well. Spread on a cookie sheet in a thin layer. Bake at 175 ^{0}C for 10 to 15 minutes or until crisp. Break into bite-sized pieces. Vanilla flavour can be added to the honey-butter.

Peanut butter squares

� cup	*Powdered milk*
� cup	*Peanut butter*

1 cup	*Shredded, unsweetened coconut*
� cup	*Sunflower seed kernels*
� cup	*Honey*
� cup	*Water*
2 tablespoons	*Brewer’s yeast*
� cup	*Dry-roasted bees*

Combine all the ingredients in a large bowl and mix until they stick together. Press into a flat, buttered pan. Cut into squares and serve, or wrap squares in clear plastic (or waxed paper) for sale. A � cup (?f dried, powdered pollen can also be added. The brewer's yeast is not essential and the nuts and seeds can be replaced by others (see also Chapter 2 recipes).

Peanut butter or any other oil-rich nut butter can be produced nuts and stirring the mixture well, in order to avoid separation of oil

Bee-Oatmeal Cookies

� cup	*Softened butter or oil*
2	*Eggs*
1 teaspoon	*Vanilla*
1 � cups	*Honey*
� cup	*Water*
2 � cups	*Regular wheat flour (all-purpose)*
1 cup	*Bee flour (see section 8.10.6)*
� teaspoon	*Baking powder*
1 teaspoon	*Baking soda*
1 teaspoon	*Salt*
1 teaspoon	*Cinnamon (powdered)*
� teaspoon	*Cloves (powdered)*
2 cups	*Rolled oats*

Warm the butter until soft, and vigorously stir in the eggs and vanilla. Add the

honey and the water. In a separate bowl blend all the dry ingrediends exept the oats. Join the liquid and dry portion, stir and add the rolled oats. Place heaped teaspoonfuls of the mix 5 cm apart on a lightly greased baking sheet (makes 70 to 80 cookies). Bake for 8 to 10 minutes at 175� C. This recipe is enough to make 70 to 80 cookies.

Honeybee granola bars

4 cups	*Rolled oats*
� cup	*Sunflower seed kernels*
� cup	*Shredded coconut*
� cup	*Sesame seeds*
� cup	*Slivered almonds*
1 tablespoon	*Cinnamon, (powdered)*
1 cup	*Honey*
1/3 cup	*Oil*
2/3 cup	*Bee pollen ground. (This should be omitted if there is*

	a risk that the product might be eaten by someone who is allergic to pollen).
� cup	*raisins*

Mix the dry ingredients, except the raisins and pollen. Mix the honey and oil separately, then combine the wet and dry mixtures. Spread the granola mixture on a lightly greased cookie sheet, frying pan or flat metal sheet. Bake at 160^{0}C for 35 minutes, stirring often for even baking. when partially cool, mix in the pollen, raisins or other dried fruits and press together into a layer about 1 cm thick. Allow to cool completely and cut into squares or strips.

These bars can be packed easily and will keep for several weeks in cool storage. Rolled oats can be replaced by other grains, e.g. puffed rice. To make rolled grains, soak whole grains in water for a few hours and/or briefly boil and drain them and then carefully pound or squeeze them under a heavy rolling pin or grinding stone.

Bee Bars

1 cup	*Honey*

1 cup	*Brown sugar*
� cup	*Milk*
1/8 teaspoon	*Salt*
2 tablespoons	*Butter*
1 teaspoon	*Vanilla flavouring*
� cup	*Dry-roasted bee larvae or pupae, finely chopped*

Mix the honey, sugar, milk and salt in a small pot. Boil over medium heat, stirring occasionally until a small amount makes a ball when dropped into cold water (or the candy thermometer reads 112 ^{0}C). Remove from the heat and mix in the butter. Cool the mixture to 50^{0}C, without ffirther stirring. Add the vanilla and beat with a wooden spoon until the mixture becomes thick and is no longer glossy. Shape the candy into a 30 cm roll, then roll it in the finely chopped bee brood. Wrap in waxed paper and chill until firm. Cut into 5 mm slices.

8.10.12 How to raise and harvest wax moth larvae

The requirements to raise wax moth larvae are minimal: several 3 - 4 litre containers (preferably glass), a diet medium, i.e. food, and a few wax moth adults to lay eggs.

The adult wax moth can be collected from any beekeeper. Several larvae or cocoons are suitable too if they are kept in a small breeder jar, a small *('A* litre) glass, metal or plastic container with a screened hole in the lid, covered with paper or cloth. The breeder jar should have some crumpled or folded paper in the bottom on which the moths can lay their eggs.

500 to 1,000 eggs can be placed into one of the larger 4 litre "growth" container. The "growth" container should have a lid with a *3-5* cm hole which is covered with fly screen and a thin cloth or paper towel, the latter to keep the dirt out and the former to keep the larvae in.

The eggs and the diet medium for the larvae are placed in the large "growth" jar and maintained at 30� to 34^{0}C, away from direct sunlight. At the lower temperature, cocooning begins after 6 weeks and at the higher temperature after 4 weeks, but wax moth larvae will survive well between 25� and 37 ^{0}C.

Harvesting can begin as soon as the larvae start cocooning. Then, every three days, the cocoons are removed from the jar walls. Removing the larvae after cocooning ensures that they will have eliminated all faecal matter and other wastes (this is true for honeybee pupae and all other pupating insects). At this stage, i.e. before pupating, but after cocooning, the wax moth larvae can be kept alive for over a year at 15 ^{0}C and 60% relative humidity. In order to perpetuate the culture, a few cocoons are allowed to pupate and hatch inside another breeder jar. Sixteen days after setting up the breeder jar, the eggs can be transferred into the larger, "growth" containers. After a few generations, a few newly collected females or males should be introduced into the breeder jar.

The survival and growth rate depends very much on the diet. Since wax moths are very adaptable in regard to their diet and since they are used worldwide in laboratories for all kinds of tests, there are many simple and more sophisticated diets. According to Eischen and Dietz (1990), however, have shown that even a good artificial diet can still be improved by adding a mixture of pollen and wax and (preferably) even honey. Adding of propolis However, reduces growth rate and survival (Eischen and Dietz, 1987). The following are a few diet recipes:

Diet recipes

1) After Taylor and Carter, 1976:

A technical diet medium is made up by boiling together � cup each of sugar, glycerol and water. when cool, mix quickly with � teaspoon of a vitamin mixture (Meads Deca- Vi-Sol) and five cups of dry Pablum (Mead-Johnson mixed cereal). Survival rate on this diet is approximately 50% and 110 to 170 g of larvae can be grown on one cup of this diet.

2) A standard diet after Jindra and Sehinal, 1989:

Ingredients (in parts by weight):

40	*Cereal flour*	*15*	*Beeswax*
10	*Dry milk*	*20*	*Honey*
5	*Dry yeast*	*10*	*glycerol*

The cereal flour should ideally consist of a mix of wheat flour and maize and wheat meal in the ratios 1:2:1. The dry components are heated to gether for sterilization for 2 hours at 80 ^{0}C and mixed with the pre-heated wax, glycerol and honey. Once cool, 200 ml (or 250 g) of the mix is poured into each "growth" jar. If the diet cannot be refrigerated or frozen, a new batch has to be made every week.

The same amount of the diet (250 g) is fed to the larvae on day 1 and again, according to need, on either day 7 to 9, 13 to 15, 18 to 20 and 23 to 25 i.e. total of 1250 g per 1000 eggs. Different feeding regimes (such as supplying all the food at once) may be more practical, but this can only be done if the feed has been sterilized properly. Optimal growing conditions for Galleria larvae are also ideal for most microorganisms. Therefore, under most circumstances, frequent replacement of food is usually better than one large feeding.

According to Eischen and Dietz (1990), it should be possible to improve most standard diets by adding a mixture of honey, pollen and wax. The pollen might function also as a feeding attractant and perhaps stimulant. Eischen and Dietz have improved the survival of larvae from 27.4% on a standard diet to 89.6% with

only honey, pollen and wax. However, adding only *5* % of the honey, pollen and wax to the standard diet increased survival to above 80%. Survival to pupation was even better. Addition of propolis and very old brood combs should be avoided, since it strongly reduces survival and growth rates (Eischen and Dietz, 1987).

3) The honey/pollen/wax diet of Eischen and Dietz (1990)consists of:

63% pollen (dried or fresh trap collected bee pollen pellets) from different plant species and 37% of honeycomb (wet cappings from harvesting). The cappings contained about 50% honey and 50% new wax. The mix was not heated, but kept frozen until use. The economics of this diet were not considered and a compromise between maximum survival and growth, and an affordable diet will have be determined for a commercial grower.

4) A sufficient diet for which any beekeeper has the ingredients:

Take some comb (but not too old or black) break it into small pieces and measure about three to four times the amount suggested in the second diet recipe above. New comb or uncappings are better because they contain less

propolis and a weight equal to the one required in the second diet recipe would be sufficient. Replace the milk and yeast powder with 20 parts of pollen pellets, or use extra broken comb with bee bread. Use 30 to 40 parts of any cereal flour or flour mix and 20 to 30 parts of honey or concentrated sugar syrup. Glycerol may also be added. Make small amounts fre quently, since the pollen should not be heated for steralization. Store all the ingredients dry and separately.

Keep the growing larvae in the dark and start harvesting when the first larvae start spinning their cocoons. Larval faeces still contain considerable amounts of nutrients and may be added to the feed for other animals.

Adapt the proportions of any of these diets to local ingredients and test for survival and growth. A survival rate from egg to pupation of above *50%* is acceptable, above 80% is very good. Final weight per larvae should be above 150 mg each. Larvae eating the second diet during their last 4.5 days reached an average body weight of 200 mg (from 50 to 65 mg per larvae at the beginning of the last instar). The diet for the earlier instars was a semi-artificial diet. An oversupply of proteins or carbohydrates does not increase growth. An optimal diet during the last instar made a difference of up to 35 % in body weight. Feeding the more expensive honey, pollen and beeswax diet only during the last instar,

may therefore be more economical.

Contents - Previous - Next

CHAPTER 9a
COSMETICS

Contents - Previous - Next

9.1 Introduction

The origin of the word cosmetic lies in the ancient Greek word Kosmein, which means decoration. The desire of people to decorate themselves, be it for hunting, sexual attraction, social status, ritual purposes, special occasions, or just for simple expression of beauty, are probably as old as humanity itself. From adornments to paints, ointments, tattoos and perfumes, the array of materials and fashions not only seems endless but is also changing with time and culture. Although occasionally very damaging ingredients have been used,, e.g. lead (Pb) and mercury (Hg) for whitening in the Middle Ages in Europe and until today in

parts of Africa, hygiene and the care of the body have usually been an essential part of such decoration.

While care for the body and hygiene flourished during the Roman Empire, were deplored as something sinful during the Dark and Middle Ages in Europe. The use of cosmetics was punished in much the same way as witchcraft was punished in Puritan England and soap was considered a sinister curiosity threatening the health of the human soul. Not until the end of the sixteenth century did the use of perfumes, powders, creams and colours, and in some European countries even baths, slowly become acceptable. Other cultures, particularly those in tropical climates, had a much more practical and healthy relationship to body care and hygiene. The continued disdain for baths in Europe, at least into the nineteenth century, made the developing cosmetic industry a necessity.

Today's cosmetic products however include in addition to perfumes, a vast and ever increasing range of products from simple skin creams, soaps and shampoos to special lotions, base creams, moisturizers, nourishers, cleansers, protectors, rejuvinators and conditioners for body, face, hands, eyes, lips, mouth, hair, nails and so on (see Figure 9.1).

As our knowledge of various afflictions of different parts of the body, particularly skin and hair, has increased, as well as our understanding of the action and interaction of various chemicals and plant extracts with different parts of the body, cosmetology has developed into a highly complex and specialized field of its own. The cosmetics industry has combined knowledge of pharmacology and dermatology, with traditional herbology, modern processing technology and most advanced marketing psychology in order to exploit one of the strongest instincts or needs of human-kind, namely that of being considered attractive and healthy in his/her narrower or wider social environment.

Though bee products are not essential to cosmetics, their characteristics add to the various care products in a way no other single product can. Many of today's commercial multichemical formulations are designed for marketing needs such as storage, or better appearance and consistency, rather than for the actual benefits of all these chemicals for the intended cosmetic application. At the same time, scientific and technological advances have reached a state of sophistication in which formulations can have real beneficial action on the skin, for preventative or restorative treatments. Thus, the distinction from pharmaceutical products, well defined by law, becomes less obvious.

Figure 9.1 : Display of various cosmetic products containing one or more primary bee products.

Using simpler formulations usually influences the consistency or durability of a product. However, a choice of simpler formulations and more natural products, variously considered an improvement or a regression, does not necessarily include a loss of benefits or quality. Many of the technological and scientific advances of the last decades can also be applied to such simpler formulations

Both high technology cosmetics and natural cosmetics have their drawbacks and benefits. High technology cosmetics are too expensive to produce on a small scale and many ingredients are too difficult and expensive to obtain, especially in many tropical countries. Natural products usually do not have as long a shelf-life as highly processed and preserved products, and are therefore also limited in their access to long distance markets. On the other hand, natural products can often be obtained locally - which often means lower prices with no need for foreign currency - their freshness may be easy to confirm and people are already familiar with such ingredients and know how to appreciate them. The freshness of such materials and of the final product, as well as their easier adaptation to local preferences can be additional selling points.

In order to produce products based on natural materials and to give them the appearance and consistency of high quality products, using a minimum of

technology, high quality ingredients and specialised knowledge are required. Home-made, small scale production is possible, but will not usually achieve the same technical quality as products processed with better facilities.

Considering quality in the sense of effectiveness, it is possible that home-made products can be of superior quality, particularly if most or all of the ingredients such as herbal extractscan be produced under controlled conditions at home as well. Again, however, a basic understanding of the different ingredients is necessary, in order to treat each in an appropriate way and maintain those characteristics for which they were selected in the first place.

Going back to the basic benefits derived from cosmetics, a much simpler approach than the high technology, high sales "make believe" approach, is possible. The purpose of this chapter is to present some basic ingredients and formulations for the different cosmetic applications in today's market, selecting more natural ingredients and providing the choice of substitutes available in various countries. Emphasis is given to understanding fundamental production principles. Very simple basic techniques are presented and contrasted with some intermediate technologies available to improve product quality. Finally, some marketing aspects will be discussed in order to present the formulated products on a

competitive basis.

The cosmetology presented here is adapted to cold climates and white Caucasian skin. Other cultures prefer different colours and products - even requirements for skin or hair change between different climates and human races. However, it is assumed that such basic functions as moisturizing, nourishing, protecting, soothing and cleaning are similar enough to permit similar formulations. This is felt to be true particularly since the specific addition of bee products for such purposes adds a much broader spectrum of action than is possible with synthetic ingredients.

Discussion of the quality and other characteristics of various bee products as ingredients has been included in the individual chapters on each primary product. Other details necessary for the final products are included in the recipes. Every cosmetic product class is discussed briefly. General considerations on the actual manufacturing process are discussed in a separate section, detailing each production process and outlining the utility of appropriate equipment.

While there are many books and articles published on the various cosmetic formulations using beekeeping products, only a few recipes can be selected for

this bulletin. More emphasis is given to methodology, technology and the understanding of basic needs, thus allowing replacement of various hard-to-come-by ingredients and encouraging experimental adaptation to suit local requirements.

9.2 Description of product types

9.2.1 Lotions

A lotion is a fairly liquid, i.e. acqueous, formulation with a high water or alcohol content, but still having many similarities with creams. In general, lotions are used for cleaning and for adding moisture to the skin or the hair. Many of the aromatic waters of the past were used like lotions. As lotions, however, they may also contain substantial amounts of emulsified oil, fat or wax (see Figure 9.2).

Figure 9.2 : Various lotions containing primary bee products and packed in dispensers for easy use.

An astringent lotion is useful for oily skin and causes pores to contract. The astringent ingredients can be one or more alcohols, witch hazel, citric acid (lemon juice), vinegar, alum, or a large choice of synthetic products. Friction lotions and skin fresheners (containing up to *50%* and *15%* of alcohol, respectively) may also contain astringents, but they mainly serve to cleanse and moisturize the skin. Suntan lotions and after-shave lotions, for example, have very specific purposes and therefore specific ingredients. Various lotion formulations are listed in the recipe section.

9.2.2 Ointments

Ointments and lipogels are not really creams because they consist of a single phase (for example, only oil). The classic preparation, using Vaseline, lanolin (wool grease) beeswax, mineral oils and/or vegetable oils, has been "modernized" by incorporating modified vegetable and animal oils, preservatives and stabilizers (e.g. hydrogenated ricinus oil). The addition of stabilizers to ointments leads to the formation of lipogels.

New choices of oils, fatty acids and triglycerides can make ointments less greasy and easier to absorb, but they are not very common in modern cosmetics. Some are employed in pharmaceuticals, and the use of beeswax carries additional benefits in these. However, it must be pointed out again that by law, cosmetic products cannot contain any pharmacologically active substances, or claim any medicinal effects.

9.2.3 Creams

In technical terminology, there are clear and not so clear distinctions between a large number of different types of creams. They are classified by the nature of the

emulsion (clear) and the purpose of application (not so clear, since very similar or equal formulations can have different applications).

The most common type of emulsion is oil emulsified (dispersed) in water (o/w) and water emulsified in oil (w/o) (see also section 9.4.3). Cold creams require beeswax and are the most basic, yet possibly the most important cosmetic creams. Being w/o or w/o/w (water in oil in water) emulsions, cold creams are oily or greasy to the touch and produce a cooling effect on the skin, as the water slowly evaporates. Incorporating new synthetics, water in oil emulsions have been developed for nutritive, restorative, protective, water-repellent and sun-protecting purposes, for all types of skins, baby care and massage. Modern cosmetics however, tend to replace these less stable w/o emulsions with w/o/w emulsions, on magnesium sulphate bases, or even with o/w emulsions with high lipid contents. The appearance and feel of a cream, its effectiveness as a moisturizer and carrier and adhesive for colours depends on the emulsion type and pH as well as the type of oils, fats, alcohols and esters used.

Some of the more generic creams currently in use include cold creams, emollient creams (for soothing and skin softening), hand creams (for moisturizing and protecting), face creams (for more gentle moisturizing, nourishing and cleansing),

bath creams (slightly astringent, for moisture sealing and replacing lost lipids), moisturizing creams (for providing moisture, moisture sealing and soothing), nourishing creams (containing vitamin and protein complexes, oils and other nutrients) and cleansing creams. Creams for more specific applications include depilatory creams, foundation creams for use under make-up, night creams, rejuvenating creams, antiwrinkle creams, sun-protection creams, shaving creams and medicated creams (for applications in dermatological disorders, inflammations and wound healing).

The selection of ingredients depends very much on the final purpose and the desired consistency (creamy, hard, soft, greasy or dry) of the product. Changing one ingredient may require changes in many others if the physical characteristics of the product are to be maintained. The diversity of applications and the choice of ingredients (mostly synthetic or modified natural products) is simply too large and too complex to be discussed here in detail. As a general guideline, the different oils, fats and waxes are chosen for their consistency and absorption characteristics, their mixability with other ingredients and for their function in protecting and providing moisture to the skin. Some oils may also be nourishing for the skin, give it special elasticity and br readily absorbed. Different types of applications often require only slight changes in the proportions of ingredients,

but sometimes, more specific ingredients have to be added to achieve the desired effect. Classifications often overlap and definitions are not used by everyone in exactly the same way (see Figure 9.3).

The aqueous (water) phase of the emulsion provides moisture to the skin, serves as a solvent or carrier for other ingredients including dyes, allows the use of gels or polymers and, in general, helps to determine the consistency and shelf life of the product.

Figure 9.3 : Various types of creams containing primary bee products.

Emollient creams in particular are used to soothe and soften the skin by providing

substances the body normally produces through its skin gland secretions. Among these sebum, secreted by the sebaceous glands, is important for its protective function. Fatty acid glycerides are abundant components of human sebaceous secretions (50%) and skin surface lipids constitute 5.5 to 37.5 %. These can be provided through incorporating one or several of many vegetable oils such as peanut, safflower, olive, avocado, corn, castor, cottonseed, sesame, peach, apricot kernel, palm kernel, coconut and hydrogenated vegetable oils and cocoa butter. One problem is the rapid degradation of these oils - they quickly become rancid if they are not refrigerated. Addition of antioxidants such as propolis extract can retard such decay. Industrial synthetic substitutes exist and are continuously being improved. In addition to the above-mentioned fatty acids and lipids, sebum also contains 14% waxes, 2% free cholesterol, 2.1 % cholesterol esters, 5.5 % squalene, 8.1 % branched paraffins, 2% alkane diols and 5.1 % of unidentified substances (Wheatley, 1950).

9.2.4 Shampoos

Shampoos are liquid, creamy or gel-like, depending on the inclusion of traditional soaps saturated with glycerides and natural or synthetic fatty alcohols or on the thickening agents (e.g. gum, resins and PEG-600D5) that are used.

In general, a shampoo is a colloidal dispersion of surfactants (substances which reduce the surface tension of a liquid) in water. Shampoos can have other substances incorporated which have a restoring and protecting effect on hair, such as natural and modified lipids, amino acids and silicones, or have a reconstituting effect on the integrity and health of the hair and scalp - such as preventing dandruff and excessive sebaceous secretion.

The actual procedures and equipment to be used must be adapted to the type of product required. Some shampoos can be mixed at room temperature simply by adding the ingredients one after the other and mixing them well. In other shampoos, the dissolution of various components will require the use of heat.

The demands for mixing are similar to those for other preparations. The product should be mixed well, in a blender which leaves no "dead", i.e. non-agitated, spaces. Since shampoos are not emulsions, speed is not very important, but a mixture prepared slowly and reaching a uniform consistency without excessive inclusion of air, is better than one prepared quickly, with a lot of included air. If the product is very liquid, has a reliable anti-oxidant and there is enough time and storage space to wait until the air bubbles have separated and the air has escaped, there should be no problem with such aeration. Alternatively, if there is

insufficient time or space, or the product is fragile, the following precautions can be taken to avoid inclusion of air. The product should be:

- mixed slowly by hand or at very slow speed with a blender, if the blades are not fully and continuously immersed in the liquid;

- thickened only after mixing and settling of air bubbles;

- heated to 30� or 35� C before draining.

Almost all primary bee products can be added to shampoo or after-shampoo balsams and conditioners, because of their beneficial effect on both the hair and scalp. Aqueous extracts of propolis however, mix better than those extracted with concentrated alcohol.

9.2.5 Soaps

Soaplike substances, usually extracts of special plants, have been used since ancient times. The Gauls of northwestern France prepared soap using animal fats, wood ash and calcium hydroxide (burned limestone plus water). However, they

used it as a cosmetic. Galenus, a physician in the second century of the Roman Empire, apparently for the first time in Europe, indicated the use of this type of soap as a detergent in place of the lyes used previously. Until today, traditional soapmakers use the same three basic ingredients as the Gauls. Progress in the nineteenth century advanced the scientific understanding of soaps and led to industrial production and significant modification of the basic recipes. Today there are liquid soaps, bar soaps, powdered soaps, bath soaps, shampoos and medical soaps in all colours, shapes, consistencies and odours.

Making soap is fairly simple, but making coloured and perfumed soaps for various cosmetic applications is a little more complicated. Soaps made from animal fats rather than glyceric acids, are of higher quality. These soaps are re-melted several times to clean them and are finally dried to obtain a high content (72%) of fatty acids.

Industrial soaps for further processing are usually available in small pellets. Toilet soaps with a low glycerol (= glycerin) content (less than 1 %) are opaque, while those containing about 6% are translucent. This provides scope for the use of different pigments to achieve various colour effects. For large scale production, the pigments are mixed or tumbled with the soap chips before or after the

addition of glycerol, fragrance, moisturizers and other additives. The mix is refined in a three-roller mill or "plodder", a special soap extruder and pelletizer. This is repeated several times if necessary. Refining is the dispersal of all the ingredients throughout the body of the soap. After refining, the soap is extruded and pressed into moulds.

For small scale production without extrusion, the soap should be melted for mixing with other ingredients and then be poured into moulds. Decorative moulds of different shapes (rather than the conventional square chunks) will look much more attractive (see Figure 9.4). This is particularly important if the soap is to be sold as a special beauty soap, and has to compete with others on the market. Adding pleasant fragrances will improve the attractiveness even further.

Most of the soap recipes given in this chapter begin with a prepared soap base. For small quantities, clean bar soap can be used. For medium and larger scale production, soap chips can be obtained from a local soap producer. For the addition of fragrances and colours, the most basic white or clear soap available should be obtained. However, white soap may already contain titanium oxide pigments, which may reduce the effectiveness of other added pigments. For simplicity, the colouring may be omitted or pre-coloured soap can be used.

Figure 9.4 : Various attractive and decorative shapes of soap formed in special moulds.

9.2.6 Toothpastes and mouth rinses

Toothpastes, by definition and common usage, are mild cosmetic detergents for cleaning teeth. Initially intended to freshen the breath and remove deposits from teeth, evolution of toothpaste has also made it a vehicle for the protection of teeth from caries and gum diseases.

The base recipe for toothpaste contains an abrasive, a detergent, a non-drying liquid, a binder, flavour, colouring and a few other additives such as preservatives, antiseptics and astringents. Formulations are relatively complex and poorly made pastes will separate, harden or liquefy.

Bennett (1970) describes the ideal abrasive as one that will not scratch the tooth enamel and yet will exert sufficient scouring action to clean and polish teeth. It should not react with the other ingredients, spoil the taste or appearance of the toothpaste nor segregate or lump with aging. Suitable abrasives include precipitated calcium carbonate, magnesium carbonate, bentonite, kaolin, chalk, silica, talc and tin oxide. Any abrasive that is used must be very finely ground. Because of the undesirable action of soaps on saliva, regular hard and soft soaps

have largely been replaced by glycol, diglycol stearate and synthetic surfactants. Synthetic surfactants are usually also better emulsifiers, with better cleaning powers and lower alkalinity. Carriers and softeners, used to suspend the abrasive and prevent drying of the toothpaste, include alcohol, honey, glucose, invert sugars, mineral oil, water and calcium chloride. Binders, also incorporated as carriers and colloiding agents, include acacia, locust bean, India and Karaya gums, agar, colloidal clays, pectin, petrolatum, silica gel and starch. If binders are plant products, they must be adequately preserved.

Bad breath, caries and gum diseases are mostly a consequence of bacterial growth in the mouth. Therefore, an effective toothpaste should have an antiseptic component which preferably, should not destroy the beneficial mouth flora. Propolis is a mild antiseptic, well suited for this purpose and honey is a good sweetener, since it was demonstrated that artificial sweeteners have been shown to have non-beneficial side effects such as, for emample, the promotion of caries. The addition of fluoride for protection against caries, has been and still is controversial, but it is widely practised anyhow.

Mouth washes are mostly alcohol-based mixtures, with antiseptic, astringent, flavour and colour additives. While their purpose is primarily to freshen breath,

they can only be effective if they destroy some of the bacterial flora of the mouth which caused the bad breath in the first place. Hence, propolis is an obvious and mildly flavoured choice ingredient.

9.2.7 Deodorants

Deodorants are designed to absorb, change, mask or prevent any unpleasant odours. Those used for cosmetic purposes are presented in soap, aerosol, cream and roll-on gel forms. The active ingredients comprise fragrances (or aromatic extracts), astringents, antibacterial agents and drying agents which interrupt the normal functions of sweat glands. A deodorant should dry quickly without leaving a greasy film. The solvents and thickening agents are selected for the method of application. One-time aerosol applicators using various driver gases should be avoided; they not only require expensive containers and filling equipment, but can also present an environmental risk. Mechanical dispensers for spray application work well and can be refilled by the customer or retailer.

Though less radical than most synthetic microbiocides, propolis extract is well suited as a deodorant ingredient, because of its bacteriostatic characteristics and for its pleasant smell.

9.2.8 Facial masks

Facial masks serve as many purposes as skin creams. Many preparations for easy application or home use are available on sale, but face masks are frequently prepared by beauticians themselves, just prior to use. Many of them have their own preferred recipes since it is possible to prepare them with a very wide variety of ingredients, particularly fresh ingredients which otherwise are too perishable. Less stringent restrictions in certain performance standards such as consistency and shelf-life, allow much freer use of primary bee products, all of which can be beneficially included in face masks. Thus, although it may be difficult to market the ingredients on a large scale, certain beauty salons and cosmeticians can prepare some of the formulas from the recipe section and all could include honey, royal jelly, propolis and pollen extracts in their own preferred formulas. However, precautions should be taken against any possible allergic reactions in customers.

Honey in these formulations serves as a moisturizing, cleansing and nourishing agent. For similar reasons, any of the other bee products can be included in those masks intended to refresh, nourish or cleanse the skin. Selection of the right be product for the right application can be made with the help of Table 9.1. Since the actual consistency or stickiness of many preparations is not very important, the

precise proportion of bee products are not important either and there is plenty of scope for experimentation.

Table 9.1
Summary of the cosmetic functions of five primary bee products (modified from Proserpio, 1981 and 1988)

Product	Cosmetic function
Honey	Sweetener, emollient, moisturizer, humectant, tonic, refresher, anti-irritant, skin softener, epithelial reconstitution and soothing agent
Wax	Excipient, protectant, film formant, water repellent, sebum restorant, depilatory, anti-irritant and emollient

Propolis	Antidandruff and anti-wrinkle agent, hair conditioner, deodorant, purifier, tonic, disinfectant, antioxidant, preservative and UV screen
Pollen and royal jelly	Anti-wrinkle, anti-stretchmarks, elastifier, nutrifier, firmer, revitalizer, hair conditioner, tonic and sebum equalizer, tanning aid (pollen only)

9.2.9 Make-up

The use of make-up includes a wide variety of applications and can be understood in a very wide sense as referring to all facial cosmetics, including actors' face paints. The make-up referred to here however, will be those facial preparations which temporarily change the appearance of part or all of the face, such as rouges, mascara and eye shadow. Lipsticks and various facial creams are

considered separately.

Mascara is usually a black, sometimes bluish or dark brown paste or fast drying liquid, which is applied to eyelashes and eyebrows. Being one of the oldest make-ups, it was once prepared with oil and lampblack (from oil and later gas lamps). A sample formulation using beeswax is provided. Mascara is frequently packed with an applicator such as a special brush. Eyebrow sticks are generally simple in composition, but usually need to be heated and pressed into the right shape.

A good foundation cream protects the skin from the colouring of the make-up and makes it easier to apply, adhere and remove. Eye colouring can be applied in cream, stick (pencil) and powder form, each requiring essentially different formulations and processing. Creams use rather complex wax and oil mixtures to produce a durable, non-smearing, easy- to-apply colour. Pencils and sticks may be extruded, or poured into forms and dried, and powders are usually pressed with high pressure into pallets or containers.

As discussed in slightly more detail below (see section 9.4.5) pigmentation of cosmetics is quite complicated. The choice is also limited to a few types of permitted pigments and dyes. Pigment choice will depend on the type of

formulation, i.e. a dry powder, cream or pressed cake. The preparation of make-up colours also requires a base which adheres well to the skin and spreads easily. There are innumerable patents for different formulations, some of them including low levels of beeswax (1 to 5 %) or other waxes which could be replaced by beeswax. One eye colouring cream formulation is described below (section 9.13.11), but its effectiveness in adhering to skin is based on two special chemicals. Pigment producers can sometimes help with certain formulation and production problems.

9.2.10 Lipsticks

It is known from archaeological discoveries that even before Egyptian times, people used red dyes to stain their lips. During the time of the Roman and Greek Empires, these stains were applied as lip pastes and liquids. Only after the beginning of this century did solid lipsticks come into limited use. Yet, only after colouring became more effective and allowing more permanent stains, but most of all permitting more natural colours than the bright carmine red, did lipsticks become socially acceptable. Since then, fashion and pigment development have determined the colours (even conspicuous ones again) which have led to today's lustrous, pearlescent and frosted shades.

Lipsticks are made of a relatively complex mixture of waxes and oils. Some of the ingredients are modified in order to obtain a soft lipstick which maintains its form even at warmer ambient temperatures and which forms a good base for the pigments. A modified beeswax (PEG-8) is used in one of the selected recipes, where the gel-forming characteristics of the modified beeswax is increased with triglycerides from fractionated coconut oil. The lipstick formulations given in the recipe section (9.13.12) involve base formulations with different degrees of complexity. The simplest are soft and creamy lip glosses, for which one recipe is given in section 9.13.12. Mixing these formulations is not very difficult and they can be poured into forms and mounted in typical lipstick dispensers. To market a product successfully however, the colour of the lipstick should be constant from batch to batch.

Mixing the correct amount of pigments every time and getting the desired colour is an art of its own and requires good laboratory equipment. There are colour chemists who specialize in only this aspect. Expensive measuring devices can be used to compare all aspects of a colour and to ensure exact correspondence between batches. Since lipstick or its ingredients must be non-toxic, not just any pigment can be used (see section 9.4.5).

9.2.11 Perfumes

Perfumes will not be discussed here as they do not normally contain beekeeping products and since they require production technologies and knowledge very different from those described here.

9.3 Sources of ingredients

9.3.1 Local sources

Extracts from many plants can be used as emollients which soften and soothe the skin, such as from cattail root (Typha) fig fruit (Ficus) Jimson weed seeds (Datura) locust flowers (Robinia) lotus root, leaves and seeds (Nelumbo) Hibiscus seeds (also used as an as astringent and various others (Krochmal, 1973). Synthetic emollients are extremely common, but beeswax, other waxes, vegetable oils, and animal fats and oils also perform very well.

Pigments and dyes, powdered or extracted from local plant resources can be included in coloured preparations, if they are soluble in at least one of the phases of the formulation. Natural dyes, while very attractive on their own, can hardly

compete with the brilliance and variety of synthetic pigments. However, natural dyes and pigments are generally, though not always safer to use.

The European Union (EU) and the US Food and Drug Administration (FDA) have published lists of natural pigments and dyes which are allowed in food, pharmaceuticals and cosmetics. Care has to be taken that local dyes and pigments are not toxic and do not cause allergies or other irritations. Pigments should be of a sufficiently small size so that they do not separate in the final product. Dyes which are soluble in the liquid phase (unlike insoluble pigments) should not stain permanently. But, as in lipsticks, some lasting colouration of the skin is desired to achieve a minimum of durability. It is probably the easiest to find out which of the locally available natural dyes and pigments have already been tested for compatibility by the larger producers, and use these.

One of the problems associated with using natural plant or animal extracts is their often inconsistent composition or quality, together with the possibility of contamination and interactions of the complex ingredients. Side-effects on skin are rare, except for fragrances, there are also several plants known for their irritant reaction. Dorato (1987) gives a short discussion of various water-soluble plant extracts, though mostly of temperate climate origin. He describes the

current trend in phytocosmetics (those using plant extracts) towards the use of standardized extracts or pure compounds for the simple reasons of more constant performance and less difficult analysis and quality control.

9.3.2 Imported

Although an attempt has been made here to provide some alternative formulations using commonly available products, specially refined raw materials are better for high quality production. Synthetic materials in particular need to be of a purity superior to that required for most other applications, so it is often best to obtain supplies from special cosmetic suppliers. Food quality products can usually be used safely in cosmetics.

A list of international suppliers of special ingredients, equipment and books should be consulted. The CTFA (Cosmetic, Toiletry and Fragrance Association) publishes the International Cosmetic Ingredient Dictionary with common, scientific and commercial names together with a list of suppliers. Information on "Emulsifiers & Detergents, Functional Materials" is published by McCutcheon's Division. The Cosmetic Bench References published by Cosmetics and Toiletries Magazine have a long list of suppliers of natural and synthetic and specialized

materials, testing and formulation laboratories and equipment suppliers. Their addresses can be found in Annex 2. Other sources are the commercial attaches of various embassies, who can give information on suppliers from their respective countries. Many international suppliers have subsidiaries around the world. Purchases through these subsidiaries will eliminate most importation problems.

The first few importations will take a lot of time and effort to obtain all the necessary permits, letters of credit and of course the foreign exchange necessary has been obtained. Insurance of expensive shipments may not cover the merchandise after arrival in the local port harbour. These transactions might become smoother and quicker with experience and after regular trade with the suppliers. Orders for supplies should be timed carefully, in order to avoid unproductive periods because of the delayed arrival of one or more ingredients and spare parts.

The simpler the formulation used, the less need there should be for importation of ingredients. If the quality of the local ingredients is not adequate, the user should work with the producer to improve his quality of production.

9.4 Technical requirements

9.4.1 Raw materials

In general, only the cleanest and freshest products should be used. Vegetable oils, vitamins, proteins, royal jelly, pollen, some plant extracts and aromatic oils have limited shelf-lives, and need special storage (refrigeration) or should be used quickly. To save work when using only very small quantities, the oil and water phases of a product may be prepared in advance, minus the aromatic oils, herb extracts and royal jelly. The different phases are then mixed only when more product is needed. Once mixed, the emulsions provide a much better medium for bacterial or fungal growth. The addition of propolis extract to the water phase acts as a mild preservative and antioxidant.

Water should be distilled or soft (with insignificant levels of bicarbonates or sulphates) and clean, rain water is preferable. Under most circumstances the water should also be boiled prior to use. In cities with piped drinking water, such water is often treated with chlorine, fluoride and other additives which can react negatively in some preparations. Even after boiling and filtering, this water would be second choice to rain water. Rainwater collected in heavily polluted areas should not be used. Distilled or deionized water is used in many industrial products.

9.4.2 Equipment

For simple home made production, little more than normal cooking utensils are necessary. The following list describes the essential items of equipment, some of which are illustrated in Figure 9.5. An example of a small area devoted to cosmetics production is shown in Figure 9.6.

For slightly larger operations better mixing equipment is most essential, as is a refrigerator. A water jacketed mixer (see Figure 9.7) would be very helpful, providing better emulsions and mixing of creans during cooling. Better bowls and glass containers for measuring and mixing would also be required eventually (see Figure 9.6). Litmus paper for controling the pH will be needed for checking quality standards. A mortar and pestle are always useful, particularly for grinding pigments. Once serious marketing is considered, bottles and vials have to be selected in which each product type is adequately preserved and presented. Additional equipment (mills, driers and bottling machines) depending on the particular products to be produced may be needed. A battery heated wire or normal current operated machine to seal clear polyethylene bags may be useful for packing products such as individual doses of soaps, shampoos or bath foams and many other value added bee products.

Figure 9.5 : Basic kitchen equipment necessary for preparing simple cosmetic products.

Figure 9.6: a) Working area with heating plates, mixing and weighing equipment for medium-scale operations.

Figure 9.6: b) Convenient containers, beakers and other wares for medium-scale operations.

9.4.3 Emulsions

An emulsion is a suspension of one material finely dispersed in another, but

without the formulation of a conventional solution. Milk and royal jelly are natural emulsions in which an oil phase is dispersed in water. In cosmetic preparations with at least two non-mixable phases, such as oil and water, the two phases are mixed at very high speed with special blades (see Figure 9. 9d). In an oil/water emulsion, the internal phase (the oil) is broken by the high speed mixer or turbine into droplets so small that they remain suspended without uniting again to form larger droplets. This emulsification is facilitated by the addition of emulsifiers. The smaller these droplets are and the better they are mixed, the longer the two phases remain emulsified, i.e. the more stable the emulsion is. Industry standards generally require an emulsion to be stable for at least 1 or 2 years.

Such stability and the success of emulsification depends on a variety of factors such as the quantity and efficiency of the emulsifier (such as borax) temperature (during and after emulsification) the sequence of addition of other ingredients, mixing techniques and the design of the equipment.

Borax is a traditional emulsifier for oil-based creams and works best for all smaller operations and simple recipes. There is a very large number of other emulsifiers available, both synthetic and natural. For further information, Emulsifiers &

Detergents, Functional Materials or other basic cosmetic textbooks should be consulted.

Figure 9.7: A simple, small to medium size paddle mixer with water jacketed bowl for temperature control of the mix. During operation, the paddles are equipped with plastic scrapers which allow very close contact between paddle and vessel, thus avoiding any "dead" spaces.

The emulsification processis one of the major difficulties encountered with small-scale production. Simple hand stirring may appear to be sufficient to disperse the two phases, but such emulsions are often unstable and can separate after a short period of time (see Figure 9.8). If parameters such as temperature of the two phases, choice of emulsifier and storage temperature are optimized carefully, product stability should be sufficient for local marketing. Numerous small batches, rather than one big one will reduce requirements for emulsion stability, but might

raise marketing and distribution costs.

Figure 9.8 : On the left, a vaseline-propolis ointment which was not properly emulsified. Droplets of propolis extract are separating from the vaseline and give the cream a defective appearance. On the right, a well-

emulsified cream (o/w) with emulsifier and proper processing, shows no sign of separation after more than one year of storage.

There are basically four types of emulsions: o/w, w/o, w/o/w and o/w/o:

In an o/w emulsion, oil droplets are dispersed in water and the water is referred to as the external phase. An o/w emulsion does not necessarily consist of more water than oil. The sensation of such an emulsion is "lighter", thinner and fresher, although the final sensation can be influenced by other ingredients such as resins, triglycerides, silicone oils and biological polymers. It is said that the finely dispersed oils and waxes, with their very large increased surface area, can penetrate the skin surface more effectively.

A w/o emulsion consists of droplets of water emulsified in oil. The oily or greasy external phase comes into contact with the skin first, resulting in the "richer" sensation given by such creams. However, today's cosmetic chemistry has evolved far from the classical Vaseline or petrolatum base, and fatty acid esters, triglycerides and oils can now be modified so much that the sensation and absorption by the skin can be accurately controlled. Evaporation of the water from w/o emulsions is slower and it is possible that some is absorbed into the outer layers of the skin.

The w/o/w and o/w/o emulsions are basically combinations of the previous two types. Such multiple emulsions are sometimes required to mix otherwise incompatible ingredients together.

A general problem with emulsions is that the more water they contain, the more susceptible they are to contamination with microorganisms. Very hygienic working conditions and in most cases, the addition of anti-microbial ingredients, are required to protect the emulsions from degradation by such organisms. Adding bee products such as royal jelly, pollen and honey, which cannot be effectively sterilized without losing their beneficial characteristics, also adds a wide array of microorganisms. Beeswax and propolis extracts however, provide

some protection. Even royal jelly and honey have some antimicrobial activity, which are unfortunately, weakened by extensive dilution. A multitude of synthetic preservatives are available.

9.4.4 Mixing

Proper mixing of the ingredients is of the utmost importance in the production of stable cosmetic products. Whether it consists of an emulsion or not, the product should be homogeneous. This is often not easy and may require expensive equipment for medium to large scale operations. The sequence of adding ingredients to each other is, in many cases, also very important because of differences in their compatibility. Adding thickeners, gels and resins affects the mixability and choice of equipment. Sometimes, the order of mixing ingredients must be changed to suit the type of equipment available.

Thus it is, for example, important to mix the various ingredients with their respective solvents prior to emulsification, particularly if the solvent is the dispersed (suspended) phase in the emulsion. Solubility is important for all ingredients, but particularly for ingredients such as fragrances, which have to be added after the emulsion has been formed.

For batches too large to handle efficiently in available mixers, smaller batches can be premixed and then combined. This is particularly useful for hand mixing or paddle mixing of viscous materials which require thorough emulsification.

The inclusion of air during stirring can cause problems, in the appearance and oxidation of the product. Slower stirring, assuring complete submersion of paddles, longer storage or expensive vacuum agitators are the solutions discussed in section 9.2.4 and below. Under high-speed mixing for emulsification, air inclusion is a serious problem than for liquid, non-emulsified, slow-stirred shampoos. Air enclosed in viscous creams will not easily settle out. Special mixer designs and mixing under vacuum are the primary means by which air inclusion is avoided without compromising the efficiency of mixing or emulsification. Mixers must not allow any "dead" spaces where the product receives no agitation. For this reason, mixing containers are usually bowl-shaped and mechanical mixers have plastic spatulas on the outer paddles to scrape the vessel wall with each rotation.

It should be apparent that choosing the right mixer for the right type of product is important, since it influences product performance, appearance and stability. A few alternative mixing systems are described:

Hand stirring

Hand stirring with a spatula is the simplest form of mixing. For hand stirring, a formulation providing easy dispersion is required. The ease of dispersion is not necessarily related to the stability of the product.

Aeration

Aeration or stirring by means of bubbling gas or air through the formulation is not much more efficient than hand stirring, unless extremely large volumes of gas are used. The use of air (or steam) is more practical in low-fragile, low-viscosity systems.

Paddle stirring

Mechanically rotated paddles or anchor type agitators are a suitable way of stirring. Mechanical rotation of paddles is usually slow and the efficiency of agitation is good only for very viscous emulsions, like those containing soap gells, resinous materials and large amounts of solids.

Planetary stirrer

In a planetary stirrer, the paddles rotate around their own axiswhile that same axis follows a circular movement around the container. In this way, a large batch may be mixed more thoroughly. The planetary stirrers, similar to the simple paddle stirrer, is especially suitable for the highly viscous fluids (honey) frequently also used in the food industry.

Propeller agitation

One or more propellers are mounted on a common shaft in a mixing tank. Modifications include variation in the location of the propellers in the tank, the use of two or more propeller shafts and the use of complex propellers. The inclusion of fixed baffles on the tank wall or adjacent to a propeller increases the efficiency. Propeller agitation is more commonly used for low and medium viscosity liquids. The system is also suited for small scale laboratory equipment.

Turbine agitator

Turbine type agitators are available in various sizes and designs, with different

speeds and various rotor-stator clearances. Turbine type systems may be designed to give a very high degree of shearing action. Turbines may be used with higher viscosity fluids than propellers, but in high viscosity batches, the gross agitation may be insufficient and a combination mixer of various systems would be more effective.

Turbine-propeller combination agitator

A more complex mixer for producing better emulsions is pictured in Figure 9.9. In a water-jacketed bowl, several blades or paddles are slowly mixing the mass while a special high speed turbine at the base of the central axis agitates the mix at the bottom. The high speed rotor of the turbine hits the droplets of the internal phase and breaks them into much finer droplets for better emulsification. Droplet size is influenced by the turbine design, the rotor-stator clearance and the rotor speed.

Colloid and roller mills

Both types of mill are usually used for pigment dispersion and not for grinding or reducing pignment size. In the colloid mill, the product is forced past a fast

spinning rotor. Clearance between the stator (the non-moving part) and moving rotor is usually a few hundredths of a millimetre. A roller mill often consists of three rollers which move against each other at different speeds. Clearance between these rollers is extremely small as between the rotor and the stator of a colloid mill. Today, this type of milling is avoided where possible for o/w emulsions, mascara and make-up foundations because of the relatively high moisture loss during processing. In such situations, a colloid mill or a turbine agitator are preferred, in combination with a mixer. If, for example, the latter attempts at mixing are not satisfactory, the pigments can be dispersed by hand or in one of the available mills in a small fraction of the oil phase, and then added to the res tof the mass shortly before or after the emulsification.

Homogenizer

In a homogenizer, emulsification is effected by forcing the two phases tpast a spring-seated value.

Pebble and ball mills

Pebble mills, ball mills and other grinding equipment are frequently used for

pigment suspension. They represent a class of relatively low speed equipment both for emulsification and for mixing dry materials. A cone-shaped container containing the product and several ceramic or metal balls is agitated. The action of the balls breaks up the pigment agglomerations and disperses them.

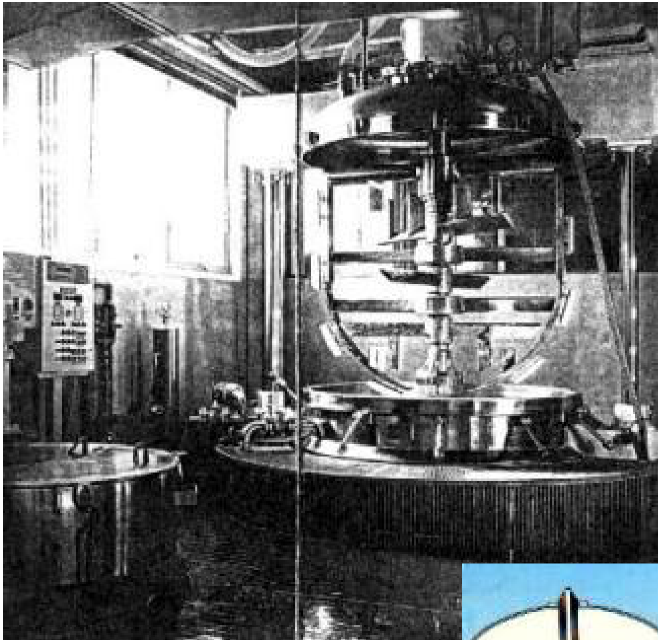
Stirring under vacuum

Sometimes, mixtures are agitated under vacuum. This largely avoids inclusion of air bubbles which may themselves become emulsified in the liquid and therefore become very difficult to remove. As discussed in section 9.2.4 under shampoos, slower and more careful stirring and longer storage of low viscosity fluids can provide cheap alternatives for small operations.

9.4.5 Colouring

The US Food and Drug Administration has classified organic colours as Food, Drug & Cosmetic colours (FD&C) Drug & Cosmetic colours (D&C) and External Drug & Cosmetic colours (Ext D&C). Only FD&C and D&C certified colours can be used for lipsticks. Inorganic colours only need to conform to purity specifications. The EC uses the prefix E for all colours approved for food, pharmaceuticals and cosmetics

which might come in contact with, or enter the digestive system. The Cosmetic Directive of the European Community (76/768/EEC) sets industry standards in Europe. The CTFA keeps updates on newly admitted dyes and pigments and their permitted uses. Some speciality suppliers of cosmetic pigments of all kinds can be found in Annex 2. Each country though, may have its own regulations and list of permitted substances. Before using any colouring, be it natural or synthetic, accurate information should be sought regarding the permissable uses. This is true for all ingredients and in particular for anti-microbial agents or other preservatives.



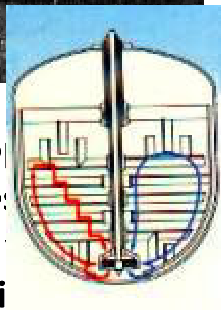


Figure 9.9: a) a large complex prop rbine vacuum mixer, removed from the ves er frame rotates to remove material from the he three horizontal propellers provide the mai nd at the bottom is a high speed turbine mixer. These mixers come

Figure 9.9: c) Diagram of product

flow in a complex mixer.

Figure 9.9: b) Small desktop model of a vacuum mixer.

Figure 9.9: d) The rotor (left) and stator (right) of a turbine mixer (All photographs courtesy of Pressindustria S.p.A.).

Since colouring cosmetics, particularly lipsticks and makeup is very difficult, experiments should first be made with very simple mixtures of dyes and pigments. A due is a colouring agent which dissolves in the base solvent of the product whiled a pigment remains partly, or completely, insoluble in the respective base material. Lipsticks, for example, require dyes or pigments which stain the skin, i.e. interact with the skin to form longer lasting colouring effects. Such interactions sometimes also change the colour. The degree of solubility of a dye or the dispersion characteristics of a pigment in the various solvents, are very important and have to be considered for any formulation.

Toners are pure, organic pigments, undiluted and without a substratum. Lakes are dyes precipitated onto a substratum which then becomes an integral part of the new pigment. Lakes are frequently used in lipsticks while both lakes and toners are commonly used in makeup.

Pigment powders range in size from 4 to 150 microns (~m); those above 90

microns, however, are considered large. These small particles often agglomerate, i.e. clump together. To improve dispersion, wetting agents and dispersants are used. Roller or colloid mills are used to break up agglomerations (rather than to reduce the size of the particles themselves) and thereby improve dispersion. Thinner oils are more effective in wetting the pigments, but if thickeners need to be added to the product, they are best added prior to milling.

Synthetic colours can be organic or inorganic pigments or dyes. Many of the inorganic colours are metal oxides and occur naturally. Their purification, however, at least in the case of the ubiquitous iron oxides, is very difficult. While some of these oxides can be easily manufactured and are the same as in regular paints (e.g. titanium oxide) cosmetic pigments have to be particularly pure, without the contamination by arsenic and lead found in industrial grade pigments. Carbon blacks and ultramarine blues are examples of colorants that are not metal oxides. Mica is used as a base for many pearlescent pigments. Alumina (aluminum hydroxide) is used as an extender for cosmetic pigments where opacity is not needed. Calcium carbonate, talc and various clays are also used as extenders.

Water-soluble dyes once in solution change colour when contacting certain metals

such as zinc, tin, aluminum, iron and copper. Accordingly, only stainless steel, enamel or glass containers should be used. If not used immediately, water soluble dyes, such as natural dyes should be carefully preserved, using cold storage or preservatives.

Organic colours are much more complex and are often derived from plants or animals. Worldwide, natural colours are extracted from numerous plant and animal species, but only a few are approved by the FDA and EC for cosmetic use. For exports of finished products such regulations have to be strictly adhered to. Since they are safety guidelines, they should really be observed by all manufacturers. If there is local knowledge about compatibility and reactions to local natural colours, they can be confirmed with experiments. Extreme care in tests with small amounts is recommended.

Speciality suppliers for cosmetic pigments of all kinds are listed in Annex 2. Suppliers will also help with certain formulations of products; otherwise specialized cosmetic literature should be consulted.

To achieve colour consistency from one batch to the next, extremely precise measurements and formulations are necessary. Objective colour comparison

according to international standards is possible with colourmeters.

Contents - Previous - Next

9.5 Benefits and applications of primary bee products in cosmetics.

Contents - Previous - Next

Beeswax

The actual uses of beeswax in cosmetics are associated with its following characteristics:

- **It is easily incorporated in w/o and o/w emulsions**
- **It is an excellent emollient and support for moisturizers**
- **It gives skin protective action of a non-occlusive type**
- **It gives good "body" (consistency) to emulsions and oilgels**
- **It reinforces the action of detergents**
- **It increases the protective action of sunscreens**

- **Its elasticity and plasticity improve product efficacy by allowing thinner films and**
- **It provides greater permanence on skin and lip surfaces**
- **It does not provoke allergic reactions[4]**
- **It is compatible with many cosmetic ingredients**
- **Even small quantities show the above effects of improvement**

For all the above reasons beeswax is very frequently used in the following cosmetic classes (see also Table 9.1 and 9.2).

- **cleansing creams**
- **cold creams and lotions**
- **emollient and barrier creams**
- **depilatories**
- **lipsticks - protective sticks in general**
- **nail creams**
- **sun protection products**
- **eye and face make up**
- **foundation creams**

Even in foaming cosmetics such as skin and body detergents, beeswax improves skin compatibility and reduces the aggressive properties of surfactants, while in shampoos and hair conditioners it improves the condition and the manageability of the hair.

Because of solubility and dispersion problems, beeswax cannot be employed successfully in aqueous or very dilute alcohol solutions. Otherwise, its only major drawback is its limited availability and sometimes erratic supply.

Beeswax is most commonly used in its bleached form, in order to facilitate colour control of the final product. Bleaching, described in section 4.11.1, destroys, among other things, the pleasant aroma of beeswax. For many products such as creams, the light yellow colour of clean beeswax should not be unpleasant at all. Many consumers might even appreciate an explanation of this "more natural" colour.

Honey

The classical for honey in cosmetics during ancient times was for beauty masks (honey, almond oil and plant flours) and for cold depilatory waxes (honey, resin

and beeswax).

Honey has an immediate moisturizing and soothing effect on dry skin and can reduce minor inflammations and itches. It also provides cutaneous relief, assists wound healing and restores natural skin moisturizing factors. Honey is also capable of retaining moisture content in a product over a wide range of relative humidities.

The possible microbiological decay of dilute solutions and the tacky feel of concentrated solutions pose the only limit to its wider use. Honey should not be sterilized or pasteurized prior to use since it will loose many of its beneficial characteristics. Variation in physico-chemical parameters with seasons and honey type are a minor drawback for industrial use. Dried, powdered honey is available for special applications.

Honey is used in the following types of cosmetics in the quantities (%) indicated (see also Table 9.1 and 9.2):

foaming products (soaps, shampoos, and foam baths)	0.5 - 5% and more

creams and other emulsions	1 - 4%
face packs and masks	3 - 8%
lip glosses, creams and sticks	1 - 3%
anhydrous (waterless) ointments and lipogels	5 - 15%

Any cosmetic formulation may be used as a guide, but it is a formulator's task to experiment until the optimal dose of each component (for product performance and quality) is reached. The addition of honey must be carried out at ambient temperatures with liquid honey in order to avoid degradiation of heat-sensitive substances. Heating to 40 or 42^{0}C is possible and facilites mixing substantially. Honey should be mixed homogeneously with a small portion of the product before it is added to the whole batch. Honey can be added to already prepared products or formulas, however changes in consistency and colour are to be expected. These may be corrected with appropriate changes in the formulation.

<u>Propolis</u>

The many beneficial characteristics of propolis, discussed in Chapter *5,* have

attracted the interest of the cosmetic industry. They include anti-bacterial, anti-fungal, anti-viral, anti-acne, anti-inflammatory and anti-oxidant activities in addition to its wound healing, epithelial and micro-circulation stimulation properties and topical anaesthetic effects. Its industrial use is only constrained by standardization and quality, the same problems that affect most other natural products and extracts. However, low toxicity and good skin compatibility have been demonstrated, despite a small risk of allergic reactions.

As a consequence of the above-mentioned beneficial effects, propolis is used principally as a deodorant and skin purifying agent, but it is also used as a preservative (see Table 9.1 and 9.2).

Propolis is normally used in one of its extracted forms. The choice of solvent depends on the final application. Concentrated alcohol extracts (EEP) are used for inclusion in the oil phase of products, and dilute alcohol or propylene glycol extracts (GEP) for inclusion in the water phase, or in foaming preparations. Glycerol extracts are also used, as well as extracts prepared with other solvents. Sometimes the solvent should be eliminated or reduced in order to avoid changes in the consistency of the formulation, as for example in the case of alcohol extracts used in certain gels.

Some of the functions, and associated applications for propolis in cosmetics, are listed below.

FUNCTION	APPLICATION
Anti-bacterial agent Anti-dandruff and sebum equalizing agent Anti-microbial and healing agent Anti-irritant and antibacterial agent Purifying agent Preservative Possibly as catching free radicals	Deodorants and antiperspirants Shampoos and hair lotions Anti-acnes and after-shave products Mouth rinses and toothpastes Cleansing crams and lotions In all of the above Anti-aging cream

Propolis extracts can be formulated at 1-5 % concentrations in ointments, in o/w

emulsions and most others, alcoholic solutions (mouth rinses) shampoos and foam baths. Higher concentrations can be used in toothpastes and soaps, but it should be noted that in alkaline environments, propolis will change the colour to dark grey. The possibility of allergic reactions should never be neglected and products should be marked accordingly.

Pollen

The functions and benefits of pollen in cosmetics are in some ways similar to those of royal jelly - they are still ill defined or unknown, but are generally accepted as nourishing and stimulating. However, because of the high allergy risk and its granular structure, unprocessed pollen is not favoured in the cosmetics industry. Glycol extracts or the lipid fractions of alcohol extracted pollen, and can also be employed in aqueous solutions and o/w emulsions (glycol extracts) or w/o emulsions and anhydrous formulations for lipid fractions (see also Table 9.1 and 9.2). Concentrations range from 1 to 5 %.

Where pollen is included directly (or alcohol extracts containing some of the colouring matter), the colour of the cosmetic may be affected. Treatment with diethylene glycol monomethyl ether may be used to discolour pollen and its

extracts (D'Albert, 1956).

Table 9.2:

List of the various formulations to which primary be added (modified from Proserpio, 1981). (-possible, ** easy)

Formulation	Honey	Wax	Propolis	Pollen	Royal jelly
Waterless, lipid pastes (ointment plus pigment)	*	**	* EEP, pastes	* lipid fraction	-
Ointments and waterless lipogels	*	**	* EEP, pastes	* lipid fraction	-
Waterless lipid fusions (sticks)	-	**	* EEP, pastes	* lipid fraction	-
Creamy w/o emulsions	-	**	* EEP, pastes	* lipid fraction	*
Liquid w/o emulsions	-	-	* EEP, pastes	* lipid fraction	*
w/o/w emulsions (cold creams)	-	**	* EEP	* lipid fraction	*
Creamy o/w emulsions	*	*	* EEP,	* glycol	*

			GEP	extract	
Liquid o/w emulsions	*	-	* EEP, GEP	* glycol extract	*
Transparent o/w emulsions	*	-	-	-	-
Hydroglyceric pastes (tooth paste)	*	-	** GEP, (EEP)	-	*
Aqueous pastes	*	-	* GEP	* glycol extract	*
Soft monophase gels	**	-	- (GEP)	-	-
Silico-glyceric gels (transparent tooth paste)	-	-	*	-	-
Aqueous and dilute, alcoholic solutions	**	-	* GEP, EEP	* hydrol. or glycol extract	*
Solid gels (sticks)	-	-	*	-	-
Liquid surfactants (liquid soaps, shampoos)	**	-	** GEP, EEP	** hydrol. or glycol extract	*
Solid surfactants (soaps)	**	*	** EEP, GEP	* lipid fraction	*

Royal jelly

Royal jelly is used in its fresh or freeze-dried form, and also mixed with a stabilizer such as lactose or glycine (see also section 6.7). Any form of royal jelly can be mixed with cosmetic products at temperatures up to 30 to 35� C.

The percentage incorporated in mixtures many years ago, when royal jelly was much more expensive ranged from 0.05 to 1 %, while today the level commonly ranges from 0.5 to 1 %. Its ascribed beneficial characteristics (Table 9.1) can be exploited in all preparations with which it will mix easily (Table 9.2) and particularly for dry, relaxed and aged skin. The lack of scientific support for such functions does not necessarily disprove its benefits.

Queen bee larvae

Only one indirect reference to the use of larvae could be found in DeNavarre (1962). It describes how in 1955, De Bevefer stabilized royal jelly with 25 % of sterilized queen bee larvae. This addition to royal jelly was said to potentiate and stabilize its action. In addition, two patents were granted for the direct inclusion of powdered queen bee "embryos" which is said to have effects similar to royal jelly (Swiss patent, 1957; D'Albert, 1958). The same report by DeNavarre mentions Rovesti's (1960) discovery of a trephonic substance in queen larvae, said to result

in effects equal to other embryonic extracts. These are very high priced ingredients for some cosmetic formulations. No use of queen bee larvae has been found in any of the reviewed formulations.

9.6 Buying

When buying ingredients for cosmetics, it is extremely important to obtain fresh, uncontaminated and clean products. It is usually difficult and expensive to sterilize a contaminated product without damaging at least some of its useful properties. Also, many contaminants cannot be cleaned sufficiently, particularly if the dirt has been dissolved in one of the ingredients. The buyer, therefore, often needs to supervise the production process of his raw materials, or give special advice on improvements to achieve the desired quality. In this respect, the processing and extraction of natural products can be particularly problematic.

Adequate testing facilities should be available and used for checking material, before buying and/or before using. This, of course, becomes more important and also more cost-effective when larger quantities are purchased. Reliable suppliers can save a manufacturer a great deal of time, effort and money. For addresses of some international suppliers, see section 9.3.2 and Annex 2.

9.7 Storage

In order to increase the useful life of a product under various circumstances, or in order to determine the possible shelf-life other than by experimentation, the following criteria have to be monitored:

- **the condition of materials prior to manufacturing**
- **the composition of the product**
- **the conditions for production and packaging**
- **packaging materials**
- **storage conditions**

These considerations are discussed in detail in the section on quality control (9.8) and in the section on packaging (section 9.9). Various forms of deterioration for the individual ingredients are summarized in Table 9.3.

Table 9.3
Degradation and preservation of cosmetic ingredients

Ingredients	Degradation	Prevention

Unsaturated lipids, natural and synthetic	Rancidification, oxidation	Addition of antioxidants, cold storage and exclusion of air
Proteins, vitamins, biological polymers, water-based products	Bacterial and fungal growth	Addition of antibiotics or fungicides and cold storage
Photosensitive material, enzymes, essences, vitamin, a.o.	Exposure to light	Addition of chemical UV filter, dark (opaque) containers and dark storage
Natural powders, gums and products rich in carbohydrates (starches, sugars, etc.)	Bacterial and fungal growth	Addition of antibiotics and fungicides, dry and cool storage
Vitamins and derivatives, enzymes, proteins, fragrances, aromas, etc.	Exposure to heat	Protection from heat, cold storage
All of the above	Aging	Rapid processing and

		consumption

Products in general should be stored for as little time as possible by the producer, the retailer and the consumer. Smaller batches made more frequently may therefore become necessary. Raw materials, each according to its requirements, can usually be stored separately better than they can be when combined in the final product. Storage temperatures for most final products should be within 5-30^{0}C. High quality emulsions with low water content may possibly be frozen, but each formulation will have to be tested for negative storage effects on stability and appearance of the product. Many products should also be kept in the dark or in dark containers, such as boxes. Containers need to be adequate for their purpose (see also sections 9.9 and 9.10). During distribution, the same criteria need to be observed. The retailer too, needs to be advised of proper storage, particularly in the case of preparations with a short shelf-life.

Industrial formulations, such as the more complex ones in the following recipes are designed to last for one to two years, observing the most stringent precautions during manufacture. The simpler recipes usually without

preservatives and anti-oxidants will last between a couple of weeks and a few months, depending on the ingredients and temperatures conditions; water emulsions (o/w) being more fragile than oil (w/o) emulsions. Refrigerated storage will prolong their shelf-life considerably. In general, they should be treated in the same manner as perishable food items.

9.8 Quality control

Quality for the consumer means the performance of a product according to its purpose, and the lack of undesirable side effects. Manufacturers however, need an additional definition of quality which allows them to control the manufacturing process for uniformity of the end product, which then has to comply with the consumer's expectations of quality.

In such a definition for a manufacturer, quality is an inherent part of a product and is defined through characteristics that, when compared with a standard, serve as a basis for measuring the uniformity of the product and drawing conclusions as to its acceptability with set quality standards.

The minimum standards must consider at least the following points:

- **the formula, with precise statements of the ingredients and the percentage or weight of each**
- **raw material specifications and compliance; guidelines, descriptions, composition and other specifications for cosmetic ingredients can be obtained from CTFA (see Annex 2)**
- **operating standards, set by the company internally according to equipment and product requirements**
- **finished product standards, which should cover all characteristics affecting product performance, longevity and safety. A sample of each product batch should be kept as a reference, stored at 4�C in the dark**
- **packaging material standards**
- **standard testing methods.**

The standards themselves are set by law, industries, industrial organizations or according to the buyers' requirements. Beyond these generally minimum

requirements, each company should set its own standards Adherence to the standards is effected by including adequate control of raw materials, packaging material, manufacturing and packaging procedures and the final product itself - such as its stability in end-use tests under various environmental conditions. Tests should compare product batches with a standard.

Since the different degrees of quality control are expensive, and better quality requires additional care, better equipment and better raw materials, there are also different levels of quality and, accordingly, different costs.

Of course, a product also has to fulfil the purpose for which it was made: soap, moisturizing cream or anti-wrinkle creams. Here, the small manufacturer, home-based artisan or producer may produce products as good or better than large international manufacturers. He can control the freshness and the purity of his ingredients better, can work with simpler formulations and use ingredients which the industrial producer cannot use without preservatives. This is possible since the small producer has to safeguard against less factors and can control many of them without having to change the product. The scale of production imposes more precautions at higher levels of production. Within legal and ethical limits, each producer and consumer should be able to decide how much of a

compromise they are willing to make.

For practical purposes, in addition to more general and legal considerations, any cosmetic manufacturer whether for home use or retail sale on a small or large-scale should observe the following steps to assure the best possible product.

As discussed under the buying section, contaminated or unfresh raw materials not only spoil the end product or reduce its effectiveness and thus its quality, but also reduce its shelf-life.

The stability of individual ingredients in a product determines its shelf-life. Proteins, vitamins, unsaturated vegetable and animal oils (or fats), biological polymers (e.g. gels), particularly when they are suspended in a water phase are most vulnerable. These require refrigeration prior to use and after processing as well. The addition of adequate preservatives for proteins and vitamins, and anti-oxidants for unsaturated fats, e.g. propolis, further improves the longevity of the product. This is particularly important where retailers and shippers do not maintain optimal conditions for their merchandise. Alternatively, these ingredients can be replaced by more stable synthetic ones, though with some compromise in consumer appeal, and possibly effectiveness and price.

Processing needs to be done with proper equipment and the utmost care, by well trained technicians. During processing, temperatures for heating should not be exceeded nor should heating be prolonged for longer than absolutely necessary (or foreseen in the recipes). Equipment should always be kept clean and if necessary, should be sterilized. This is true for all apparatus and materials (tubes and pumps) in contact with the product - including peoples' hands. The processing room should be as clean as possible - this means much cleaner than most people's kitchens. After processing, the product should be put into clean containers which should be kept closed in a clean dry place at a suitable storage temperature as cool as possible between 5-30^{0}C. Many creams should not be bottled until 24 to 48 hours after processing.

During packaging, a high level of cleanliness should be maintained in the work place, in the bottling equipment, retail containers and among personnel. All personnel should be made aware of the need for cleanliness, which needs to be strictly observed. Packaging materials have to be clean and adequate , i.e. compatible with their contents. Packages or containers must not discolour, crack, tear or deform and neither should the product ooze through the walls or lids of the container. Lids and seals should be tight and secure to avoid any leakage or

contamination by dust or bacteria, which might lead to oxidation and discolouring.

Lastly, storage and distribution have to be handled correctly and quickly to reduce damage or deterioration to a minimum.

Creating this perception of value is sometimes achieved not by larger volume, but by higher weight, i.e. a very small container of very thick glass, or by using an especially decorative container.

Not all these conditions can be fulfilled 100% of the time under all circumstances, but quality production requires the best possible efforts. If something goes wrong, each step should be checked against the list of precautions and the recipe and any mistakes should be corrected accordingly. Prevention is generally cheaper than the loss of a batch or customers. New formulations or equipment modifications should be tested with small batches before attempting full scale production.

Figure 9.10: Very decorative bottles for honey shampoo and foam bath and other gift packages.

9.9 Packaging and presentation

For all practical purposes, the container for a product should be adequate. It should not break easily, it should protect the contents and contain them without leakage. A package is also the business card of the product. It is a way of presenting and recommending the product to the consumer. Product identification is important in a competitive market (see also section 9.10).

The requirements for an adequate container have, in part, already been discussed in sections 9.7 (storage) and 9.8 (quality control). The aspects not yet considered are those of shipping and presentation. Shipping is charged for by weight or by

volume and thus, containers should be as light as possible while protected against breakage. For various reasons, this general rule is often completely disregarded when packaging cosmetics.

Because they are used in small amounts, many cosmetic creams and make-ups are packaged and sold in small quantities. This minimises problems of loss of freshness. Pricing considerations are also important. Containers would be very small. Consequently, many of the containers are double-walled, i.e. one small bowl-shaped container inside another compartment. This facilitates more complete removal of the product and better protection of the internal compartment. A much larger outside container also gives the impression of a substantial amount of product or more value. An important and understandable objective, given the often very substantial price of cosmetics. Creating this perception of value is sometimes achieved not by larger volume, but by higher weight, i.e. a very small container of very thick glass, or by using an especially decorative container. Of course, the net weight has to be stated correctly.

But apart from volume/price or weight/price considerations, a decorative or otherwise attractive package must be provided. While some may think this is deceptive, it is an important element of consumer satisfaction, relating to the high

price and small volume of the product but also to one of the intrinsic purposes of cosmetics : to promote beauty and make the user feel good about him/herself.

Of course, it is possible to sell for a much lower price which most local and less famous manufacturers have to do. Many of the less famous brands are sold in simple, small tubes and cheaper plastic containers. Customers in many societies have become used to equating high price with high quality, expecting to get something better when paying a higher price. Particularly with cosmetics this is not necessarily true.

Special containeers made to order or purchased internationally, would have to be bought in large quantities, hardly affordable for a small part-time manufacturer. Suitable locally available containers may be available, but the practical considerations mentioned earlier must be observed. Unusual, yet still practical shapes or special cardboard packages (see Figure 9.10) can still be selected. A well designed label can also make a big difference even on a very simple container. While the decorative aspect of a label is very important, it still should supply all the information legally required for each product. For the introduction of a new product, an attractive card attached to the container or included in the package may explain the special benefits of the bee products added to it but without

suggesting unrealizable medicinal or therapeutic benefits.

Printing costs for labels can be high, if only small quantities or many different types are needed. Effective black and white designs are possible and could even be photocopied. Natural health care products have different requirements for consumer appeal compared with products aimed at the higher priced luxury market. Small label printers at reasonable prices, directed at producers with a need for a few individualized or versatile labels, are marketed (see Annex 2).

Cheap plastic containers, with good sealing lids can be dressed up to look special by inserting them into well made or even carved wooden boxes, miniature woven baskets with colourful straw flowers, or fancy shaped clay pots. These could have the added attraction that their manufacture could employ local craftsmen. Here too, quality control is important. Tiny clay pots, if well closed by a cork and if glazed on the inside with low metal glazes, can also serve as very decorative containers (see top of Figure 9.3). Decorated, refillable containers with special dispensers are another possibility (see Figure 9.4). Attractive multi-shaped printed cardboard boxes can be an effective low cost alternative (see Figure 9.11).

If there is an active local tourist market, products packed in coloured containers in

traditional shapes and labelled with a local name present something typical of the area and are often very attractive to tourists. Though tourists are most likely to be once only customers, they may still constitute part of a more or less regular market and they, too, are becoming more quality conscious.

Figure 9.11 : Attractive cardboard boxes can create a distinctive presentation at an affordable price.

An alternative for some products such as soap bars, liquid soap, shampoo, foam baths or toothpaste may be packaging in small portions in heat-sealed plastic bags. These may not be as attractive for shampoos as for soaps, but since they are

single portions, they can be sold very cheaply in local markets. A simple paper label with name, address, product, quantity and other legal necessities can be stapled on or inserted into a section of plastic above the product. The label can be printed with a simple rubber stamp.

For wholesale packaging of larger quantities, fewer such aesthetic concerns have to be considered. Durable, cheap and safe packaging is important. Depending on the product, various containers are available, from 1 litre wide-mouthed or screwtop bottles, through 20 litre buckets to plastic drums with well sealing lids. While new containers are better, clean reused containers can be lined with food-grade plastic to protect the product from possible odours or interaction with the container. Recycled containers which have contained toxic or strong smelling materials might contaminate the product and should not be used.

9.10 Marketing

Profit margins for producers and retailers of industrial cosmetics are usually very high, but frequently more than half of all costs incurred by large international cosmetic brands is spent on advertising and promotion. The small local producer usually has neither the budget nor the need for such advertisement, because of

the small production volume. Once production capacity has increased, as a consequence of experience and dedication, the advertising aspect of marketing too frequently neglected has to be seriously considered.

Next to quality control, presentation is probably the most important aspect of cosmetic manufacturing. Attractive package and label designs are the most important considerations. Though not directly contributing to the performance of the product, being a beauty product it has to appeal to the consumer also from an aesthetic point of view. Many consumers may be more practical and not be very influenced by packaging, yet if there is competition with equal or better products, most consumers will prefer the "nicer ~, "prettier' or simply better looking packaged product. This aspect should not be neglected by any producer who has a choice in selecting from various package shapes, colours or imprinted cartons and labels.

The easier a certain label or shape is to recognize (assuming it is generally attractive) the more consumers will identify quality with this specific product (label), develop a trust and certain expectations for this brand. The reverse is of course true as well - once a bad batch or other defect is marketed with a label, the consumer will not quickly forget. The competition when introducing a new

product has to overcome the positive identification of brands and products, which is why there is so much money spent on advertisement and getting consumers to try a product first.

In the beginning, discounted packages and special displays in stores are cheap and effective way of product promotion. Local fairs and shows, donating products to TV shows, raffles, charity sales, etc., are all inexpensive ways to promote a product, have people try it, see it and become familiar with its label and the name. Giving samples free or at reduced prices to beauticians and hair salons for trial, while simultaneously displaying a conspicuous sign with the product's name is yet another possibility. Free demonstrations of beauty care or make-up application using the new products may also be given. Of course, all such activities are worthwhile only if a resulting increase in demand can be satisfied with sufficient products.

Depending on the targeted market, other promotional alternatives may be chosen, such as mail order and distribution through supermarkets, pharmacies, speciality stores and speciality commercial fairs. The possibilities are many and need to be adapted to local situations, needs, capabilities and commonly used methods. Expensive advertisements in newspapers, radio and TV should be a last

resort. Particularly for cosmetics including bee products, still a novelty for most people, there is always a possibility to invite reporters for a special story including stories about bees, their life and biology, other bee products, etc. Such articles and interviews are free advertisement just make sure that you, your store or the name of your product are mentioned. Those beekeepers good with a pen may actually write the article themselves for local newspapers, radio programmes, bee journals, etc. Do no expect miracles immediately.

These alternative sales and promotion methods are really not that different from those that can be used for all the other bee products as well, including of course home sales and signs at the road side. Small village communities often do not need any other promotion than the good reputation of the manufacturer.

Once all this effort has been spent on promoting the product line, special attention must be devoted to maintaining standards. Mistakes, including inadequate attention to quality, missing, damaged or delayed shipments, lack of regular communication, difficulties in collecting payments, late delivery and late or inadequate responses to orders can all contribute to loss of customers faster than the advertising can provide them. Reliability is a very important factor in marketing, and development of customer relationships. If he wants to remain in

business, the producer has to have suppliers and transport at least as reliable as he himself wants to be. This is, potentially, one of the most difficult and expensive problems to overcome, but it is a basic requirement for success.

Though marketing and advertising are special professional fields, much can be done by the small entrepreneur himself. With some ingenuity, common sense and imagination, attractive presentations and displays can be designed. Marketing approaches or "strategies" can be developed by watching how other successful competing products are distributed and sold, and asking people why they use them, how they came to know about them and why they prefer one product over others and how they are distributed. Most of all, successful marketing requires active interaction with customers and continuous improvement.

If the product has a short shelf-life, emphasis should be put on improving production methods, in particular temperature and mixing controls and quality assurance of raw materials. If these improvements cannot prolong product durability, smaller batches should be manufactured and distributed more frequently. Several sub-distributors who have refrigerators for proper storage may have to be selected. After that, more complex formulations using preservatives and incorporating more synthetic products may be the next alternative for those

who do not want to continue with natural products.

It is plausible that customers with a preference for cosmetics with bee products might also show interest in products made with other natural ingredients. Herbal cosmetics and traditional medicines or food supplements could complete a product line, thus by reducing marketing-related costs per item and reaching a larger clientele, product diversity can provide better security. Having one's own retail stores may increase the profit margin, but may also limit the market volume. A combination of direct retail and distribution is a solution for many circumstances, particularly for small, part-time or growing enterprises.

Most present beekeeping/cosmetic lines include a product range of 5 to 20 items in 3 or 4 types, such as creams, soaps, shampoos and depilatory waxes. The products usually require similar ingredients and production equipment. In addition, other items such as food supplements or sweets, containing one or more primary bee products are usually offered. Many of the producers involved have grown from small, home sale operations.

Beekeepers becoming involved in and thinking about cosmetics production in order to increase the marketability of their primary products will soon notice that

the cosmetic side of their business requires increasing attention. Since good cosmetics are good business and produce considerable income, producing them may quickly become a major activity.

9.11 Caution

Once again it should be mentioned that cosmetics with one or the other bee products can cause allergic reactions in some people. Most commercial, highly processed products have been tested for allergic effects. However, each skin reacts differently and people's sensitivity changes due to internal and external influences. Additions of propolis or pollen increase the chance of someone having an allergic reaction. Though rarely required by law, consumers should be advised of such possibilities. A test which may be suggested to the consumer is to apply a small quantity to skin on the inside of the underarm. If the subject is allergic to the preparation, this very sensitive area will usually show a reaction within 24 hours. Pollen extracts can reduce the risk of allergic reactions.

The preferred use of propylene glycol in cosmetics for pollen and propolis extractions is due to its non-polar properties, which means it mixes easily in water and oil phases. Unfortunately, its extraction of active ingredients from

propolis and pollen is not as complete as that of concentrated ethanol. However, it must also be remembered (see Chapter 5) that glycol is toxic when ingested and 1.5 g per adult per day is the maximum safe limit. External application is not toxic. Doses of glycol in toothpastes have to be low enough to avoid danger to children accidentally consuming larger quantities.

Since natural cosmetics are perishable, their freshness and special storage needs to be closely guarded. cleanliness in all processing and packing steps and quality raw materials are of the utmost importance in order to avoid spoilage.

9.12 Market outlook

From an economic point of view, cosmetics are probably the most versatile and most profitable, easy to produce and easy to market value added beekeeping products. Product value is generally very high and the product has both regular market and health market appeal. There are many small enterprises, most of them recently started, entering the market and occasionally there are exceptional multi-million dollar success stories, such as that of a Thai woman entrepreneur reported in Asiaweek (July 26, 1991).

The market for small entrepreneurs appears to be open, since the high priced international market leaves a large enough economic niche for local producers with good quality products. The product type is well suited for small-scale, self-taught starters. Quality and marketing are easily adapted to increasing experience and increased business size.

Markets with growing numbers of consumers and increasing buying power of consumers who are becoming aware of health products, offer opportunities for many producers. In the author's opinion, there are plenty of opportunities in many countries for successful cosmetic producers with special lines based on bee products. Competition is growing though, and this makes product choice and marketing, but most of all quality ever more important.

Contents - Previous - Next

CHAPTER 9b
COSMETICS

Contents - Previous - Next

9.13 Recipes

It should be recalled again that a very large percentage of modern cosmetic ingredients are simply to improve appearance, durability, emulsification and preservation of a much simpler and more natural formulation. it should not be neglected that many of these chemicals, though not proven to be directly damaging, are nevert~eless artificial and foreign to the system to which they are applied. Equally, it is known that many cosmetic products do not do what they claim to do and instead may be damaging skin, hair, eyes, etc., after prolonged use. In general, it is therefore recommended to resort to less complex and more natural ingredients wherever possible.

Figure 9.12 : Two attractive displays of various cosmetic items, all containing one or more primary bee products (left: M�ngersdorff, Germany; right: La casa de miel Argentina).

Freshly prepared creams and other formulations, should not be poured

immediately into their retail containers or, at least, sufficient time should be left after bottling for the product to cool before it is capped. If poured warm and capped immediately, water may condense on the lid and drop onto the surface of the cream. Some cold creams in particular maintain a smoother texture if filled cold, though this may require pressure fillers for the more viscous products.

If premanufactured cream or soap bases are purchased and mixed with bee products, advice on the correct addition of the various products should be sought from the formulator of the base.

The inclusion of herbal extracts, such as Aloe vera gels, powders or juice is possible in many products. Particularly the Aloe products are known for many benefits similar to those known for royal jelly and other bee products. Their synergistic interactions might further increase beneficial effects.

9.13.1 Lotions

Aqueous solutions are possible with all bee products except beeswax, but solutions might produce precipitates after shorter or longer periods of time. Even honey, in acqueous solution might eventually produce some precipitation. Adding

some alcohol and a substance to facilitate or maintain dissolutions (such as ricinus oil) will make acqueous sollutions of propolis possible, up to a certain concentration.

The following five formulations have been described by Proserpio (1981) and can be mixed by just shaking the ingredients in a bottle or using any simple mixing device. The mixing sequence is not very important.

Ingredients (parts by weight)	**PRODUCT**				
	Hair Care	**After Shave**	**Skin Cleaner**	**Skin Softener**	**Skin Toner**
Ethanol (90% vol)	60	50	25	-	-
Ricinus oil (40) OE	2.75	7.5	3.75	2.25	2.25
Essential oil or fragrance	0.25	1	0.25	0.25	0.25
Water (boiled and cooled)	30	-	-	50	50
Witch hazel water extract	-	40	70	-	-

Rose water (also orange or camomile)	-	-	-	40	40
Glycerol	-	-	-	5	-
Honey	q.s.	-	-	2.5	q.s.
Propolis extract (20%, EEP)	5	1	1	-	-
Pollen (ethanol or glycol extract)	2*	-	-	q.s.	7.5
Royal jelly	q.s.	-	-	q.s.	q.s.

**** Hydrolysed pollen is recommended because it has a protecting and nourishing effect on the hair.***

Other primary bee products can be added to the hair lotion to increase its beneficial effect. The skin softener for dry skin and the toning lotion for firming relaxed, stretched or stressed skin may benefit from the addition of royal jelly or honey.

Emollient lotion (o/w)

Ingredients (in parts by weight):

8	*Beeswax*
15	*Mineral oil (white petrolatum)*
2	*Isopropyl miristate*
10	*PEG 400 monostearate*
5	*Lanolin*
2	*Stearic acid*
0.15	*Propylparaben*
0.15	*Methylparaben*
0.7	*Borax*
56.75	*Water*
q.s.	*Fragrances*

Melt and mix like any other emulsion cream and add fragrances when cool.

Emollient mil for face and body (o/w)

Ingredients (in parts by weight) after Proserpio (1981):

3.5	*Sorbitan (20) OE stearate*	*75*	*Water (boiled and cooled)*
1.5	*Sorbitan stearate*	*0.5*	*Hydroxy ethyl cellulose*
2	*Stearic alcohol*	*0.25*	*Xanthan gum*
7.5	*Almond oil*	*1.5*	*Lauryl alcohol (25) OP*
0.5	*Silicones and antioxidants*	*2.5*	*Glycerol (=glycerin)*
		2.5	*Pollen extract (lipid extract)*
		2.5	*Honey*
		q.s.	*Fragrances*

Warm, dissolve and mix all the ingredients in the left hand column. Dissolve the gum in a small amount of water. Very slowly mix the cellulose into the rest of the water, stirring well. Heat while stirring, add the dissolved gum, alcohol and glycerol, then mix well. Bring the oil phase to same temperature (70-80^{0}C) and emulsijy for 10-15 minutes. Continue stirring while cooling. Once below 40^{0}C, the honey, pollen extracts and fragrances may be added.

Honey and lotion

Ingredients (in parts by weight) after Krochmal (1985):

8	*Petroleum jelly (Vaseline)*
2	*Honey*
3	*Glycerol*
1	*Liquid lecithin*
0.5	*Silicones and*

antioxidants

Melt the petroleum jelly in a water bath. Add the remaining ingredients and heat (<42 ^{0}C) for several minutes until the mixture is smooth and well mixed. For very small batches, to be used at home, 1 part could be equivalent to one tablespoon.

Honey and Rosewater hand lotion

Ingredients (in parts by volume) after Krochmal (1985):

1	*Irish moss*
4	*Rosewater*
4	*Honey*
8	*Water*
5	*Glycerol*

Simmer the Irish moss in the water over low heat until the mixture is thick (about

10 minutes). Strain or filter and combine the cooled filtrate ~ltered liquid) with the remaining ingredients. Aqueous (diluted) alcohol extracts of propolis may be added to the warm filtrate or glycerol, but might discolour the solution.

Cleansing gel

Ingredients (in parts by volume) after Krochmal (1973)

24	*Glycerol*
3	*Honey*
48	*Water*
2	*Gelatin or pectin*
0.1	*Oil of lavender*

Moisturizing gel

Ingredients (in parts by volume) modified after Krochmal (1973)

24	*Glycerol*
4	*Honey*
12	*Water*
2	*Gelatin or pectin*
1	*Propolis extract (10% EEP)*
0.1	*Essential oil*

Soak the gelatin in the water and dissolve over a low heat. Add the glycerol. Cool until warm to the hand and add the other ingredients.

9.13.2 Ointments

Ointments are fairly easy to prepare and proportions can be varied easily, since little or no emulsification is necessary and consistency is not very sensitive to minor changes in proportion or substitution by similar substances. Their durability is limited by the choice of oils.

Beeswax and coconut hand cream (ointment)

Ingredients (in parts by volume) from Krochmal (1985):

4	*Beeswax*
3	*Baby (jojoba or mineral) oil*
4	*Coconut oil*
5	*Glycerol or mineral oil*

Melt the beeswax and coconut oil in a water bath. Stir and add the other ingredients until smooth. After 5 minutes take away from the heat and continue

stirring. As the cream will become fairly hard when it is cool, pour it into containers while it is still warm.

To soften the ointment, add approximately 3 to S parts of water and up to 0.2 parts of borax.

Propolis ointment

Ingredients (in parts by weight) from Spitznagel (1985):

8	*Cold-pressed olive oil*
2	*Unbleached beeswax*
1.5	*35% propolis extract (35% EEP)*
q.s.	*Lipid extract of pollen*

The proportion of oil to wax should be 4.'] and the total propolis content near 5%. Any multiple or fractions of the above weights can be used as long as the right proportions are maintained. The wax is melted in a water bath. Once liquid, the oil is added slowly with continuous stirring until the mixture is very clear. The

pot can then be removed from the heat, but stirring has to continue until the mixture is cold and creamy. During the last phase, the propolis solution needs to be mixed in gradually.

The warmer the mixture, the better the propolis will mix, but in a cooler mix the characteristics ofthepropolis will be better preserved. A compromise would be about 40^{0}C. The olive oil may be replaced with other plant oils such as coconut or palm oil, or animal fat. Since any of these oils can go rancid, such a cream has a limited shelf lift even in the presence of propolis. Lipid extracts of pollen can be added to this ointment, but other non-lipid products such as royal jelly will not mix well.

Ingredients (in parts by weight) from Proserpio (1981):

Propolis extract (20% EEP)	*10*	*10*	*5*
Beeswax	*10*	*5*	*-*
Pollen extract (lipid fraction)	*-*	*5*	*5*
	-	*10*	*10*

Lanolin			
Vaseline	*80*	*-*	*60*
Pork fat	*-*	*70*	*-*
Menthol or other aromatic oil	*q.s.*	*q.s.*	*q.s.*

The formulas are very similar to the previous recipe and the mixing instructions are the same. The similarity shows the flexibility in mixing different proportions and ingredients partially or wholly replaced by others.

Nourishing bee cream (oointment)

Ingredients (in parts by weight) after Dany, 1988.

5	*Beeswax*	*1*	*Royal jelly*
40	*Wheat germ oil*	*1*	*Honey*
1	*Raw propolis or extract*	*3*	*Pollen pellets or extract*

0.2	*Borax*	*q.s.*	*Water*
0.2	*Pine oil or other aromatic oil*		

Heat the wax, wheat germ oil and propolis in a water bath until they are all melted. Mix and grind the pollen, honey and royal jelly in a small bowl or mortar. Mix with a little water and warm to 36-38 ^{0}C, using a water bath. Dissolve the borax, in afew drops of hot water, cool and add to the honey mix. The honey phase can also be prepared with very little or no water. Both phases will greatly improve in consistency it extracts of propolis and pollen are used instead of the raw materials. The solvent should be reduced as much as possible before use.

While the oil and wax are cooling, continue stirring without mixing in too much air. At about 40 ^{0}C, add the pollen, honey, royal jelly and borax mix (which should be about the same temperature) and continue to stir. when cooled to about 30-32 ^{0}C, add the aromatic oil. Continue stirring until the mixture is cool. If the mixture separates or the consistency is not correct, heat it again slowly until

good mixing (stirring) is possible.

With good stirring the consistency should be creamy. Keep the cream in a well sealed storage vessel for 24-48 hours before filling into jars then label and sell. The cream may be kept for about 4 to S and it is better to refrigerate after preparation is completed.

Coconut hand cream (ointment)

Ingredients (in parts by weight) after Berthold, (1993).

3	*Beeswax*
3	*Coconut oil*
4	*Glycerol*
3	*Baby oil*
q.s.	*Honey, propolis or pollen etract*

Melt the beeswax in a water bath and slowly blend in the other ingredients except bee products. Continue stirring while cooling. The baby oil can be replaced by mineral oil, jojoba oil or other. Proportions can be varied and other bee products may be added at levels of 2 to 10%.

Aloe moisturizing cream (ointment)

Ingredients (in parts by volume) after Krochmal,(undated)

12	*Beeswax*
24	*Avocado oil*
6	*Coconut oil*
0.02	*Vitamin E oil*
0.25	*Chamomile extract*
24	*Aloe vera gel*

Heat the first three ingredients in a water bath until the wax is melted. Stir well, remove from the heat and while cooling, slowly add the aloe vera gel a drop at a time. Continue stirring and when the mixture thickens, add the vitamin oil and chamomile extract.

Insect repellent

Ingredients (in parts by volume) after Krochmal,(1991)

1	*Aloe vera gel*
1	*Citronella oil*
1.5	*Beeswax*

The most commonly used commercial repellent is N,N-diethyl-meta-toluamide. It can be added as well, but should be present at a fairly high percentage (15-25%).

Combine the aloe and citronella oil in a saucepan and heat slowly over a low heat for 3 minutes. Add the wax and stir until the wax melts. Remove the pan

from the heat and stir until the mixture thickens. Pour into jars. The beeswax makes this cream water resistant.

Waterless paste (ointment to which zinc oxide has been added)

Ingredients (in parts by volume) after Proserpio,(1981)

5	*Beeswax*
20	*Cacao butter*
25	*Almond oil*
25	*Rice amides (rice starch)*
25	*Zinc oxide*

Melt the beeswax in a water bath and stir in the other ingredients. Continue stirring while cooling.

9.13.3 Creams

General operating instructions

Emulsions require an efficient mixing system and an emulsifier, to obtain a homogeneous product.

The oils, waxes and emulsifier(s) are melted together at *70-75* ^{0}C. The water and heat stable water soluble substances are heated to 75- 80^{0}C. The formation of an emulsion is likely to be easier and more successful if the temperatures of the two phases are about the same at the time of mixing. If borax is used as an emulsifier, it is usually mixed with the water phase. Each phase may have to be filtered before mixing.

The different phases are premixed and added to each other according to the emulsion type and specific formulation, using turbo-mixing and stirring to emulsify and homogenise. Stirring is continued for 10-15 minutes at the same temperature. After cooling to 60^{0}C homogenization is stopped and mixing is continued, if possible under vacuum.

At 30 to 40^{0}C, heat sensitive substances and fragrances are added, during continued mixing of the product. The cream should be mixed for a further 5 minutes after which physio-chemical parameters such as pH, viscosity, organoleptic aspects and colour should be adjusted. It may then be poured into a storage vessel.

In the case of emulsions or lipogels containing pigments or insoluble powders in suspension, adequate milling systems should be used in order to get a good dispersion, homogeneity of the colour and absence of lumps. Three roller mills, pebble mills or homogenizers (rotor-stator type) are normally used for this operation.

If the addition of propolis renders a product too dark, titanium dioxide can be added in order to lighten the final colour. Use a mill or, if hand mixing, a mortar and pestle or preferably a mill to disperse the pigment in a small quantity of product before incorporating it into the bulk.

The following are four olw emulsion formulations. 01w emulsions are considered the most appropriate by some people, because of the ease with which they can dissolve both water soluble and fat-soluble ingredients. But formulations must be

"correct" for the skin, i.e. optimum pH and without surfactants or Vaseline. All primary bee products can be mixed with these emulsions. Their incorporation in the following formulations can be varied considerably. Though beeswax can be incorporated in small quantities, it finds much less use than in the cold cream type formulations (w/o and w/o/w emulsions). When substituting or changing the proportions of ingredients, a few small batches should be tried first. In contrast to ointments, even small changes can cause significant differences in the consistency, shelf life and other aspects of the end product.

Cleansing milk (o/w)

Ingredients (in parts by weight) after Proserpio,(1981)

5	*Glyceryl (24) OE sterate*	*65*	*Water (boiled and cooled)*
5	*Glyceryl stearate*	*0.5*	*Hydroxy ethyl cellulose*
2	*Hydrogenated lanolin*	*2.5*	*Lauryl alcohol (25) OP*
12.5	*Vegetable oil*	*5*	*Propylene glycol*

0.5	*Silicones and antioxidant*	*0,5*	*Essential oils, fragrances*
		1.5	*Honey*
		q.s.	*Propolis extract (10% GEP)*

Mix the components of the oil phase (left column) according to standard procedures and heat to 70-75^{0}C. Slowly dissolve the cellulose in the cold water, then while stirring well heat to the same temperature as the oil phase. Add alcohols to the water phase. when mixed well, slowly add oil phase and emulsijy for 10-15 minutes. Continue stirring while the emulsion cools. Once cooled to below 40^{0}C, the honey, predissolved in a little water, proplis (10% or higher concentrated glycol extract) and essential oils are added. The amount of propylene glycol should be reduced in proportion to the amount of glycol contained in any added propolis extract.

Purifying cream (o/w)

Ingredients (in parts by weight) after Proserpio,(1981)

5	*PEG 8 - C12 18 alkyl ester*	*65*	*Water (boiled and cooled)*
5	*Stearic alcohol (20) O"*	*5*	*Glycerol*
10	*Stearin*	*0.5*	*Essential oils, fragrances*
4	*Vegetable oil*	*5*	*Propolis (10%, GEP)*
0.5	*Silicones and antioxidant*		

Mix the ingredients of the oil phase (in the left hand column) and the ingredients of the water phase (in the right hand column) according to standard procedures. Add the essential oils or fragrances and the glycol extract of propolis once the temperature is below 40^{0}C.

Hand cream (o/w)

Ingredients (in parts by weight) after Proserpio,(1981)

2	*Beeswax*	*70*	*Water*

6	*Cetyl alcohol (20) OE*	*5*	*Glycerol*
4	*Cetyl alcohol*	*0.5*	*Essential oil, fragrances*
2	*Hydrogenated lanolin*	*2*	*Propolis (10% GEP)*
5	*Vegetable oil*	*2.5*	*Honey*
1	*Silicone and Antioxidant*		

Mix according to standard procedures, add the essential oils, the GEP and the honey (predissolved in a little of the water) once the temperature is below 40 ^{0}C. Propolis extracted in ethanol or hydrogenated lanolin can also be used, but glycol extracted propolis is better.

Reconstituting cream (o/w)

Ingredients in percent by weight after Proserpio,(1981)

10	*PEG 8 - C12 18 alkylester*	*65*	*Water (boiled and cooled)*
5	*Glyceryl stearate and*	*5*	*Glycerol*

	PEG 100 stearate	*0.5*	*Essential oil, fragrances*
5	*Wheat germ oil*	*2*	*Pollen extract, lipid fraction*
2	*Unsaponifiable olive*	*4*	*Honey*
0.5	*Silicone and Antioxidant*	*1*	*Royal jelly*

Mix according to standard procedures, add the essential oils, honey, royal jelly and pollen extract at temperatures below 40 ^{0}C. The pollen extract should be fat soluble, i.e. made with concentrated ethanol or in glycerol (the former is preferred).

Beeswax-pollen cream (o/w)

Ingredients (in parts by weight), modified after Sato,(1977)

11	*stearic acid*	*1.5*	*Hydrophilic surfactants*

6	*Liquid paraffin*	*57.5*	*Distilled water*
4	*Solid paraffin*	*1*	*Triethanol amine (emulsifier)*
6	*Bees wax*	*8*	*Propylene glycol*
2.5	*Hydrophobic surfactants*	*2*	*Propolis extract (20%, glycol)*
		3	*Pollen or pollen extract*
		0.5	*Fragrances*

Prepare like any standard emulsion and once cooled to below 40 ^{0}C, add propolis, pollen and fragrances. The content of pollen may vary from 0.1-10%, or its equivalent alcohol (glycol) extracts. The amount of glycol added should be adjusted to account for any glycol included in the extracts of pollen and propolis.

Hand creams (o/w)

Ingredients (in parts by weight)	*Hand cream*	*Nourishing cream*

	(o/w)	(o/w)
OIL PHASE		
Mineral oil	*5-10*	*3-5*
Vegetable oil	*2-5*	*5-10*
Thickener	*0-0.5*	*0-0.5*
Silicone derivative	*0.5-1*	*0.5-1*
Fatty alcohols C16-C18	*1-3*	*0.5-1*
Long chain esters	*2-5*	*1-3*
Short chain, branched esters	*-*	*5-8*
Beeswax	*1-3*	*1-3*
Emulsifiers	*5-10*	*5-10*
Preservatives and antioxidants	*q.s.*	*q.s.*
AQUEOUS PHASE		
Humectants	*5-10*	*3-5*
Thickeners	*0-0.5*	*0-05*
Honey	*1-4*	*1-4*
Chelating agents	*q.s.*	*q.s.*
Preservatives	*q.s.*	*q.s.*

pH correctors	*q.s.*	*q.s.*
Fragrances	*q.s.*	*q.s.*
Primary bee products (propolis, pollen and royal jelly)	*1-3*	*1-3*
Water	*q.s. to 100*	*q.s. to 100*

Prepare like any emulsion, but watch for correct sequences in preparing each phase and the pH of the aqueous phase (according to the requirements of the chelating agents). For simplicity, these formulas can be reduced to their bare minimum of oils, beeswax, emulsifier (borax), water, fragrances and other primary bee products. For such a simple example, see the next recipe.

Nail cream (o/w)

Ingredients (in parts by weight):

25	*Lanolin*
16	*Mineral oil (white, liquid petrolatum)*

4	*Beeswax*
55	*Water*
q.s.	*Fragrances and preservatives*

Mix like standard o/w emulsion. One part of borax should facilitate emulsification of the cream.

Night cream (o/w)

Ingredients (in parts by weight) form Klein (1991):

A)	*43.45*	*Deionized water*
	0.7	*Sodium borate*
	2	*Glycerol*
	0.3	*Xanthum gum*
	0.1	*Terasodium EDTA*
B)	*2*	*Cetearyl alcohol*

	2	*Sorbitan sesquiolate*
	5	*Glyceryl monostearate*
	8	*Macadamia nut oil*
	0.2	*Vitamin E acetate*
	12	*Beeswax*
	15	*Mineral oil*
	8	*Octyl palmitate*
C)	*1*	*Hermaben II (propylene glycol, diazolidinyl urea and parabens)*
D)	*0.25*	*Fragrance*

Mix the ingredients listed under A and heat them to 75 ^{0}C. Mix those under B and heat them also to 75^{0}C. Mix B into A, emulsijy, cool to 40^{0}C, then add the hermaben and the fragrance. Stir throughout the process and homogenize. This oil-in-water cream utilizes an anionic/nonionic emulsijjcation system. The Macadamia nut oil helps to reduce any greasiness of the mineral oil.

Modern cold cream (w/o/w)

Ingredients (in parts by weight) after Proserpio (1981):

2.5	*Beeswax*	*55*	*Water,boiled and cooled*
2.5	*Glyceryl stearate*	*0.5*	*Hydroxy ethyl cellulose*
5	*Stearic alcohol*	*0.5*	*Magnesium sulphate*
5	*Hydrogenated lanolin*	*6*	*Glycerol*
1	*Phytosterols*	*0.5*	*Essential oils,fragrances*
1	*Ethoxylated phytosterol*	*1-2*	*Pollen extract (10%)*
0.5	*Silicone and antioxidatns*	*1-2*	*Propolis extract (20%)*
20	*Vegetable oils*	*1*	*Royal jelly, fresh*

Heat the oil phase to 70 or 75 ^{0}C, then add and mix all the oil phase ingredients

(in the left hand column) into the melted beeswax in the above sequence. Slowly dissolve the cellulose in the water and heat, stirring well. Add the water phase ingredients (the glycerol and magnesium sulphate), dissolve and homogenize, bring to the same temperature as the lipid phase and combine slowly. Emulsijy for 10 to 15 minutes and continue stirring while the liquid starts to cool. At less than 35^{0}C, add the fragrances, propolis, pollen extract and royal jelly.

Glycol or ethanol extracts of propolis and pollen can be used. Royal jelly can also be used in its freeze-dried form if weights are adapted accordingly, i.e. 0.35 parts of freeze-dried royal jelly if no carrier substance has been mixed with the royal jelly and 0.65 parts added to the water.

Cleansing creams (w/o) and ointment

Ingredients (in parts by weight)	***Emulsion (w/o)***	***Ointment***
Beeswax	*10.0*	*6.2*
Mineral oil, liquid paraffin	*57.0*	*62.5*
Petroleum jelly (Vaseline)	*-*	*18.8*

Paraffin wax	*-*	*12.5*
Borax	*0.7*	*-*
Water	*30.3*	*-*
Preservatives, antioxidants	*q.s.*	*-*
Fragrances, propolis extract	*q.s.*	*q.s.*

Cleansing creams (w/o)

Ingredients (in parts by weight)	***Cold creams***		***Emollient cream***
	w/o	***w/o***	***o/w***
Beeswax	*7*	*15*	*15*
Mineral oil, liquid paraffin	*50*	*20*	*20*
Almond oil	*-*	*10*	*-*
Sesame oil	*-*	*10*	*-*
Hydrogenated vegetable oil	*-*	*-*	*10*
Petroleum jelly (Vaseline)	*-*	*10*	*10*

PEG 40 sorbitan lanolate	*-*	*-*	*10*
Borax	*-*	*1*	*0.7*
Tween 40	*2*	*-*	*-*
Atlas G1726 (emulsifier)	*8*	*-*	*-*
Water	*33*	*33*	*q.s. to 100*
Antioxidant, preservative	*q.s.*	*q.s.*	*q.s.*
Fragrances	*q.s.*	*0.50*	*0.25*

The waxes and oils are heated to 75 ^{0}C together with the emulsifiers which can be substituted by a much smaller quantity of borax, i.e. 0.5 to 1 part. The water is also heated to 75 ^{0}C and added slowly to the wax-oil phase while emulsijying, stir thoroughly until it has cooled to room temperature. Below 40^{0}C, the pe~me and other heat sensitive ingredients may be added and everything is stirred to a homogeneous cream. After 24 hours the product can be filled into retail containers.

Classic cold creams (w/o with borax)

Ingredients (in parts by weight) after Proserpio (1981)

Ingredients	*Cold creams*		
Beeswax	*10*	*12*	*15*
Vaseline	*12*	-	-
Mineral oil	*50*	-	*50*
Almond oil	-	*67*	-
Water (boiled and cooled)	*27*	*20*	*34*
Borax	*0.4*	*0.7*	*1*
Essential oils	*0.6*	*q.s.*	*q.s.*
Propolis extract	*q.s.*	*q.s.*	*q.s.*
Pollen extract	*q.s.*	*q.s.*	*q.s.*
Royal jelly	*q.s.*	*q.s.*	*q.s.*

The emulsions are prepared according to the standard procedure described previously. Essential oils (according to preference) concentrated and evaporated ethanol extracts of pollen orpropolis (at 0 to 5%) and fresh or freeze dried royal

jelly (0-3%), can be included at varying concentrations individually or in various combinations. The almond oil and mineral oil can be replaced by other vegetable oils. In general, these formulations are very flexible and different proportions can be tried. Other waxes and, of course, other emulsifiers can be used. The water content generally ranges from 20 to 37%, but as in the case of ointments may be reduced to 0% thus influencing the consistency. Any modifications can influence the consistency of the product, trial batches should be made to confirm the acceptability of the new consistency.

Berthold (1992) lists 11 basic recipes for creams (w/o emulsions with borax) in a comparative table. The basic ingredients varied from 5 to 17 parts of beeswax, 40 to *56* parts mineral oil, 5 to 35 parts of water and 0.4 to 1 part borax. This again demon~trates the great flexibility of this type of emulsion in simple recipes, where itis easy to change ingredients unlike in more complex formulations.

Moisturizing cream (w/o)

Ingredients (in parts by volume) after Krochmal (1973):

1	*Honey*	*8*	*Almond oil*

1	*Glycerol*	*0.1*	*Oil of rose*
8	*Olive oil*	*1*	*water*

Combine the honey and glycerol, then stir in the oils. Afterwards, stir in the water. This cream does not require heating, but will not be stable for very long and might separate. Its storability should be tested.

Aloe cream (w/o) for general cosmetic purposes or for burns

Ingredients (in parts by weight) form Gentry (1988):

18	*Beeswax*
40	*Paraffin*
30	*Water*
0.6 to 1	*Borax*
10	*Pulverized aloe*
2	*Propolis extract (10%, EEP), optional*

2 Honey, optional

Grate and melt together the beeswax and paraffin in a water bath (maximum 75 ^{0}C). Warm the water to the same temperature and dissolve the borax. Slowly pour the water into the wax with rapid stirring. Remove from the heat and continue to stir until thickened. Stir in the aloe powder while the mix is still liquid. Propolis extract and honey may be added, particularly if the cream is to be used for treating burns, even 2 parts of honey could be very beneficial.

Multipurpose cream

Ingredients (in parts by weight) form Dany (1988):

60 Butter or hydrogenated vegetable oil (margarine)

50 Pollen or pollen extract

40 Honey

30 Propolis extract (10% EEP)

10 Royal jelly

Gently melt the butter, then remove it from the heat, add the propolis extract. Stir the pollen extract into the honey and add this to the cooled (but still warm) butter. Add the royal jelly, mix well and store in a refrigerator in a well sealed glass jar

Though mentioned here as a cream, this product can be eaten and used as a home remedy for relief (not cure) of any illness. To guard against allergies, use pollen extract (or beebread extract) instead of pollen.

Contents - Previous - Next

9.13.4 Sun protection

Contents - Previous - Next

Sun cream

Ingredients (in parts by weight):

10	*Beeswax*
2	*Ozocerite*
2	*Glyceryl monostearate*
20	*Isopropyl*
2	*Sun filter*
2	*Isopropyl lanolate*
22	*Lanolin alcohol ethers (20 OP)*
3	*Hydroxylated lanolin*
0.6	*Borax*
33.4	*Water*
q.s.	*Perfume and preservatives*

Sun cream (w/o)

Ingredients (in parts by weight) after Proserpio (1981):

5	*Beeswax*

5	*PEG 2) dodecyl glycol copolymer*
2.5	*Sorbitan oleate*
5	*Sterol alcohols*
2.5	*UV filter*
2.5	*Pentaerithritol ether*
15	*Squalene*
5	*Fat-soluble walnut extract*
1	*Hyfrogenated ricinus oil*

Follow instructions for mixing the copolymer or mix it very slowly with the melted beeswax. Add other ingredients while stirring.

Suntan oil

Ingredients (in parts by volume) modified from Krochmal (1973):

8	*Olive oil*	*or*	*16*	*Olive oil*	*or*	*16*	*Vaseline*

1	*Sesame oil*	*16*	*Peanut oil*	*3*	*Beeswax*
4	*Peanut oil*	*0.25*	*Oil of jasmine*	*0.1*	*Oil of rose*
0.2	*Pollen extract (20% GEP)*			*1*	*Propolis (GEP)*

Combine all the ingredients. Other oils such as coconut or palm oil may also be used. It is better to use refined rather than regular cooking oil, though the latter can be used for products consumed at home. Different essential oils may be added as well. Either pollen extracted can with propylene glycol or with concentrated ethanol (with the ethanol largely evaporated or replaced by glycol) can be used. Pollen is said to promote tanning and propolis (ethanol or glycol extract) can be added to increase sun protection. For additional protection against UV radiation, special synthetic UV filters can be included. These may require an additional agent to dissolve or suspend them in the oils. Such information can be obtained when purchasing the raw material. Commercial formulations generally do not contain much more than has been listed in this recipe.

For personal use, ready-made suntan lotions may be purchased and the pollen or propolis extracts be added directly to them.

Sun gel (lipogel – an ointment to which a stabilizer, in this case hydrogenated ricinus oil has been added)

Ingredients (in parts by weight) after Proserpio (1981):

2.5	*Beeswax*	*2.5*	*UV filter*
50	*Sesame oil*	*5*	*Hydrogenated lanolin*
25	*Vegetable oil*	*2*	*Liquid jojoba wax*
2.5	*Unsaponifiable olive oil*	*0.5*	*Essential oils*
5	*Lipid-soluble walnut extract*	*5*	*Hydrogenated ricinus oil*

Melt the beeswax in a water bath and add the other ingredients. The fragrances and ricinus oil are added last. Ricinus oil (castor oil) is extracted from Ricinus communis seeds.

The product will be improved by the addition of propolis as a weak UV screen, and pollen extract (2 parts) for its effect on tanning, will ffirther improve the product.

After sun gel (monophasic gel)

Ingredients (in parts by weight) after Proserpio (1981):

10	*Honey*
50	*Water (boiled and cooled)*
30	*Witch hazel (aqueous extract)*
1	*Carbopol 940*
5	*Glycerol*
2.75	*Ricinus oil (40) OE*
0.25	*Chamomile oil*
1	*Neutralizing base*
1-2	*Propolis extract*

Dissolve the honey in a little water. Premix the neutralizing base in a little glycerol or water. At room temperature, mix the rest of the water and the witch hazel and add the carbopol very slowly while stirring vigorously. Stir until everything has dissolved. Mix the oils in the glycerol. Add the glycerol/oil phase to the carbopol/water phase. Mix carejully without incorporating air. when homogeneous, add the premixed base and stir slowly for another 30 minutes.

A glycolic propolis extract, preferably in paste form can also be added. It should be mixed with the glycerol before adding to the carbopol/water.

9.13.5 Shampoos

Generic ingredients (parts by weight)	***Shampoo***	***Bath foam***
Anfoteric surfactant	*25-30*	*5-10*
Anionic surfactant	*5-10*	*35-40*
Non-ionic lather booster	*1-3*	
Thickener	*0-0.5*	*0-0.5*
Alkyl glucoside C_8-C_{10}	*1-3*	

Restoring, conditioning agents	*1-5*	*1-3*
Honey and other be products	*0.5-5*	*0.5-5*
Preservatives and chelating agents	*q.s.*	*q.s.*
Fragrances and antioxidants	*q.s.*	*q.s.*
Water	*q.s. to 100*	*q.s. to 100*

Without heating, mix all the ingredients, except the thickener, water and pe~me. Use a slow moving blade mixer and mix until a homogeneous mixture is obtained, avoiding as much as possible the trapping of air. Slowly add the water and mix until homogeneous. The thickener is heated slightly and added to the main mass. Shampoos with a glycerol or oil phase can also include a small percentage of beeswax.

Fragrances and other additives can be added shortly before pouring into storage vessels and before control and/or adjustment of physical characteristics.

The following two shampoos have been described by Proserpio (1981):

For dry hair **For oily hair**

15	*Coccoilamido propylbetain*	*25*	*Lauryl ethoxy sulphate MEA*
10	*Cocoimidazolin*	*5*	*Lauryl sulfur succinate NA*
4	*Glucose $C_{8\ 10}$ alkylether*	*2*	*Coccoilamid*
1	*Lecithin amide*	*2*	*Abietoil polypeptide*
0.5	*Essential oils or fragrances*	*0.5*	*Essential oils or fragrances*
65	*Water (boiled and cooled)*	*45*	*Water (boiled and cooled)*
2.5	*Hydrolysed pollen*	*0.5*	*Citric acid*
2	*Honey*	*2*	*Hydrolysed pollen*
		2.5	*Propolis extract (10%, GEP)*

The following two formulas are adopted from Krochmal (1985). They are very

simple and use relatively common materials. However, they do not produce a very stable product for marketing in most stores.

Ingredients (parts by volume)	
Honey-pollen shampoo	***Honey-egg shampoo***
12 honey 24 glycerol 3 witch hazel 12 cologne 1 liquid soap 2 alcohol 6 pollen extract	*12 honey 3 almond oil 3 witch hazel 3 cologne 6 liquid soap 6 water 1 large egg per 60 ml honey*

Cologne (perfumed aqueous alcohol) can be used, but rose water, orange flower water or other aqueous aromatic extracts which are much cheaper than cologne can also be used. If a glycol extract of pollen is used, the shampoo will have a

smoother texture. Propolis extract can be added to treat dandruff The honey content may be reduced in order to reduce costs.

For very small quantities, when 1 part is equivalent to one teaspoon (and 24 parts to � a cup), the ingredients may be put in a bottle and shaken until a more or less homogeneous solution is obtained. For larger quantities dissolve the honey in the cologne and the soap in the alcohol. After glycerol is mixed into the honey and the cologne, the witch hazel, pollen and soap are added.

The problem for marketing is the lack of preservatives (and consequently the short shelf-life), and the possibility of separation of the ingredients after a short time. The honey-pollen recipe already has an alcohol content which functions as preservative, but the egg in the second recipe makes it very perishable. If sold without the egg, the shampoo should keep for many weeks. Customers might be advised to add an egg themselves.

After- shampoo balsam

Ingredients (in parts by weight) after Proserpio (1981):

2.6	*Cetyl alcohol*
2.5	*Jojoba oil*
1.0	*Cetyl polyethoxy ammonium phosphate*
4.0	*Tallow (15) OE polyamine*
80	*Water (boiled and cooled)*
1.0	*Citric acid*
0.5	*Essential oils of fragrances*
3.5	*Hydrolysed pollen*
5.0	*Propolis extract (10%, GEP)*

The thickeners (phosphate and polyamine) also junction as emulsifiers and can be replaced by other, more readily available thickeners and emulsifiers. Beeswax can be included at a very small percentage (1-2%).

Foam baths (with honey or propolis)

Ingredients (in parts by weight) after Proserpio (1981):

50	*Lauryl ethoxy sulphate (sodium salt)*
10	*Lauryl sulfur succinate (sodium salt)*
5	*Glucose $C_{8\ 10}$ alkylether*
2.5	*Coccoilamid*
7.5	*Coccoilamido betaine*
2.5	*Essential oils or fragrances*
20	*Water (boiled and cooled)*
2.5	*Honey and/or propolis extract (10%, GEP)*

In addition to three variations distinguished by the addition of honey, propolis or both, herbal extracts to promote relaxation and stimulation of circulation may be added to this kind of formulation.

Figure 9.13 : A simple, attractive gift package

9.13.6 Solid soaps

The addition of propolis to any soap products will cause a strong greyish colouring.

Basic beeswax soap

Ingredients (in parts by volume) after Berthold (1992):

72	*Tallow, clean, rendered*	*36*	*Water (soft, rain water)*
24	*Vegetable oil*	*12*	*Lye flakes (potassium hydroxide or sodium hydroxide)*
9	*Beeswax*	*1*	*Citronella oil*
		0.25	*Lemon oil optional*
		6	*Honey, optional*
		5-10	*Propolis extract 10% EEC, optional*

Melt the beeswax in a water bath and stir in the vegetable oil. In a separate pot, melt the tallow and measure the right quantity. Dissolve the lye flakes in cold water, then thoroughly mix the lye solution with the melted tallow and add the melted beeswax-vegetable oil mixture in a thin stream. Beat mixture vigorously until blended thoroughly. Add honey (if desired), the propolis extract, citronella and the lemon oil or other essential oils (rose, sandalwood or lavender) and pour into greased moulds. The soap will take a while to harden. Protect it from dust.

Scented honey-propolis-beeswax soap

Ingredients (in parts by weight) after Dany (1988):

180	*Beeswax*	*50*	*Rosewater*
80	*Bar soap, milk*	*20*	*Honey*
30	*Almond oil*	*1*	*Propolis extract*

Melt the beeswax in a water bath and slowly add small chunks of the soap. Remove the hot waxAoap mix and gently heat the almond oil, rosewater and propolis in a separate pot to 40^{0}C, while stirring. The rosewater can be replaced

with other preferred fragrances. when the wax and soap mixture has cooled to about the same temperature, add the two liquids together and stir well. Before it cools completely, stir in the honey. Then pour into oiled (mineral or vegetable oil) forms. It will take a while for the soap to harden. Lightly cover to provent dust and dirt settling on top of the soap, but do not close hermetically because of continuing evaporation of water when hard, remove, wrap in paper, label and box in a nice carton. If the soap is of pleasant colour and shape, it may also be packed in clear plastic and sealed.

Honey-propolis soap

Ingredients (in parts by weight):

100	*Soap base (chips or bar soap)*
5	*Honey diluted with 2 water*
2	*Propolis in 18 parts glycerol or equivalent of 10% GEP*

The honey needs to be diluted with the water prior to jurther mixing. The propolis can be extracted in glycerol directly (though not very efficient) or an alcohol extract may be thickened by evaporation and mixed (emulsified or dispersed) in the glycerol at a concentration of 10% paste.

The soap chips can be tumbled in the two liquids and then refined and extruded as described in 9.2.4 or the soap may be careffilly melted. Shortly before hardening, the warmed honey - water (35 - 40^{0}c) and proplis are stirred in.

Honey-beeswax soap

Ingredients (in parts by weight) after Proserpio (1981):

90	*Soap base (chips or bars)*
5	*Glycerol*
0.5	*Beeswax*
2.5	*Essential oil (or propolis extract)*
2.5	*honey*

This is another very simple formula in which essential oil is added for fragrance. Pigments can be added alone to the formula or accompanied with a specljic dispersing agent, if necessary. Melt and blend the soap, glycerol and beeswax. when the mixture starts to thicken during cooling, add the honey and essential oils. Pour into greased or oiled moulds.

9.13.7 Liquid soaps

Honey, pollen and propolis can be easily incorporated into liquid soaps. The polypeptide and amino acid components of hydrolysed pollen are thought to reduce the irritant and defatting action of the surfactants (soaps). In hygiene products for women, propolis has proven particularly effective.

Intimate soap (liquid)

Ingredients (in parts by weight) after Proserpio (1981):

15	*Coccoilamid betaine*
10	*Coccoimidazolin*

5	*Glucose C_{8-10} alkylether*
1	*Coccoilamid*
1	*Essential oils of fragrances*
65	*Water (boiled and cooled)*
2	*Citric acid*
1	*Propolis ectract (10%GEP)*

The ingredients are mixed careffilly at room temperature.

Aloe and honey soap

Ingredients (in parts by volume) after Krochmal (undated):

24	*Aloe vera gel*
1	*Chamomile extract*
1	*Calendula extract*
12	*Glycerol*

12 *Liquid castile soap*
q.s. *Honey, pollen or propolis extract*

Combine all the ingredients except the soap and stir or shake well in ajar. Then add the liquid soap. Pour into a soap dispenser or storage vessel. Honey, lipid pollen extract and EEP propolis extract can be added in small percentages, as well as special herb extracts.

9.13.8 Toothpaste and mouth rinses

From an economic and manufacturing point of view, large batches of toothpaste will be difficult to make in many countries. Obtaining the printed tubes and packing them requires special non-versatile expensive machines. Buying a base and adding flavouring, colouring, propolis and honey still leaves a packing problem, unless everything is done by a third party to specific specifications. This might only be feasible to complete a product line. For improving toothpaste for home use, and a recipe which contains propolis, see *5.16.8.* Adding beneficial products, however, does not remove less desirable ones already part of the base product. Mouth rinses are easier to prepare and package. The first three recipes

use three different thickening agents.

Toothpaste (calcium carbonate base)

Ingredients (in parts by weight) after Proserpio (1981):

60	*Water (boiled and cooled)*
2	*Hydroxy ethyl cellulose*
0.5	*Xanthum gum*
5	*Propolis extract (10%, GEP)*
60	*Glycerol*
3.5	*Sweetener and aroma*
60	*Calcium carbonate*
5	*Pyrogenic silica*
4	*Sodium laurysulfate*

Mix the propolis with the glycerol. Heat the water slightly and slowly add the cellulose. when dissolved, add the xanthum gum and then the glycerol. Stir carefully without mixing air into the paste. Continue stirring, while letting it cool and adding the other ingredients.

Toothpaste (phosphate base)

Ingredients (in parts by weight) after Proserpio (1981):

50	*Water (boiled and cooled)*
2	*Sodium carboxymethyl cellulose*
5	*Propolis extract (10%, GEP)*
50	*Glycerol*
3	*Sweetener and aroma*
80	*Dibasic calcium phosphate*
6	*Pyrogenic silica*
4	*Sodium laurylsulfate*

Mix the cellulose slowly into the water without heating. Mix the propolis with the glycerol then add the glycerol to the water. Stir well for 15 minutes (avoid trapping air) then add the other ingredients and continue stirring slowly for 20 to 30 minutes.

Clear gel

Ingredients (in parts by weight) after Bennet (1970):

40	*Glycerol*
282	*Water*
0.6	*Sodium saccharin **ate? or q.s. honey*
6.6	*Carbopol 940 resin*
0.4	*Duponol C*
40	*Water*
28	*Sodium hydroxide (10%solution)*
1	*Propolis paste*

q.s. peppermint

Prior to processing, dissolve the propolis paste in the glycerol. If the liquid is not clear, leave for 24 hours, refrigerate and filter. The saccharin sweetener may be replaced with about 3 parts of honey, or according to taste. Take a small portion from the 282 parts water and dissolve the honey in it.

While stirring the 282 parts of water, add the glycerol. Then sprinkle in the saccharin (or add honey) and mix for two minutes. Very slowly add the carbopol, mix for ten minutes and deaerate (in a vacuum) or with time for settling.

Dissolve the su~actant (Duponol) in the 40 parts of water and add to the Carbopol solution. Mix slowly for 60 minutes. Add the sodium hydroxide solution and stir for another 30 minutes. Finally, mix in the peppermint oil and stir for another 15 minutes.

Classic Toothpaste

Ingredients (in parts by volume) after Krochmal (1731):

9	*Soap flakes*
64	*Precipitated fine chalk*
12	*Glycerol*
0.5	*Oil of peppermint*
1	*Ethanol (70% by volume)*
q.s.	*Propolis extract and honey*

Combine the chalk and the soap flakes. Add the glycerol and stir until smooth. Dissolve the oil in the alcohol and add to the soap mixture. Propolis extract can be added to the alcohol part, but in the alkaline environment (soap), the propolis will discolour the toothpaste to a dark brown. Today '5 pastes do not use soaps any more, but other surfactants.

Aerosol mouthwash

Ingredients (in parts by volume):

12	*Propolis extract, 10 - 20% in ethanol*

q.s.	*Honey to taste*
2	*Peppermint oil*
1	*Coumarin (food spice)*
20	*Water*
40	*Glycerol*
325	*Ethanol (complete to 100%)*

Mix all the ingredients together until dissolved. The mixture can then be filled into a mechanical mister and used as a mouth spray. Other flavours can be used such as eucalyptol, menthol, cinnamon oil, citric acid or clove oil and mixed according to taste.

Water soluble peppermint extracts can be used and the propolis precipitate filtered out, or a more aqueous extract of propolis can be used. Glycerol in such a preparation, though preferred technically, should be minimized (or avoided) because of its relative toxicity.

Water content can only be increased slightly, before causing precipitation of the propolis extract, once the peppermint oil is added.

Aerosol mouthwash

Another aerosol mouthwash has been described as an oral spray in section 5.16.2.

9.13.9 Deodorants

A warning should be given here about adding alcohol extracts to preformulated bases or those prepared with certain gels and thickeners. The alcohol may have a strong thinning effect. The alcohol may have to be evaporated first or be replaced with another compatible liquid. Alternatively, a different thickener may be chosen. Very simple basic cold creams (section 9.13.3) or lotions (section 9.13.1) with an increased content of propolis work well and are less irritant.

1) Cream deodorant

Ingredients (in parts by weight):

1-3	*Beeswax*
8-15	*Isoparaffins (C_{10}-C_{11})*
3-5	*Vegetable oils*
0-2	*Fatty alcohols (C_{16}-C_{18})*
0-2	*Fatty acids or long chain fatty esters*
1-2	*Thickeners*
5-10	*Emulsifying agent*
q.s.	*Antioxidants*
8-12	*Zinc oxide*
1-3	*Enzyme inhibitor (triethylcitrate)*
1-3	*Zinc ricinoleate*
1-3	*Propolis glycerol extract (20%)*
q.s.	*Perfume, preservatives*
q.s. to 100	*water*

Melt the first 8 ingredients and mix them together. The next four are mixed in water and heated to 50^{0}C at which point they are mixed with the oil phase heated to the same temperature. During cooling and continuous stirring the perfumes, preservatives and propolis extract are added (at 30 to 40�C).

Emulsifiers include a wide range of cosmetics ingredients: sorbitan esters and sorbitan polyoxyethylenated esters are extensively used. Glyceryl monostearate is also useffil in many cases, when blended with alkaline soaps.

The glycerol extract can be made in the same way as the ethanol extract, by using glycerol instead of ethanol (see section 5.7). This type of extract is not expected to be as effective as ethanol extract even if the glycerol solution is heated to 40 ^{0}C. If this extract is replaced by an EEP, the alcohol should be eliminated as much as possible and the thick paste added at 0.3 to 1 parts.

2) Liquid (alcoholic) deodorant

Generic ingredients (in parts by weight):

50-70	*Ethanol**
1-3	*Glycol extracts*
0.1-0.5	*Allantoin*
1-3	*Enzyme inhibitor*
0.5-1	*Antibacterial agent**
q.s.	*Antioxidant*
1-3	*Propolis extract (10-20% EEP)**
q.s.	*Perfume*
q.s. to 100	*water*

All ingredients can be mixed at room temperature with a paddle or propeller mixer, careffilly avoiding incorporation of air.

9.13.10 Face packs Honey face pack

Honey face pack

Ingredients (in parts by weight)

Lipid phase		Aqueous phase	
8-15	*Vegetable and/or ineral oils*	*0.5-2*	*Thickener*
1-3	*Beeswax*	*3-8*	*Humectants (polyalcohols)*
1-3	*Fatty alcohol (C_{16}-C_{18})*	*3-8*	*Honey*
5-10	*Emulsifiers*	*q.s.*	*Preservatives*
0.5-1	*Polysiloxantes*	*q.s.*	*Fragrances*
q.s.	*Antioxidants*	*q.s. to 100*	*Water*

Heat and mix both the ingredients of each phase separately; then combine, homogenize and stir while cooling. Add fragrances when almost cold. This face mask can be packaged and sold. Storability in a refrigerator without preservatives and antitoxidants is several weeks. With preservatives, it should last as long as any other emulsified industrial creams.

Face mask gel (monophasic gel)

Ingredients (in parts by weight) after Proserpio (1981):

10	*Honey*
75	*Water*
5	*Hydroxymethyl cellulose*
2.25	*Ricinus oil (40) OE*
0.25	*Essential oils of fragrances*
2.5	*Pollen, glycol extract*
5	*Glycerol*

Dissolve the honey in 10 parts of water, then add to the rest of the water at room temperature. Rapidly stirring the honey water, add the cellulose very slowly. Stir until completely dissolved and avoid aerating the solution too much. Mix the pollen extract with the glycerol and add all the oils one after the other to the cellulose, honey and water mix. Stir for a few more minutes to ensure

homogeneous distribution.

This face mask can be stored refrigerated over a long period. For regular marketing it should keep at least a few months. Glycol extract of propolis may be added too, and will increase the cleansing power of the mask.

9.13.11 Make-up

Eye colouring cake

Ingredients (in parts by weight):

4	*Glyceryl stearate SE*
1	*Propylene glycol stearate SE*
2	*Stearic acid TP*
1	*Beeswax*
1	*Isopropanolamine*
1	*Pigments*

q.s.	*Preservatives*

Mix and heat until a homogeneous mass is formed. Before completely cool, fill into trays or small forms in which the various coloured cakes are to be sold.

Eye colouring cream

Ingredients (in parts by weight):

8	*Propylene glycol*
3	*Cetyl alcohol*
9	*Beeswax*
7	*Isopropyl miristate*
8	*Glyceryl stearate and laureth-23*
1.3	*Cetyl lactate*
2	*Polyglyceryl-r oleate and PEG-8 propylene glycol cocoate*
9	*Pigments*

0.2	*Calcium stearate*
q.s.	*Preservatives*
q.s. to 100	*water*

Melt, mix and emulsijy like other w/o creams.

Eye shadow

Ingredients (in parts by weight) after Brown (1981):

1	*Beeswax*	*4*	*Liquid paraffin or mineral oil*
2	*Lanolin*	*2*	*White petrolatum (Vaseline)*
2	*Paraffin wax*	*4*	*Pigment*
		q.s.	*Essential oils*

This is a much simpler recipe than the preceding one and is said to work well.

Melt the ingredients in a water bath and mix well. Disperse the pigment in part

of the liquid paraffin using a mortar and pestle or mill, then add it to the melted waxes. Stir very well and continue stirring during cooling but avoid aerating the mixture. Essential oils may be added for fragrance.

Eyelid make-up crayons

Ingredients (in parts by weight):

20-40	*Ceresin wax*
10-22	*Petrolatum (Vaseline)*
1-12	*Lanolin (or beeswax)*
10-20	*Castor oil*
5-23	*Pigments*

The ingredients are warmed and thoroughly mixed together. The oil and waxes can be varied in type and quantity to achieve the right consistency. This recipe cited by Fox (1992) has been described in a Polish patent awarded to Pruszkowskie Zaklady Materialow.

Eyebrow pencil

Ingredients (in parts by weight):

	I		*II*
15	*Lanolin (or beeswax)*	*20*	*Japan wax (or beeswax)*
15	*Stearic acid*	*10*	*Stearic acid*
20	*Carbon black (lamp black)*	*25*	*Carbon black*
10	*Titanium dioxide*	*5*	*Titanium dioxide*
20	*Talc*	*20*	*Talc*
17	*Sericite (mica)*	*14*	*Sericite (mica)*
3	*Sodium carboxyl-methyl-cellulose (as binder)*	*6*	*Hydroxyethyl cellulose as binder*
24	*Water*	*42*	*water*

The water-soluble binder is mixed with water and added to the rest of the ingredients. The mix is heated and moulded into rods which are dried. A proper wrapping or other protective shell should be applied. As can be seen from the second, similar formulation other aqueous binders can be used and the proportion and types of wax may be changed. The base recipes (without beeswax) are from a patent of the Tombow Pencil Co., Ltd., as reported in Fox (1992).

Mascara (o/w, water and smudge proof)

Ingredients (in parts by weight) after Cosmetics and Toiletries (1992):

A)	*1*	*Carnauba wax*
	5	*Candelile wax*
	5	*Beeswax*
	2	*Ozocerite*
	5	*Stearic acid*
B)	*54.25*	*Deionized water*

	3	*Propylene glycol*
	3	*Cetyl alcohol*
	3	*Lanolin oil*
C)	*5*	*Dermacryl 79, Acrylates/t-octylpropenamid copolymer*
D)	*5*	*Iron oxide (7133 Purified Black Oxide)*
E)	*1*	*Propylene lycol, diazolidinyl ure, methylparaben propylparaben*

Combine the ingredients listed under A and heat to 85 ^{0}C. Mix the ingredients listed under B in a separate vessel. While maintaining good agitation, without aeration, slowly add the Dermacryl 79 (C) to the mixture B. Heat to 85^{0}C. When uniform, add mixture A to mixture BC, then add the iron oxide (D) and continue mixing. Cool to 50^{0}C and add the ingredients listed under E. Cool to room temperature. The final pH should be approximately 7.8.

Black mascara (simple recipe)

Ingredients (in parts by weight) after Brown (1981):

6	*Beeswax*	*16*	*Triethanolamine*
20	*Paraffin*	*5*	*Carbon black*
4	*Lanolin*	*q.s.*	*Essential oils*

Melt the waxes and mix well. Take two or three parts of the melted waxes and mix with the carbon black with a mortar and pestle or ball mill. Stir well during and after adding the premixed pigment. If necessary, mill using a pebble or ball mill. Continue stirring during cooling. Below 40^{0}C, add the essential oils, pour into shallow tins or jars and allow to set before sealing.

Contents - Previous - Next

9. 13.12 Lipsticks and glosses

Contents - Previous - Next

Lipstick

In general, lipsticks are composed of variable proportions of the following ingredients (in parts by weight):

15-30	*Plant and mineral waxes*
3-8	*Beeswax*
2-5	*Fatty alcohols (C_{16}-C_{18})*
5-10	*Liquid, branched chain alcohols/esters*
15-30	*Mineral oil (white petrolatum)*
5-10	*Rosin methyl ester*
1-3	*Honey*
q.s.	*Perfume*
q.s.	*Antioxidant*

q.s.	*Sunscreen (micronized Ti02)*
q.s. to 100	*Castor oil*

–

are base formulations for lipsticks:

Ingredients	F1 (in parts by weight)	F2 (in parts by weight)	F3 (in parts by weight)
Beeswax	*15*	*10*	*6*
Carnauba wax	*10*	*3*	*3*
Candelille wax	-	*8*	*7*
Ozocerite	-	*4*	*5*
Lanolin	*5*	-	-
Acetylated lanolin	-	-	*5*
Lanolin alcohols	-	*5*	-
ricinoleate	-	*10*	-
Isopropyl lanolate	-	-	*5*

Lanolin alcohols ethers	*-*	*5*	*-*
(2 OP)	*5*	*-*	*-*
Lanolin alcohols	*-*	*-*	*25*
Cetyl alcohol	*-*	*-*	*5*
Isopropyl palmitate	*65*	*55*	*28*
Miristyl lactate	*q.s.*	*q.s.*	*11*
Castor oil	*q.s.*	*q.s.*	*q.s.*
Pigments	*q.s.*	*q.s.*	*q.s.*
Perfume			
Antiodisants and preservative			

The waxes, alcohols and oil are mixed together one after the other into the melted beeswax, at a temperature of about 70^{0}C. Depending on the pigments and antioxidants used, they' can be added at this stage (hot) or once the mix has cooled. The pigments may have to be premixed in the castor oil. Pe~mes are added at approximately 40^{0}C or before the mass becomes too viscous. The final

mix is poured into forms, or extruded for large scale production.

Lipstick

Ingredients	*Lipstick (parts by weight)*	*Lucid lipstick (parts by weight)*
Beeswax	*7.5*	*7*
Carnauba wax	*12.5*	*8*
Candelilla wax	*2.5*	*5*
Cacao butter	*15*	*10*
Hydrogenated	*12*	*30*
lanolin	*50*	*39.5*
Ricinus oil	*0.5*	*0.5*
Sweeteners and aromas		

Both formulations are after Proserpio (1981). If the sweetener is honey, its quantity should be increased. Melt the ingredients and mix them well. Pour into

forms before hardening. This is a more protective type of lipstick (rather than a fashion, coloured one) but some pigments or a Uvfilter can be added.

Simple lipstick

Ingredients (in parts by weight) modified from Brown (1981):

3	*Beeswax*	*6*	*White petrolatum (Vaseline)*
6	*Ceresin*	*2*	*Liquid paraffin*
1	*Lanolin*	*1*	*Cetyl alcohol*
2	*Pigments**	*q.s.*	*Essential oila**
		q.s.	*Honey**

**** optional***

Prepare moulds of small diameter, similar to wax candles, using plastic tubing, PVC or metal pipes and metal foil tubes. Clean plastic syringes of the right diameter work very well. Leave the plunger, but the tip of the syringe should be cut off. The plunger will also help in removing the stick.

Melt the wax and stir in the other products. If so desired, pigments can be predispersed in the liquid paraffin and essential oils and honey should only be added below 50^{0}C. Pour into the moulds when almost cool. Once hardened, place into the lipstick holders and pass the tip quickly through a low flame to give it a glossy finish.

Protective lipstick

Ingredients (in parts by weight) after Proserpio (1981):

25	*Beeswax*
5	*Cetyl alcohol*
30	*Oleic alcohol*
25	*Mineral or ricinus (castor) oil*
15	*Paraffin*
q.s.	*Aromatic oils and sweetener (honey)*

Heat wax in a water bath (70 – 75�C) add other ingredients and mix well. Before

hardening, add aromatic oil and pour into forms. Sweetner can be honey and, for some applications, a UVfilter and some pigments can be added as well.

Moisturizing lipstick

Ingredients (in parts by weight) after Cosmetics and Toiletries (1992):

A)	*14*	*Lanolin (an hydrous Lanolin P95)*
	5	*Lanolin oil (Argonol 50)*
	40	*Mineral oil*
	6	*Cetyl alcohol*
	2	*Ozocerite*
	8	*Candelilla wax*
	q.s.	*Preservative*

B. Pigments dispersed in castor oil:

10	*Titanium oxide*

	8	*Mica (and) titanium dioxide (Timica Pearl White)*
	6	*D&C red 6 barium lake*
C)	*q.s.*	*Fragrance/flavour*

Heat the ingredients listed under A and mix until clear. Add premixed B and mix well. Adjust the temperature to 60^{0}C and add C. Pour into moulds. This formulation makes an elegant glossy lipstick, which spreads easily and conditions the lips.

Anhydrous (waterless) lip ointment

Ingredients (in parts by weight):

2-5	*Beeswax*
2-5	*Hydrogenated castor oil*
10-20	*Polydecene*
20-40	*PEG 22 dodecylglycol copolymer*
5-10	*Mineral oil (white petrolatum)*

5-15	*Honey*
q.s.	*Sunscreen*
q.s.	*Fragrance*
q.s. to 100	*POE 20 castor oil*

Mix like any other ointment.

Lucid lip ointment

Ingredients (in parts by weight) after Proserpio (1981):

5	*Beeswax*	*10*	*Hydrogenated lanolin*
10	*Honey*	*5*	*Hydrogenated ricinus oil*
60	*Ricinus oil*	*q.s.*	*Fragrances*
10	*Cacao butter*		

Mix like other ointments in section 9.13.3.

A very simple lip gloss can be made by melting 12 parts of cocoa butter with 1 part beeswax (Krochmal, 1973).

Tinted lip gloss

Ingredients (in parts by volume) after Krochmal (1973):

12	*Beeswax*
24	*Almond oil*
0.25	*Carmine*
0.05	*Oil of rose*

Melt the wax over a low heat in a water bath and stir in the carmine. Gradually add the almond oil and the oil of rose

9.13.13 Depilatory waxes

Depilatory waxes are made using various proportions of resins, beeswax and oils. To obtain a low melting point near 40 to 45 ^{0}C, honey is sometimes included. No

other ingredients are essential for this mixture. The liquified waxes are applied in a thin film on the skin and covered with a strip of muslin cloth pressed firmly to the skin. When cooled, the skin is pulled taut and the cloth strip is pulled against the direction of hair growth.

A French patent describes aromatic oils and resins added to beeswax as analgesics or perfumes and triethanolamine as an emulsifier. The final mixture is spread on a siliconized paper. According to Anon (1965) it consists of the following (in parts by weight):

20	*Beeswax*	*1*	*Benzoin*
170	*Resin*	*0.5*	*Lemongrass oil*
90	*Vegetable oil*	*1*	*Butyl p-aminobenzoate*
10	*Triethanolamine*	*0.5*	*Jaborandi alcohol*
1	*Tolu balsam*		

Depilatory cream

Ingredients (in parts by volume):

42	*Rosin*
37	*Beeswax*
6	*Carnauba wax*
15	*Mineral oil (white petrolatum)*
q.s.	*Preservatives, antioxidants and perfume*

Melt the beeswax and the carnauba wax and mix in the resins and oil. When cooled to below 40^{0}C add the other ingredients. If preservatives and antioxidants are heat stable, they can also be mixed earlier

9.13 14 Shaving preparations

Shaving cream (o/w)

Ingredients (in parts by volume) after Krochmal (1973):

4	*Stearic acid*
4	*Mineral oil*
6	*Beeswax*
4	*Soap flakes*
16	*Water (clean)*

Heat the water to 70^{0}C and dissolve the soap. Melt the stearic acid and beeswax in a water bath to 75 ^{0}C and stir this into the soapy water Oand emulsift. Stir and mix well. When homogeneous, stir in the mineral oil. The mix might also be scented with 0.1 part of an essential oil.

After shave lotion

Ingredients	***I (parts by weight)***	***II (parts by weight)***
Ethanol (96% volume)	*50*	*50*

Sorbitol	*2.5*	*-*
Fragrance (aromatic oil)	*0.5*	*0.5*
Menthol	*0.1*	*0.1*
Methyl paraben (preservative)	*0.2*	*-*
Witch hazel extract	*5*	*5*
Propolis extract (10% EEP)	*1*	*1*
Water	*q.s. to 100*	*q.s. to 100*

Dissolve all the ingredients completely in the alcohol and dilute with the water, mixing thoroughly. Leave to stand for 1 to 2 days with adequate chilling or 1 week without chilling, then filter to clear and bottle.

After shave cream (o/w)

Ingredients (in parts by weight):

3.0	*Glyceryl monostearate*
0.5	*Beeswax*

1.5	*Stearyl alcohol*
2.5	*Sorbitol*
2.5	*Lapyrium chloride (Emcol 607 Witco)*
1.0	*Steapyrium chloride (Emcol E 607 S Witco)*
0.1	*Sodium benzoate*
0.3	*Fragrances*
q.s. to 100	*Water*

Heat the first three ingredients together to 70�C. In another vessel dissolve the next four ingredients in water and heat to 70�C. Add the oil phase to the aqueous phase with good agitation and continue stirring while cooling. Add the fragrances, at or below 40�C. Continue stirring slowly until the mix reaches 25�C. Bottle after 24 hours.

After shave gel

Ingredients (in parts by weight):

0.25	*Carbomer 941*
q.s. to 100	*Water*
2.0	*Glycerol*
50.0	*Ethyl alcohol*
2.5	*TEA 10% aqueous*
0.1	*Menthol*
0.1	*Propolis extract (EEP)*

Under rapid stirring, slowly add the carbomer resin to the water - glycerol mix. Continue mixing until free of undispersed particles. Dissolve menthol and propolis in alcohol. Mix the two phases (aqueous and alcohol). Add the TEA slowly, with good agitation.

For simpler production the resin and gel agent may be replaced with locally available gel forming substances (pectin or agar), but compatibility with the alcohol has to be tried first and different ratios tested. The final consistency will

be different. Propolis content can be increased considerably.

[3] Dr Luigi Rigano assisted in the preparation of this Chapter with technical advice and provision of formulations.

[4]Beeswax is completely non-allergenic, but possible contamination with pollen may cause allergic reactions in extremely sensitive persons. Such effects are reduced or eliminated by bleaching (almost all cosmetically used beeswax is bleached) and otherwise freeing beeswax from pollen by filtering.

Contents - Previous - Next

ANNEX 1
BIBLIOGRAPHY

Contents - Previous - Next

Accorti, M., Piazza, M.G., Persano Oddo, L. and Sabatini, A.G. (1986) Schede di caratterizzazione delle principali qualita' di miele italiano. Apicoltura, 2: appendi

Accorti, M. 1992. [The influence of the environment on the behaviour and biology of bees in environmental monitoring]. In Proc. of Symp. on "The honeybee as monitoring insect for agricultural pollution1~, 1992, Florence 41-53

Adam, Brother 1953. Mead. Bee World, 34(8): 149-156

Adams, F. 1939. The genuine works of Hippocrates. Williams & Wilkins, Baltimore, U.S.A.

Adjare, S.O. 1984. The golden insect, A handbook on beekeeping for beginners. IT Publications, Russell Press Ltd., Nottingham, UK, 104 pp.

Adjare, S.O. 1990. Beekeeping in Africa. FAO Agricultural Series, Bulletin 68/6, Rome, Italy, 130 pp.

Aeppler, C.W. (1922) Tremendous growth force. Gleaning in bee culture, *50:* 69-73
Afifi, E.A., Khattab, M.M., El-Berry, A.A., and Abdel-Gawaad, A.A. (1989) Effect of

royal jelly on guinea-pig growh. In Proceedings of the Fourth International Conference on

Apiculture in Tropical Climates. Cairo, Egypt, 6-10 November 1988. IBRA, London, U.K.

Ahmed, S.M., Gupta, M.R. and Bhavanagary, M.M. 1976. Stabilization of pyrethrins for prolonged residual toxicity Part II. Development of new formulations. Pyretlirum Post, 13 (4): 119-121

Aleksandrova, L.I. and 8 others 1972. Rosin and beeswax composition (polish). USSR Patent No.329813

Alfa-Laval 1988. Centri-therm: ultra-short-time evaporator for heat sensitive liquids. Lund. Sweden, 8 pp.

Alford, D.V. 1975. Bumble bees. Davis-Poynter, London, UK.

American Bee Journal 1982. Cosmetic natural waxes are not melting away. Amer. Bee I., 122 (12): 822-823

American Bee Journal 1993. U.S. honey, beeswax and pollen prices. Amer. Bee J., 133 (4): 235

Ammon, R. and Zoch, E. (1957) Zur Biochemie des Futtersaftes der Bienenko~mgin. Arzneimitt. Forsch. 7: 699-702

Andrich, G., Fiorentini, R. and Consiglieri, A. 1987. [Characteristics of some samples of propolis from the Ligurian Coast] Caratteristiche di alcuni tipi di propoli della Riviera Ligure. Citta delle Api, (28): 30-31, 34, 35, 37, 38.

Anonimous. 1981. Infant botulism. FDA Drug Bull. 11:11-12

Apimondia 1975a. A valuable product of beekeeping: propolis. Researches and views on its composition, properties and therapeutic value. Apimondia Publishing House, Bucharest, Rumania, 167 pp.

Apimondia 1975b. The hive products: food health and beauty. Proc. of Intern. Symp. on Apitherapy. Apimondia Publishing House, Bucharest, Romania, 154 pp.

Apimondia 1976. Apitherapy today. Apimondia Publishing House, Bucharest,

Romania, 105 pp.

Apimondia 1977. New apitherapy research. Proc. of Second Intern. Symp. on Apitherapy. Apimondia Publishing House, Bucharest, Romania, 360 pp.

Apimondia 1978 A remarkable hive product: propolis. Apimondia Publishing House, Bucharest, 250 pp.

Anon 1965. Productions du docteur Anon. French Patent No.1,396,582. In: Chem. Abstr. 63: 6782g *(1965).*

Armon, P.J. 1980. The use of honey in the treatment of infected wounds. Tropical Doctor, 10: 91.

Arora, D.D. and Kual, K.K. 1973. Feeding practices during the first five years among central Indian communities. Indian Journal of Pediatrics, 40: 203-216.

Asencot, M. and Lensky, Y. (1975) Des larves femelles d'abeille mellif~re, nourries avec de la gelee d' ouvrie'res supplementee, naissent des reines adultes. XXV Congr. Int. Apic. (Grenoble), Apimodia, Bucharest, 271-278.

Asis, M. 1979. El propoleo, un valioso producto apicola. Ministeno de Agricultura, Havana, Cuba, 124 pp.

Asis, M. 1989. [Propolis: the purple gold of honeybees.] Centro de Informaci6n y Documentaci6n Agropecuano, Havana, Cuba, *255* pp.

Ask-Upmark, E. 1967. Prostatitis and its treatment. Acta Med. Scand., 181: 355-357

Aubert, S. and Gonnet, M. 1983. Mesure de Ia couleur des miels. Apidologie, 14 (2): 105-118

Aureli, P., Hatheway, C.L., Fenicia, L. and Ferrini, A.M. 1986. Prime segnalazaioni di casi di botulismo infantile in Italia. Ann. 1st. Super. Sanita', 22: 855-858

Bailey, R.C. 1989. The Efe: archers of the African rain forest. Nat. Geographic, 176: 664-668

Banks, B.E.C. and Shipolini R.A. 1986. Chemistry and pharmacology of honeybee venom. In "Venoms of the Hymenoptera", T. Piek (ed.), Academic Press, London, chpt. 7, 329-416

Bankova, V. and 7 others. 1988. [On the chemical composition of some propolis fractions with antiviral action.] Acta Microbiologica Bulgarica, 23: 52-57

Bankova, V. and 4 others. 1991. A study on the origin of Bulgarian propolis. Apiacta, 26(1): 13-17

Bankova, V., Dyulgerov, A., Popov, S., Evstatieva, L. Kuleva L., Purb 0. and Zamjansan, Z. 1992. Propolis produced in Bulgaria and Mongolia: Phenolic compounds and plant origin. Apidologie, 23 :79-85

Bankova, V. Dyalgerov, A., Popov, S. and Marekov, N.L. 1987. [A GC/MS study of the propolis phenolic constituents.] Z. f. Naturforschung, 42:147-151

Bansal, R.D., Ghosh, B.N., Bhardwaj, U.D. and Joshi, S.C. 1973. Infant feeding and weaning practices at Simla-Hills, Himachal Pradesh. Indian I. Medical Research, 61 (12): 1869-1875

Barral, G. and D. 1992. Propolis ointment with Vaseline. Pers. communication.

Bee Well, 1992 and 1993. The Quarterly Newsletter of the American Apitherapy

Society (many case histories and literature reviews) Vol.2 and 3. (see Annex for address)

Bennett, H. 1970. The new cosmetic formulary. Chemical Publ. Comp., New York, 150 pp.

Benkova, M., Boroskova', Z., Dubaj, J. and Sze'chenyi, S. 1989. The immunomodulative effect of propolis preparations on guinea pigs with experimental ascaridosis. Helminthologia 26(2): 163-172

Benson, G.G., Hemingway, S.R. and Leach, F.N. 1978. Coi~p9sition of the wrappings of an ancient Egyptian mummy. J. Pharmacy and Pharmacology, 30 (supplement), 78

Benson, K. 1984. Cleaning and handling pollen. Amer. Bee J. 124: 301-305

Benton, A.W. and Morse, R.A. 1968. Venom toxicity and proteins of the genus Apis. J. Apic. Res., 7 (3): 113-118

Benton, A.W., Morse, R.A. and Stewart, J.D. 1963. Venom collection from

honeybees. Science, 142 : 228-230

Bera, L.N., Adam, V.E. and Costea, D. 1971. Solid paste for wear-resistance enhancement of cutting tools. Romania Patent, 51103, 2 pp.

Bergman, A. Yanai, J., Weiss, I., Bell, D. and Menachem, P.D. 1983. Acceleration of wound healing by topical application of honey. An animal model. The American J. of Surgery, 145 : 374-376

Berthold, R. 1993. Beeswax crafting. Wicwas Press, Cheshire, Conn., U.S.A., 128 pp.
Berthold. R. 1988a. A new concept in mead making. Amer. Bee J., 128: 820-824
Berthold, R. 1988b. A delicious way to increase sales, honey and fruit, Glean. Bee Cult., 116 (7): 408-410

Bezborodov, V.G. 1968. [Technological properties of slips for the hot casting of glass articles under pressure.] Steklo Keram., 25 (7): 24-27

Bhandari, N.R. and Patel, G.P. 1973. Dietary and feeding habits of infants in various socio-economic groups. Indian Pediatrics, 10 (4): 233-238

Bianchi, E.M. 1990. Control de calidad de la lmiel y de la cera. FAO Agricultural Series, Bulletin No.68/3, Rome, Italy, 69 pp.

Bianchi, E.M. 1991. Preparacidn de Tintura, Extracto Blando, Pomada 0 Unguento, Jabon y otros productos a base de propoleo. CEDIA: 1-30

Birshtein, V.Y., Tul'chinskii, V.M. and Troitskii A.V. 1976. [A study of organic components in ancient Central Asian and Crimean wall paintings.] Vestnik Moskosvkogo Universiteta. 31(3): 33-38

Birshtein, V.Y. and Tul'chinskii, V.M. 1977. [Determination of beeswax and some impurities by infrared spectroscopy.] Khimiya Prirodnykh Sodinenil. (2): 271-275

Blum, M.S., Novak A.F. and Taber III, 5. *1959.* 10-Hydroxy-decenoic acid, an antibiotic found in royal jelly. Science, 130 : 452-453

Blum, M.S., Jones, T.H., Rinderer, T.E. and Sylvester, H.A. 1988. Oxygenated compounds in beeswax: Identification and possible significance. Comp. Biochem. and Physiol., 91(3): 581-583

Bogdanov, 5. 1989. Determination of pinocembrin in honey using HPLC. I. Apic. Res., 28 (1): 55-57

Bonomi, A. 1959. [Observations and remarks on the effect of royal jelly on the increase in weight, the haematological picture, the development of male gonads and the demobromatological composition of the flesh of chickens]. 1st. Zootecn. Gen., Univ. Parma, H.H: VI Convengo Salute: 18 pp

Bonomi, A., Marletto F. and Bianchi, M. 1976. [Use of propolis in the food of laying hens.] Revista di Avicultura, 45 (4): 43-55

Bonomi, A. (1983) Acquisizioni in tema di composizione chimica e di attivita' biologica della pappa reale. Apitalia, 10 *(15):* 7-13.

Borgia, M., Sepe, N., Brancato, V., Simone, P., Costa, G. and Borgia, R. (1984) Efficacia e tollerabilita' di un preparato a base di miele, pappa reale e ginseng in un gruppo di pazienti affette da tubercolosi cronica. Clinica Dietologica, 11 443-447.

Brand, H.M. 1989. Modified beeswax and a process for the modification of

beeswax. European Patent Application No. EP 319 062, 21 pp.

Braines, L.N. 1959. Royal jelly I. Inform. Bull. Inst. Pchelovodstva, 31 pp (with various articles)

Braines, L.N. 1960. Royal jelly II. Inform. Bull. Inst. Pchelovodstva, 40 pp.

Braines, L.N. 1962. Royal jelly III. Inform. Bull. Inst. Pchelovodstva, 40

Broadman, J. 1962. Bee venom: the natural curative for arthritis and rheumatism. Putman, New York, 220

Bromenshenk, J.J. and 3 others 1985. Pollution Monitoring of Puget Sound with honeybees. Science, NY, 227 : 632-634

Brown, D. and Kosikowski, F.B. 1990. How to make honey yoghurt. American Dairy Review (4)

Brown, R.H. 1981. Beeswax. Bee Books New & Old, Burrowbridge, UK, 74 pp. (2nd edition in 1989)

Brumfitt, W., Hamilton-Miller, J.M.T. and Franklin, 1.1990. Antibiotic activity of natural products: 1. Propolis. Microbios 62:19-22

Budavari, S. (ed.) 1989. The Merck Index. Merck & Co., Rahway, NJ.

B�ll, R. 1959-1977. Vom Wachs: Hoechster Beitra~ge zur Kenntnis der Wachse. (Of waxes:...) Hoechst AG, Frankfurt, Germany, vol.1 in 12 parts, 1097 pp.

Burgett, M. 1990. Bakuti - a Nepalese culinary preparation of giant honeybee brood. The Food Insects Newsletter, 3 (3): 1-2

Burlando, F. 1978. [About the therapeutic action of honey on burn wounds.] Minerva dermatolog. 113: 699-706

Buscigho, J.A. 1988. ssAnti-inflammatgory topical compositions containing lidocaine and diphenhydramine [and propolis]. USA Patent No.4 748 002, 5 pp.

Canadian Honeybee Research Association (CHRA), 1988. The propolis trap. CHRA, B.C. Newsletter, June, 2-3

Carli, H.O. De., Cornejo, L.G. and Maljar, L. (1975) Aterosclerosis expermental.

Ministeno de Asuntos Agrarios, Buenos Aires, Argentina, *(1975),* 63 pp.

Cartland, B. 1970. The magic of honey. Corgi Books, London, UK, 160 pp.

Cavanagh, D., Beazley, 1. and Ostapowicz, F. 1970. Radical operation for carcinoma of the vulva. A new approach to wound healing. The 1. of Obstet. & Gynaec. BC, 77 (11)1037-1040

Chauvin, R., Deftomont, C., Louveaux, 1. and Verge', 1.1952. Sur une substance presente dans le pollen, qui s'oppose au developpement de certaines bacteries. Compt. Rend. Soc. Biol. 146: 645

Chauvin, R. and Louveaux, 1. (1956) Etdue macroscopique et microscopique de lagelee royale. L'apiculteur.

Chauvin, R. Action physiologique et therapeutique des produits de la ruche. In Traite' de biologie de l'abeille. Paris, France, Masson et Cie, (1968) Tomme III, 116-1154.

Chernyak, N.F. 1973. On synergistic effect of propolis and some anti-bacterial

drugs. Antibiotiki, 18 : 259-261

Chirife, 1., Scarmato, G. and Herszage, L. 1982. Scientific basis for use of granulated sugar in treatment of infected wounds. The Lancet, : 560-561

Cho, Y.T. 1977. Studies on royal jelly and abnormal cholesterol and triglycerides. Amer. Bee 1., 117 : 36-38

Cho, H., Toni, M. and Kanamori, T. 1988. [Deodorants controlling mouth odour.] Japanese Patent No. JP 63 264 516 [88 264 *516],* 6 pp.

CHRA. 1988. The propolis trap. Newsletter, Canadian Honeybee Research Assocition of British Columbia, June, 2-3

Clauss, B. 1982. Beekeeping handbook. Ministry of Agriculture, Gaborone, Botswana.

Clauss, B. and R. 1991. Zambian Beekeeping Handbook. Mission Press, Ndola, Zambia, 108 pp.

Codex Alimentarius Commission 1989. Codex standards for sugards (honey).

Supplement 2 to Codex Alimentarius Volume III. Food and Agriculture Organization of the United Nations and World Health Organization, Rome.

Codex Alimentarius 1994. Honey. 2nd Edition, FAO/WHO, Vol.11: 21-24

Codex Alimentarius 1995. Standards for honey. 2nd Education, FAO/WHO Vol.13 (in preparation).

Coggshall, W. and Morse, R.A. 1984. Beeswax: production, harvesting, processing and products. Wicwas Press, Ithaca, NY, USA, 192 pp.

Colangelo, M. 1980. Combo-packed yoghurt and granola gives convenience a healthy image. Dairy Field 163 (10): 95-96, 98, 100.

Cohn, M.E. and 3 others 1986. La qualite' des miels du commerce. Cah. Nut. Diet., 21 (3): 219-222

Contari, G. 1987. [Process for the propolis extract preparation]. Apicolt. Mod., 78 :147-150

Contessi, A. (1990) Le api, biologia, allevamento, prodotti. Edagricole, Bologna

Coprean, D. and 4 others. 1986. [Effect of standardized propolis extract in the experimentally intoxicated liver of rats.] Clujul Medical, 59(4): 333-337

Cortopassi-Laurino, M. and Gelli, D.S. 1991. Analyse pollinique, propriete's physicochimiques et action antibacterienne des miels d'abeilles africanisees Apis mellifera et de Meliponine's du Bresil. Apidologie 22: 61-73

Cosmetics and Toiletries. 1992. Various formulae. Cosmetics and Toiletries 107(4): 96, 99

Costantini, F. and Ricciardelli d'Albore, G. 1971. Pollen as an additive to the chicken diet. Proc. 23rd International Apicultural Congress, Apimondia, p.539-542.

Couture, H. and Guzzi, D. 1989. Candle making using beeswax. Leaflet from Trop.

Beekeeping Newsletter, IBRA, Cardiff, UK, 3 pp.

Crane, E. 1975. Honey: A comprehensive survey. Heinemann (in coop. with IBRA), London, U.K. 608 pp.

Crane, B. 1979. Honey in relation to infant botulism. Bee World, 60(4): 152-154

Crane, B. 1980. A book of honey. Oxford University Press, Oxford, U.K., 198 pp.

Crane, E. 1984. Bees, honey and pollen as indicators of metals in the environment. Bee World, 65 (1): 47-49

Crane, E. 1990. Bees and beekeeping: Science, Practice and World Resources. Cornstock Publ., Ithaca, NY., USA. 593 pp

Cuellar Cuellar, A. and Rojas Hernandez, N.M. 1987. [Chemical components of Cuban propolis, 1.] Revista Cubana de Farmacologia, 21(3): 365-372

Cue llar Cue llar, A., Rojas Hernandez, N.M. and Martinez Perez, J. 1990. p[New antimicrobial structure from propolis collected in Cuba.] Revista Cubana de Farmacia, 24 (1): *51-58*

Csuka, J., Baumgartner, J. and Dubay, J. 1978. [The effect of royal jelly on some reproductive characters of Japanese quail.] Zivocisna Vyroba, 23 (5): 395-400

Dadant & Sons 1975. The hive and the honeybee. Dadant & Sons, Hamilton, Illinois, USA, 740 pp. (see Graham, 1992, for newer edition)

Dadant, 1992. The hive and the honeybee. Dadant & Sons, Hamilton, Ill., USA, 1324 pp. (see also Graham, 1992)

Daharu, P.A. and Sporns, P. 1984. Phenol residue levels in honey. J. Apic. Res., 23 (2): 110-113

Dany, B. 1988. Selbstgemachtes aus Bienenprodukten. Ehrenwirth Verlag, Mu~nchen, 174 pp.

De Belfever, B. (1958) La gelee royale des abeilles. Maloine, Paris.

Debuyser, E. 1984. La propolis. These pour dipl6me de docteur en Pharmacie. Fac. Pharmacie, Univ. Nantes, France, 34 pp.

DeNavarre, M.G. 1962. The chemistry and manufacture of cosmetics. Vol.11 - Cosmetic Materials. D. Van Nostrand Comp., Princeton, NJ., USA.

Denis, L.J. 1966. Chronic prostatitis. Acta Urol. Belg., 34: 49-55

Derevici, A. and Petrescu, A. (1965) Experimental studies in vitro and in vivo on the virulicidal action of royal jelly. Lucr. Stunt. Stat. cent. Sen. Apic. (1965), 5:135-

143.

Destrem, H. (1956) Experimentation de la gelee royale d'abeille en pratique geriatrique (134 cas). Rev. Franc. Geront, 3.

Destrem, H. (1981) La gelee royale chez les personnes agees. Revue Fran~aise d'apiculture, numero speciale (Apitherapie 1981)16-18.

Devakumar, C., Baskaran, S. and Mukerjee, 5K. 1986. Isolation of N=triacontanol from Indian beeswax and its effect on dry matter of rice. Indian Journal of Agricultural Sciences, *56(10):* 744-747

Diaz Gonzalez, J.A. and Iglesias Perez, H. 1977. Characteristics of Cuban beeswax. Revista Cubana de Farmacia, 11(1): 75-82

Dietz, W., Martin, P.J. and Harcus. J.F. 1976. Bees as a protein supplement for pigs. Can. J. Anim. Sci., 56 (4): 841

Dietz, A. 1975. Nutrition of the adult honeybee. In: The hive and the honeybee. Dadant & Sons, Hamilton, Ill., p.125-156

Dietz, A. and Stevenson, H.R. 1975. The effect of long-term storage on the nutritive value of pollen for brood rearing of honeybees. Amer. Bee J. 115: 476-477, 482

Dietz, A. and Stevenson, H.R. 1980. Influence of long-term storage on the nutritional value of frozen pollen for brood rearing of honeybees. Apidologie, 11:143-151

Dillon, J.C. and Louveaux, J. Pollen et gelee royale. Cah. Nutr. Diet. (1987), 22 (6): 456-*465.*

Dimov, V., Ivanovska, N., Bankova, V. and Popov, 5. 1992. Immunomodulatory action of propolis: IV. Prophylactic activity against Gram-negative infections and adjuvant effect of the water-soluble derivative. Vaccine, 12 (V): 1-7

Dimov, V., Ivanovska, N., Manolova, N., Bankova, V., Nikolov N. and Popov, 5. 1991. Immunomodulatory action of propolis: Influence on anti-infectious protection and macrophage function. Apidologie, 22:155-162

Donadieu, Y. 1975. Le miel. Maloine Ed., Paris, 36 pp.

Donadieu, Y. 1979. La propolis. Editions Maloine, Paris.

Donadieu, Y. 1980. La gelee royale. Maloine, Paris

Donadieu, Y. 1983. Honey in natural therapeutics. Paris: Maloine Editeur, S.A., 28 (2nd.)

Donadieu, Y. and Marchiset, C. 1984. La cire (wax).. Editions Maloine, Paris, 131 pp.

Doner, L.W., Chia, D. and White, J.W. 1979. Mass spectrometric $^{13}C/^{12}C$ determinations to distinguish honey and C_3 plant syrups from C_4 plant syrups (sugar cane and corn) in candied pineapple and papaya. J. Ass. Off. Analyt. Chem., 62 (4): 928-930

Dorato, S. 1987. Water solub le jplant extracts in cosmetics. Cosmetics and Toiletries 102: 70-73

Dotimas, E.M. and Hider, R.C. 1987. Honeybee venom. Bee World, 68 (2): 51-70

Driesche, D. Van 1983. Hand-dipped beeswax candles. Amer. Bee J., 123 (3): 173-176

Dubaj, J. and 7 others. 1988. [Agent for the regeneration of damaged tissue containing pantothenic acid, zinc, and extract of propolis.] Czech Patent No. CS 253 424, 13 pp.

Dubovsky, I. and 6 others. 1988. [Propolis-stabilized vitamin C.] Hungarian Patent No. HU 46 849, 8 pp.

Dumronglert, E. 1983. A follow-up study of chronic wound healing dressing with pure natural honey. J. Nat. Res. Council, Thailand, *15(2):* 39-66

Dunn, J.D. 1984. The effect of bee venom on plasma corticosterone levels. Neuroendocrinology Letters, 6 (5): 273-277

Dustmann, J.H. 1979. Zur antibakteriellen Wirkung des Honigs. Apiacta, 14: 7-11

Dustmann, J.H. and Gunst, E. 1982. Inhibins and bacteriostatic action of beebread. Apiacta, 17: 51-54

Dustmann, J.H. and von der Ohe, W. 1988. Radioaktivita~tsmessungen in Honig aus m.edersachsischen Trachtgebieten. Nordwestdeutsche Imkerzeitung, 40 (5): 129-131

Dutta, R.K. 1959. Indian Bee Journal 21:110 as cited in Sharma and Singh, 1983

Dyce, E.J. 1975. Producing finely granulated or creamed honey. In: [1]'Honey, a comprehensive survey". by Crane, (ed.), Heinemann, London, U.K. 293-306

Eason, T. 1991. Hand dipping beeswax candles. Amer. Bee J., 131: 617-619

Ebisu, T., Maeda, N., Matsubara, H. and Kato, K. 1988. [Honey powder compositions as additives for foods and pharmaceuticals.] Japanese Patent No.63 157 943 [88 157 943], 3 pp.

Efem, S.E.E. 1988. Clinical observations on the wound healing properties of honey. British J. of Surgery, 75: 679-681

Eischen, F.A. and Dietz, A. 1987. Growth and survival of Galleria mellonella (Lepidoptera: Pyralidae) larvae fed diets containing honeybee-collected plant

resins. Ann. Entomol. Soc. Am., 80 (1): 74-77

Eischen, F.A. and Dietz, A. 1990. Improved culture techniques for mass rearing Galleria mellonella (Lepidoptera: Pyralidae). Entomological News, 101(2): 123-128

El-Banby, M.A. 1987. Honeybees in the Koran and in medicine. Al-Ahram Centre for Translation and Publication, Cairo, Egypt, 205 pp.

El-Banby, M.A. and 4 others. 1989. Healing effect of floral honey and honey from sugar-fed bees on surgical wounds (animal model). In: Proc. 4th Intern. Conf. Apic. Trop. Climates, Cairo, Egypt. 6-10 November 1988. IBR, London, U.K. p.46-49.

El-Sabbagh, H.M., Abdel-Gawad, H.A. and El-Said, Y. 1988. Development and characterization of an oleogineous suppository base. Alexandria Journal of Pharmaceutical Science, 2(1): 80-83

El-Shahaly, A.A., Mohamed, M.S., El-Zalaki, E.M. and Mohasseb, Z.S. 1978. Formulation, storage possibilities, and chemical composition of ready-to-eat honeytahena paste. Libyan J. Agriculture, 7: 65-72

Enger, C.C. 1976. Impermeable silicone composition. US patent No.3963677, 6 pp. In Chem. Abstr. 85:79451

Fahmy, F.G. and Omar, M.O.M. 1989. Effect of propolis extracts on certain potato viruses. Proc. 4th Intern. Conf. Apic. Trop. Climates, Cairo, Egypt, November 1988: 56-60

Faruga, A., Puchajda, H. and Bobrzecki, J. 1975. [Utilization of bee hive waste in poultry feed]. Zeszyty Naukowe Akad. Rolniczo Techn., W Olsztynie, 142:151-158

Feinberg, S.M. and Gothers. 1940. Oral pollen therapy in ragweed pollinosis. J. Amer. Med. Assoc. 115: 23-29

Feinberg, W. 1983. Lost-wax casting. Intermed. Technol. Publ. London, 74 pp

Fenfenati, L., Sabatini, A.G., Nanetti, A. (1986) Composizione in sali minerali della gelatina reale. Apicoltura, 2:129-143.

Ferber, C.E.M. and Nursten, H.E. 1977. The aroma of beeswax. J. Sci. Fd. Agric., 28: 511-518

Filho, O.M. and Carvalho, A.C.P. de. 1990. Application of propolis to dental sockets and skin wounds. Journal of Nihon University School of Dentistry, 32(1): 4-13

Fotin, A.V. and Gel'medova, N.N. 1981. (Treatment of allergic rhinosinusitis in children using honeybee venom). Vestnik Otorinolaringologii, (4): 42-44

Fox, C. 1992. Cosmetics & Toiletries, 107: 70-88

Franco, T.T. and Kurebayashi, A.K. 1986. [Isolation of the main active constituents of propolis by two-dimensional paper chromatography and spectrophotometry]. Revista do Inst. Adolfo Lutz, 46 (1/2): 81-86

Free, J.B. and S others 1983. Using foraging honeybees to sample an area for trace metals. Environ. Entomol., 9: 9-12

Friedmann, H., Kern, J. and Rust, J.H. 1957. The domestic chick: a substitute for the honey guide as a symbient with cerolytic. Amer.Nat., 91(860): 321-325

Frilli, F., Barbattini, R. and Milani, N. 1989. L'ape, atlante. (The bee atlas.)

University of Udine, Dept. of Plant Defenses, Italy and ERSA, 40 pp.

Fuchs, L. 1960. The problem of royal jelly therapy. Medsche Welt, Stuttg., 40: 2119-2121

Fuchs, F.J. 1970. High pressure continuous wire extrusion. Western Electric. Princeton, N.J., USA, 18 pp.

Fuj ii, A., Kobayashi, S., Ishihama, S. Yamamoto, H. and Tamura, T. 1990. Augmentation of wound healing by royal jelly. Japan. J. Pharmacol., 53 (3): 331-337

Furness, C. 1974. Beeswax Candles. British Bee Publications, Gedd., 54 pp

Furness, C. 1977. How to make beeswax candles. British Bee Publications, Geddingtron, U.K., 14 pp.

Furness, C. 1986. Beeswax Candles. British Bee Publications, Geddington, U.K., 20 pp.

Gabrys, J. and 4 others 1986. Free amino acids in bee hive products (propolis) as

identified and quantified by gas-liquid chromatography. Pharmac. Research Communications 18 (6): 513-518

Gafar, J., Sacalus, A., David, E. and David, N. 1986. [Treatment of simple pulp gangrene with the apitherapy product "Propolis'.] Stomatologie, 33(2): 115-117

Gaider, F.A. 1950. Pchelovodostvo, 37: 55, as cited in Sharma and Singh, 1980.

Gala Books 1971. 2000 down home skills & secret formulas for practically everything. Gala Books, Laguna Beach, CA.

Galuszka, H. 1972. The research on a most effective method of the collection of bee venom by means of electric current. Zoologica Pol., 22 (12): 53-69

Gary, N.E., Ficken, R.W. and Stein, R.C. 1961. Honeybee larvae (<u>Apis mellifera L.</u>) for bird food. Avicult. Mag., 67: 27-32

Gasparri, F. 1983. [Beekeeping and cosmetics. Elements for an evaluation of the use of honey and propolis in cosmetics, criteria for the choice of their application and qualitative analysis methods for the original material and the final product.]

Italy, Proc. Conf. Erboristeria e Cosmetico, Bologna. Erboristeria Domani - Quaderni, 30-35

Gayre, G.R. 1948. Wassaill in mazers of mead. Phillmore &.Co., London, 176 pp.

Gayre, G.R. and Papazian, C. 1986. Brewing mead - Wassaill in mazers of mead. Brewers Pubi, Boulder, Co. USA, 200 pp.

Geiskopf, 5. 1984. Putting it up with honey: a natural food canning and processing cookbook. Quicksilver Productions, Ashland, OR, USA, 219 pp.

Gentry, C. and 3 others. *1985.* A manual for trainers of small-scale beekeeping development workers. Peace Corps, Washington, D.C., USA, 2nd edition, 407 pp.

Gentry, C. 1988. Small scale beekeeping. Peace Corps, Wash. D.C., USA, 213 pp.

Ghisalberti, E.L. 1979. Propolis: a review. Bee World, 60 (2): 59-84

Gimbel, N.S., Threlkeld, R., Farris, W. (1962) Epithelization in experimental burn blisters. Research in Burns. Am. Inst. Biolog. Sci. (9).

Ginsberg, N.J., Dauer, M. and Slotta, K.H. 1968. Melittim used as a protective agent against X-irradiation. Nature, 220 :1334

Giordani, G. 1961. [Effect of royal jelly on chickens.] Avicoltura 30 (6): 114-120

Giurgea, R. and 4 others. 1987. Biochemical effects of standardized propolis extract (SPE) and of silymarin on the liver of ethyl alcohol intoxicated rats. Agressologie, 28(8): 831-832.

Giugea, R., Rusu, M.A., Popescu, H. and Polinicencu, C. 1989. [The liver-protecting action of standardized propolis extract in ethanol poi;soning of rats.] Clujul Medical, 62(1): *56-59*

Gondal, S.M.A. and Hashmi, A.A. 1976. Effect on egg production in Apis cerana indica queens on feeding them with royal jelly or crushed larvae. J. Apic. Res. *15(3/4):* 130-132

Gonnet, M. 1973. [Controlled granulation of honey and production of creamed honey.] Revue fran~aise d'apiculture, 309: 209-212

Gonnet, M. 1977. Liquefazione, pastorizzazione e cristallizzazione controllata del miele. In: "Miele: aspetti tecnologici" by Apimondia, Bucharest : 61-66

Gonnet, M. *1985.* Miel creme. Review Fran~aise d'Apiculture, 12: *591-593.*

Gonnet, M. et Vache, G. *1985.* Le gout du miel. U.N.A.F., Paris. 146 pp.

Gonnet, M. 1986. Une bonne pate pour un bon tube. Revue Fran~aise d'Apiculture, (1): 29-30

Gonnet, M. 1986. L'analyse des miels. Description de quelques methodes de contr6le de la qualite'. Bull. Tech. Apicole, 13(1): 17-36.

Gonnet, M., Jeanne, F. and Faucon, A. 1988. L'hydromel. Bull. Tech. Apicole. *15(3):* 139-146.

Gorbatenko, A.G. 1971. [Treatment of ulcer patients with a 30% alcohol solution of propolis.] Vrach. Delo, 3: 22-24

Graham, J.M. Ed. 1992. The hive and the honeybee. Dadant & Sons, Hamilton, Illinois, U.S.A. 1324 pp.

Grange, J.M. and Davey, R.W. 1990. Antibacterial lproperties of propolis (bee glue). J. Roy. Soc. Medicine, London, U.K. 83(3): ***159-160***

Grange, J.M. 1990. Honey and propolis as possible promotors of the healing of ulcers in leprosy (reply letter, comment). Lepr. Rev. 61(2): 195.

Green, A.E. 1988. Wound healing properties of honey. British J. of Surgery, 75 (12): 1278

Greenaway, W., Scaysbrook, T. and Whatley, F.R. 1987. The analysis of bud exudate of Populus X euramericana and of propolis by gas chromatography-mass spectrometry. Proc. Royal Soc. London B, 232: 249-272

Greenaway, W., Scaysbrook, T. and Whatley, F.R. 1988. ~omposition of propolis of Oxfordshire, lU.K. and its relation to poplar bud exudate. Zeitschrift fur Naturforschung, C 43: 301-304

Greenaway, W., May, J., Scaysbrook, T. and Whatley, F.R. 1990a. Identification by gas chromatography - mass spectrometry of 150 compounds in propolis. Zeitschrift fu~r Naturforschung, C, 46:111-121

Greenaway, W., Scaysbrook, T. and Whatley, F.R. 1990b. The composition and plant origins of propolis: a report of work at Oxford. Bee World, 71:107-118

Grohmann, F. and Spitznagel, H.U. 1988. Processing your propolis the right way. Canadian Honeybee Research Association of British Columbia Newsletter, August : 5-6

Grunberger, D. and 7 others. 1988. Preferential cytotoxicity on tumor cells by caffeic acid phenethyl ester isolated from propolis. Experientia, 44: 230-232

Gubicza, A. and Molnar, P. 1987. [Propolis in the rearing of calves.] Magyar Mezo~gazdasa'g, 42(17): 14

Gueorguieva, E. and Vassilev, V. 1990. Traitement de l'ulce're par la propolis. Revue fran~aise d'apiculture, 499: 394-397

Gunnison, A.F. 1966. An improved method for collecting the liquid fraction of bee venom. J.Apic. Res., 5 (1): 33-36

Guralnick, M.W., Mulfinger, L.M. and Benton, A.W. 1986. Collection and

standardization of Hymenoptera venoms. Folia Allerg. et Immunol. Clinica, 33 (1): 9-18

Guss, S.B. 1967. Bee larvae as food for caged birds. Amer. Bee J., 107: 62

Haffejee, I.E. and Moosa, A. 1985. Honey in the treatment of infantile gastroenteritis. Brit. Med. J. 290:1866-1867

Halberstadt, K. (1978) Etude comparative de la nourriture larvaire et des glandes nourricieres chez l'abeille domestique sur le plan de l'enzymologie et de la chimie des proteins. Apidologie, 9:143-146.

Hasegawa, M., Saeki, Y. and Sato, Y. 1983. [Artificial rearing of some beneficial insects on drone powder and the possibility of their application.] Honeybee Science, 4:153-156

Hashimoto T., Takeuchi, K., Hara, M. and Akatsuka, K. 1977. Pharmacological study on royal jelly (RJ). 1. Acute and subacute toxicity tests on RJ in mice and rats. Bulletin of the Meiji College of Pharmacy No.7 1-13.

Hashimoto, T., Tori, M., Asakawa, Y. and Wollenweber, E. 1988. Synthesis of two allergenic constituents of propolis and poplar bud excretion. Zeitschrift flir Naturforschung, C 43: 470-472

Hausen, B.M., Wollenweber, E., Senff, H. and Post, B. 1987. Propolis allergy. (I). Origin, properties, usage and literature review. Contact Dermatitis, 17:163-170

Hausen, B.M. and Wollenweber, E. 1988. Propolis allergy: (III) Sensitization studies with minor constituents. Contact Dermatitis, 19: 296-303

Haydak, M.H. 1967. Bee nutrition and pollen substitutes. Apiacta, 1: 3-8

Heggers and 6 others. 1987. Control of burn wound sepsis: a comparison of in vitro topical antimicrobial assays. The J. of Trauma. 28(2): 176-179

Henschler, D. (1954) Hoher Acetylocholingehalt von Bienenfuttersa~ften. Naturwissenschaften, 41:142.

Hepburn, H.R. 1986. Honeybees and Wax: An Experimental Natural History. GFR: Springer-Verlag, Berlin, Gewrmany, 205 pp.

Herbert, E.W. Jr. 1992. Honeybee nutrition. In: The hive and the honeybee, Graham, Ed., :197-233

Hernuss, P. and 6 others 1975. Pollendia~t als Adjuvans der Strahlentherapie gynaekologischer Karzinoma (Pollen diat as adjuvant to radiation therapy of gynaecological carcinoma). Strahlentherapie, 150: 500-506

Hetland, A. 1986. Clostridium botulinum sporer i norskproduserd honning? Norsk. Vet. Artidsskr., 98 (10): 725-727

Higginbottom, J.A. 1974. A guide to wax and dyecraft materials: a comprehensive catalogue of materials for candlemaking, tie-&-die and batik. Candle Makers Supplies, London, U.K., 47 pp.

Hill, R. 1977. Propolis, the natural antibiotic. Thorsons, Wellingborough, U.K.

Hill, K. Hawkes, K., Hurtado, M. and Kaplan H. 1984. Seasonal variance in the diet of Ache hunter-gatherers in eastern Paraguay. Human ecology, 12: 101-135

Hofmann, U., Holst, H. and Schlo~sser, E. 1989. [Studies of the effect of plant

protection agents on the susceptibility of grapevines to Plasmonara viticola. 2. Results of an infection trial.] Wein-Wissenschaft 44: 61-65

Holderna, E. and Kedzia, F. 1987. Investigations upon the combined action of propolis and antimycotic drugs on Candida albicans. Herba Polonica, 33(2): 145-151

Hollands, I., Miyares, C., Sigarroa, A. and Perez, A. 1984. [Efficacy of propolis against infection by intestinal Eimeria in rabbits.] Revista Cubana de Ciencias Veterinarias, 15(2): 157-163

Hollands, I., Miyares, C. and Sigarroa, A. 1988. [Comparative analysis of the action of propolis, sulphaquinoxaline and sulphamethazine in rabbits with coccidiosis.] Rivista Cubana de Ciencias Veterinarias, 19(2): 99-104

Hollands, I., Miyares, C. and Pimienta, R. 1988. [Quality ;control of Propolisina (alcoholic extract of propolis) used as a coccidiostat, by means of a biological method.] Revista Cubana de Ciencias Veterinarias, 19(4): 319-326

Ho Shin 1980. (Api-acupuncture). Ho Shin, No.1, 120 pp.

Hocking, B. and Matsumura, F. 1960. Bee brood as food. Bee World, 41(5): 113-120

Howe, S.R., Dimick, P.S., Benton, A.W. (1985) Composition of freshly harvested and commercial royal jelly. J. Apic. Res., 24 (1): 52-61.

Hsiang, H.K. and Elliott, W.B. *1975.* Differences in honeybee (Apis mellifera) venom obtained by venom sac extraction and electrical milking. Toxicon 13: 145-148

Hughes, N.B. 1960. Casting composition. US Patent 2,942,995 (1960).

Huhtanen, C.N., Knox, D. and Shimanuki, H. 1981. Incidence of Clostridium botulinuim spores in honey. J. of Food Protection, 44(11): 812-814

Hunt, K.J. and 5 others 1978. A controlled trial of immunotherapy in insect hypersensitivity. New Eng. I. Med., 299:157-161

Hutton, D.J. 1966. Treatment of pressure sores. Nursing Times, 18:1533-1534 limori, Y. 1975. A rust inhibitor (incorporating beeswax). Japanese Patent, 75 15 484, 3 pp. Ikeno, K., Ikeno, T. and Miyazawa, C. 1991. Effects of propolis on dental

caries in rats. Caries Research, 25: 347-351

Ikuta, H. 1931. The investigation of Japanese beeswax. Analyst, *56:* 430-436

Inoue, T. and Inoue, A. 1964. The world royal jelly industry: present status and future prospects. Bee World, 45 (2): 59-69.

Inoue, T. 1986. The use and utilization of royal jelly and the evaluation of the medical efficacy of royal jelly in Japan. Proceeding sof the XXXth International Congress of Apiculture, Nagoya, 1985, Apimondia, 444-447

Inoue, H. 1988. [Propolis, its chemical constituents and biological activity.] Honeybee Science, 9(3): 115-126

ITDG 1978. Simple methods of candle manufacture. Intermed{ate Technology Development Group, London, U.K., 19 pp

ITC, UNCTAD/GATT 1977. Major markets for honey: Openings for quality supplies from developing countries. ITC Publications, Geneva, Switzerland, 120 pp.

ITC, UNCTAD/GATT 1978. The world market for beeswax: a high value product requiring little investment. ITC Publications, Geneva, 105 pp.

ITC, UNCTAD/GATT 1986. Honey, a study of major markets. ITC Publications, Geneva, 167 pp.

ITC, UNCTAD/GATT. 1986. Report on the markets for selected hive products in the United Kingdom, France and Italy. Prospects and developments (ins French). ITC Publications, Geneva, Switzerland, 35 pp.

Iwamoto, N., Nakano, A. and Imanishi, Y. 1965. Method for filling hard capsules with granular drugs. D.B.R. Patent No.1207047 (1965).

Iwasaki, M. 1990. [Propolis-containing antibiotic ointments for atopic dermatitis treatment.] Japanese Patent No. JP 02 142 734 [90 142 734], 2 pp.

Jacoli, G. (1956) Ricerche sperimentali su alcune proprieta' biologiche della gelatina reale. Apicoltore d'Italia, 23 (9-10): 211-214.

Jean, E. 1956. A process of royal jelly absorption for its incorporation into assimilable substances. Fr. Pat., 1,118,123

Jeanne, F. 1985. La refonte du miel. Bull. Tech. Apicole. 12(1): 33-40

Jeddar, A. and 5 others 1985. The antibacterial action of honey. S. Afric. Med. J., 67: 257-258

Jiang, J. 1986. [Rape oil steroid isolation from beeswax for use as a plant growth stimulator.] Chinese Patent No. CN 85 102 899, 5 pp.

Jindra, M. and Sehnal, F. 1989. Larval growth, food consumption, and utilization of dietary protein and energy in Galleria mellonella. J. Insect Physiol., 35 (9): 729-724

Johansen, C. *1955.* Bee-collected pollen for artificial pollination of apples. Amer. Bee J., 95: 352-353

Johansson, T.S.K., Johansson, M.P. (1958) Royal Jelly II. Bee World, 39: 254-264, 277-286.

Jolly, V.G. 1977. Propolis violin varnish. Strad, 88: 713-719

Jolly, V.G. 1978. Propolis varnish for violins. Bee World, 59 (4): 158-161

Jones, CL. 1977. The balance of beeswax retained in synthetics. Manuf. Chemist & Aerosol News, 48 (3): 46-50

Kaal, J. 1991 Natural medicine from honeybees. 93 pp. (available from Bees and Development)

Kaatz, H. 1986. Heisser Honig? Nach Tschernobyl: Auch der Honig ist radioaktiv belastet. Allg. dtsch. Imkerzeitung, 20 (7): 222-224

Kandil, A., El-Banby, M., Abdel-Wahed, K. Abou Sehly, G. and Ezzat, N. 1987a. Healing effect of true floral and false nonfloral honey on medical wounds. J. of Drug Research (Egypt), 17 (1-2): 71-75

Kandil, A., El-Bandy, M., Abdel-Wahed, K., Abdel-Gawaad, M. and Fayez, M. 1987b. Curative properties of true floral and false non-floral honeys on induced gastric ulcers. J. Drug Research Egypt, 17(1-2): 103-106

Kandil, A., El-Banby, M.A., Abdel-Wahed, K., Abdel-Gawaad, M. and Fayez, M. 1989. Curative properties of floral honey and honey from sugar-fed bees on induced gastric ulcers. Proc. 4th Intern. Conf. Apic. Trop. Clim., 68-69

Karaali, A., Meydanoglu, F. and Eke, D. (1988) Studies on cp~mpositon, freeze drying and storage of Turkish royal jelly. J. Apic. Res., 27 (3): 182-185.

Karimova, Z.H. and Rodionova E.I. 1975. Propolis in the treatment of lung tuberculosis. In: A valuable product of beekeeping: propolis. Apimondia 1975. Edition Apimondia, Bucharest, Romania.

Katsilambros, N.L., Philippides, P., Touliatou, A., Georgakopoulos, K., Kofotzouli, L. Frangaki, D., Siskoudis, P., Marangos, M. and Sfikakis, P. 1988. Metabolic effects of honey (alone or combined with other foods) in type II diabetics. Acta Diabetologica Latina, 25 (3): 197-203

Kaul, 5. 1967. Erfahrungen mit Bienenhom.glu~sungen in der Allgemeinpraxis. Physik. Med. u. Rehab., 8: 265-266

Kedzia, A. 1986. [Effect of ethanol extract of propolis (EEP) on anaerobic bacteria.] Herba Polonica, 32(1): 53-58

Kedzia, B, and Holderna, E. 1986. [Investigations on the combined action of antibiotics and propolis on Staphylococcus aureus.] Herba Polonica, 32(3/4): 187-

195

Kedzia, B., Iwaszkiewicz, J. and Geppert, B. 1988. [Pharmacological investigations on ethanolic extract of propolis.] Herba Polonica, 34(4): 243-253

Kel'man, I.M. 1960. Application of bee venom in sanatorium conditions. Pchelovodstvo, 37 (3): ***52-54***

Kerkvliet, J.D. 1981. Analysis of a toxic rhododendron honey. J. Apic. Res. 20(4): 249-253 Khattab, M.M., Radwan, A.A. and Afifi, E.A. (1989) Physiological effect of royal jelly on female reproductive capacity in rabbits. In Proceedings of the Fourth International Conference on Apiculture in Tropical Climates. Cairo, Egypt, 6-10 November 1988. IBRA, London, U.K.

Killion, E.E. 1992. The production of comb and bulk comb honey. In: The hive and the honeybee by Graham, Dadant & Sons, Ill., U.S.A. 705-722

Kim, C.M. 1989. Bee venom therapy for arthritis. Rheumatology, 41(3): 67-72

Kime, R.W., McLellan, M.R. and Lee, C.Y. 1991. An improved method of mead

production. Am. Bee J. 131(6): 394-395

Klein, K. 1991. Kukui and Macadamia nut oils. Cosmetic applications. Cosmetics & Toiletries, 106: 87-90

Knopf, E. and Ogait, A. 1961. [Why is German propolis no longer suitable for varnishing stringed instruments?] Instrumentenbau Z., 5: 152-160

Kondo, T. 1979. Microencapsulation. Techno Inc., Tokyo, 119 pp

K�nig, B. and Dustmann, J.H. 1985. Fortschritte der Celler Untersuchungen zur antivirotischen Aktivita~t von Propolis. Apidologie, 16 (3): 228-230

K�m.g, B. 1988. (News about propolis: Anti-tumor effect and allergies from caffeic acid derivates). Heilkunst, 101(10): 453-456

K�nig, B. and Dustmann, J.H. 1989. Tree resins, bees, and antiviral chemotherapy. Animal Research and Development, 29: 21-42

Kramer, K.J., Childs, C.N., Spiers, R.D. and Jacobs, R.M. (1982) Purification of insulin-like peptides from insects haemolynph and royal jelly. Insect Biochemistry

12 (1):91-98.

Kramer, K.J. Tager, H.S., Childs, C.N. and Spiers, R.D. (1977) Insulin-like hypoglycemic and immunological activities in honeybee royal jelly. Journal of Insect Physiology (1977), 23 (2): 293-295.

Krause, M.V. and Mahan, L.K. 1979. Food, nutrition and diet therapy. W.B. Saunders Co., Philadelphia, USA, 963 pp.

Krell, R. 1990. A simple modification for the centrifugal extraction of combs harvested from frameless hives. (similar to Krell, 1991). Appr. Technology, 17 (3)

Krell, R. 1991. Centrifugal honey extraction in frameless-hive beekeeping. Beekeeping & Development, 19: 6-7

Krell, R. 1992. A simple method for reducing the moisture content of tropical honeys. Proc. 5th Intern. Conf. Apic. in Tropical Climates, Trinidad and Tobago, 38-43.

Krell, R., Persano Oddo, L. and Ricciardelli D'Albore, G. 1988. The influence of

harvesting and processing methods on honey quality in Zambia and Malawi. Proc. of the 4th Internat. Conf. on Apiculture in Tropical Climates, Cairo: 268-273

Krochmal, C. (Undated) Natural cosmetics, from beehive to herb garden. Selfpublished, Asheville, USA, 35 pp.

Krochmal, C. 1973. A guide to natural cosmetics. Times Book Comp., Quadrangle, New York, 227 pp.

Krochmal, C. 1985. Hive cosmetics. Glean. Bee Cult., 113 (10): 527-529

Krochmal, C. 1991. Hive cosmetics. Amer. Bee J. , 131: 573-576

Krzyzynski, K. 1988. [Varnish from dammar resin and/or wax [beeswax] for paintings and art restoration.] French Patent No. FR 2 607 513, 5 pp.

K�hn, H. 1960. Detection and identification of waxes, including Punic wax, by infra-red spectrography. Stud. Conserv., 5 (2): 71-81

Kurstjens, S.P., McClain, E. and Hepburn, H.R. 1990. The proteins of beeswax. Naturwissenschaften, 77 (1): 34-35

Labochev, S.V., Marenkov, G.M. and Salnikov, V.1. 1958. Pchjelovodstvo 35: *50,* as cited in Sharma and Singh (1980).

Lagrange, V. 1991. Ultrafiltration of Honey. Am. Bee J. 131(6): 453-455, 458

Laidlaw, H.H., Jr. 1979. Contemporary Queen Rearing. Dadant and Sons, Inc., Hamilton, Illinois, USA.

Laidlaw, H.H., Jr. 1992. Production of queens and package bees. In: The hive and the honeybee. ed. J.M. Graham. Dadant and Sons, Hamilton, Illinois, USA, 989-1042.

Lanyon, W.E. and Laynon, V.H. 1969. A technique for rearing passerine birds from the egg. Living bird, 8: 81-93

La Torre, A., Guccione, M. and Imbroglini G. 1990. (Preliminary observations on the action of propolis based preparations against Botrvtis cinerea Pers. on Strawberries. Apicoltura, 6:169-177

Lawrence, W.V. 1986. Infant botulism and its relationship to honey: a review. Am.

Bee J., 126: 484-486

Lavie, P. 1968. Proprie te's antibacteriennes et action physiologique des produits de la ruche et des abeilles. In vol.3 of: Chauvin, 1968, p.1-115.

Lavie, P. Les substances antibiotiques dans la colonie d'abeille. In Traite' de biologie de l'abeille, Paris, France, Masson et Cie, (1968) Tome III, 1115.

Lee, C.Y. and Kime, R.W. 1984. The use of honey for clari;fying apple juice. J. Apic. Res. 23(1): 45-49

Lee, M.H. and Lee, Y.H. 1987. [Preparation and evaluation of yellow beeswax matrixes and nalidixic acid.] Seoul University Journal of Pharmaceutical Sciences, 12: 33-43

Lejeune, B. and 5 others 1984. [Propolis: extracts and uses in shampoos and lotions.] Parfums, Cosmetiques, Aromes, (56): 65-68

Lejeune, B., Pourrat, A. and Dehmouche, H. 1988. Propolis utilisation en dermocosmetologie. Parfums, Cosmetiques, Aromes, 8~2: 73-77

Lercker, G., Capella, P., Conte, L.S., Ruinji, F. and Giordani, G. (1981) Components of royal jelly. I. Identification of organic acids. Lipids 16: 912-919

Lercker, G., Capella, P., Conte, L.S., Ruini, F. and Giordani, G. (1982) Components of royal jelly: II. The lipid fraction, hydrocarbons and sterolds. J. Apic. Res. 21(3):178-184.

Lercker, G., Vecchi, M.A., Sabatini, A.G. and Nanetti, A. 1984. Controllo chimicoanalitico della gelatina reale. Riv. Merceol. 23 (1): 83-94.

Lercker, G., Savioli, S., Vecchi, M.A., Sabatini, A.G., Nanetti, A. and Piana, L. (1986) Carbohydrate Determination of Royal Jelly by High Resolution Gas Chromatography (HRGC). Food Chemistry, 19: 255-264.

Lercker, G., Caboni, M.F., Vecchi, M.A., Sabatini, A.G. and Nanetti, A. (1992) Caratterizzazione dei principali costituenti della gelatina reale. Apicoltura 8:11-21.

Lilley, W. 1983. Bee miners join British Columbia gold hunt. Amer. Bee J., 123 (9): 635-637

Lloyd, G. 1957. Polish and Shine: Recipes of Women's Institute members and their ancestors. WI Books Ltd., London, UK, 40 pp.

Louveaux, J., Maurizio, A., and Vorwohl, G. 1978. Methods of melissopalynology. Bee World. 59(4): 139-157

L�cke, H. 1935. Wundbehandlung mit Honig und Lebertran. (Wound treatment with honey and codliver oil.) Dtsch. Mediz. Wochenschrift, 41:14-17

L�pke, J. 1980. Bienenhonig in Trockenform. Kakao u. Zucker., 32 (2): 43

Ltihrs, B. 1935. Honig in a~usserlicher Anwendung. Ztschr. f. Veterina~rkunde, 47: 57-58

Lukoschus, F.S. and Keularts, J.L.W. 1968. [A further function of the mandibular gland of worker honeybees (Apis mellifera L.): Production of a substance inhibiting pollen germination]. Ztschr. f. Bienenforsch., 9 (8): 333-343

Lupachev, V.F. 1963. (Pharmacology of Apilac). Farmak. Toks., 26 (3): 333-338

Majno, G. 1975. The healing hand: man and wound in the ancient world. Harvard

Univ. Press, Cambridge, MA., USA, 571 pp.

Makarov, F.D. 1972. (Propolis treatment of ulcer disease and pyloroduodenitis). Vrach. Delo, 4: 93-96

Maksimova-Todorova, V. and 7 others. 1985. [Antiviral effects of some fractions isolated from propolis.] Acta Microbiologica Bulgarica 17: 79-85

Malak, B. 1964. Method of preparing a varnish for furniture. Polish Pat. No.: 48,688. In: Chem. Abstr. 63: 8612b (1965)

Malossi, C., Grandi, F. (1956) Osservazioni sulla gelatina reale nell'alimentazione degli immaturi. Atti del 10 convegno nazionale per lo studio dell'applicazione dei prodotti delle api nel campo medico-biologico, Bologna, Italia, 130-133.

Manolova, N. and *5* others. 1987. [Immunobiological effect of propolis. I. Effect on cellular immunity.] Acta Microbiologica B ulgarica 21: 76-81 (Abstract)

Marchenay, P. 1977. La propolis. Marchenay Philippe, Paris.

Marcos, A. 1991. [Extraction and treatment of pollen]. Abeille de France et

l'Apiculteur, 756: 27-32

Marko, P., Pechan, J. and Vittek, J. Some phosphorous compounds in royal jelly. Nature (1964) 202:188-189.

Marletto, F. 1983. Caratteristiche della propoli in funzione dell'origine florale e dell'utilizzazione da parte delle api. Apicolt. Mod., 74 (5)187-191

Marston, N. and Campbell, B. 1973. Comparison of nine diets for rearing Galleria mellonella. Ann. Entomol. Soc. Am., 66:132-136

Marston, N. and Brown, B. 1974. Constituents in diets for Galleria melonella. J. Econ. Entomol. 67(4): 497-500

Martinetti, R. and Caracristi, C. (1956) Azione eccitometabolica della gelatina reale nell'uomo. Atti del I^{0} convegno nazionale per lo studio dell'applicazione dei prodotti delle api nel campo-medico-biologico, Bologna, Italia, 139-144.

Matsuka, M., Watanabe, M. and Nujima, K. 1982. Longevity and oviposition of vedalia beetles on artificial diets. Environ. Entomol., 11: 816-819

Maxwell, H. 1987. A small-scale honey drying system. Amer. Bee J., 127 (4): 284-286 Melampy, R.M. and Jones, D.B. (1939) Chemical composition and vitamin of royal jelly. Proc. Soc. Expt. Biol. Med. 41: 382-388.

Melampy, R.M. and Stanley, A.J. 1940. Alleged gonadotropic effect of royal jelly. Sience 91: 457-458.

Meresta, L. and Meresta, T. 1985/1986. Antibacterial activity of flavonoid compounds of propolis, occurring in flora in Poland. Bulletin of the Veterinary Institute in Pulawy, 28-29(1-4): 61-63

Meresta, T. and Meresta, L. 1988. [Sensitivity of Bacillas larvae to an extract of propolis in vitro.] Medycyna Weterynayjna, 44(3): 169-170

Meresta, L., Meresta, T., Burdzinski, J. and Chmurzunski, P.1989. [Treatment of mastitis in cows using an extract of propolis.] Medycyna Weterynaryjna, 45(7): 392-3905

Meyer, P. 1977. Nuclear energy and the environment. Kerntechnik, 19 (1): 9-13

Mikhailov, A. C. 1950. The application of medicated honey to eye diseases. Pchelovodstvo, 2:117-118

Milena, L., Leifertova, I. and Baloun, I. 1989. [Fungistatic effect of propolis.] Folia Pharm. Univ. Carol, 13: 29-44

Miller, R.M. 1974. Figure sculpture in wax and plaster. David & Charles, 175 pp.

Millet-Clerc, J., Simeray, J., Michel, D. and Chaumont, J.P. 1986. (Antifungal properties of propolis against fungi causing mycoses). Bulletin de Ia Socie'te' Fran~aise de Mycologie Me'dicale, 15(2): 517-521.

Millet-Clerc, J., Michel, D., Simeray, J. and Chaumont, J.P. 1987. [Preliminary study of the antifungal properties of propolis compared with some commercial products.] Plantes Me'dicinales et Phytothe'rapie, 21(1): 3-7

Minrath, W.R. 1957. Van Nostrand's practical formulary. D. Van Nostrand Company, Inc., Princeton, NJ.

Mitev, B. 1971. (Collection of bee venom using a weak electric current - its effect

on the condition and the performance of the colony). Zhivot. Nauki, 8 (1): 103-108

Mizuno, M., linuma, M. and Kato, H. 1987. [Useful ingredients and biological activity of propolis.] Fragrance Journal, 15(2): 20-28

Mizuno, M. 1989a. [Propolis- or its extract-containing resin compositions.] Japanese Patent No. JP Ol 245 058 [89 245 058], 5 pp.

Mizuno, M. 1989b. [Food packaging materials containing propolis[as a preservative].] Japanese Patent No. JP Ol 243 974 [89 243 974], 5 pp.

Mladenov, 5. 1972. Mierea Si therapia cu miere. Editura Ceres, Bucharest, 264

Mlagan, V. and Sulimanovic, D. 1982. Action of propolis solutions on <u>Bacillus larvae</u>. Apiacta, 17:16-20

Molan, P.C., Smith, I.M. and Reid, G.M. 1988. A comparison of the antibacterial activity of some New Zealand honeys. J. Apic. Res., 27 (4): 252-256

Molan, P.C., Allen, K.L., Tan, S.T. and Wilkins, A.L. 1989. Identification of components responsible for the antibacterial activity of Manuka and Viper's

Bugloss honeys. Ann. Conf. New Zealand Inst. fo Chem., Paper No.1

Monteverdi, T. and Reitano, S. 1972. [Eutrophic effect of a "natural food" (queen honeybee larvae) in a group of psychiatric patients.] Minerva Dietologica 12(4): 133-144

Morgan, J.F., Tolnai, S. and Townsend, G.F. (1960) Studies on the in vitro antitumor activity of fatty acides: ii. saturated dicarboxylic acids. Can. J. Biochem. Physiol. 38: 597-603.

Morishita, H., Nonogaki, S., Suzuki, A. and Morioka, M. 1978. Ink compositions. Japanese Kokai, 53-9607, 2 pp. In: Chem. Abstr. 89: 26242t (1978)

Morse, R.A. 1964. Honey wine and how to make it. Glean. Bee Cult., 92 (6):338-343 Morse, R.A. and Benton, A.W. 1964a. Notes on venom collection from honeybees. Bee World. 45 (4): 141-143

Morse, R.A. and Benton, A.W. 1964b. Mass collection of bee venom. Glean. Bee Cult., 92 (1): 42-45,54

Morse, R.A. 1965. The effect of light on comb construction by honeybees. J. Apic. Res. 4(1): 23-29

Morse, R.A. and Steinkraus, K.H. 1975. Wines from the fermentation of honey. In:

Honey: a comprehensive survey, by Crame, ed.: 392-407

Morse, R.A. 1978. Comb honey production. Wicwas Press, Ithaca, NY, USA, 128 pp.

Morse, R.A. 1980. Making mead (Honey wine). Wicwas Press, Cheshire, Conn., USA

Mraz, C. 1982. Bee venom for arthritis - an update. Amer. Bee J., 122:121-123

Mraz, C. 1983. Methods of collecting bee venom and its utilization. Apiacta, 18: 33-34, 54

Mucsi, I. and 4 others. 1989. [Drug for treating muscle hypoplasia in piglets, based on propolis extract and vitamins.] Hungarian Patent No. HU 49 809, 13 pp.

M�ller, E. 1938. [The venom production of honeybees] Verhandlungen VII. Kongress Entomol., p.1857-1864

Muniategui, S., Simal, J., H;uidobro, J.F. and Garcia, M.C. 1989. [Study of the fatty acids in bee-collected pollen.] Grasas y Aceites, 40(2): 81-86

Munoz, L.G. 1989. Prevention of legs' affections in ovines using propolis. Apiacta 24(3: 80-81

Munro, J.A. 1943. The viscosity and thixotrophy of honey. J. Econ. Ent. 35(5): 769-777 Nagy, E., Pa'pay, V., Litkei, G. and Dinya, Z. 1985. Investigation of the chemical constituents, particularly the flavonoid components, of propolis and populi gemma by the GC/MS method. Studies in Organic Chemistry - Flavonoids and Bioflavonoids. 23: 223-232

Nagy, M. and S others 1989. Constituents of propolis of Czechoslovak origin. V. Chemical Papers, 42 (5): 691-696

Nahmias, F. 1981. [Cure yourself with honey.] Curatevi con il miele. De Vecchi Editore, Milano, 125 pp.

Nahmias, F. 1983. La miel cura y sana. Translation from Italian of Nahmias, 1981, Editorial De Vecchi, Barcelona, 96 pp.

Nakajin, S., Okiyama, K., Yamashita, S., Akiyama, Y. and Shinoda, M. (1982) Effect of royal jelly on experimental hypercholesterolemia in rabbits. Shoyakugalku Zasshi (1982) 36 (1): 65-69.

Nakamura, T. (1986) Quality standards of royal jelly for medical use. proceedings of the XXXth International Congress of Apiculture, Nagoya, 1985 Apimondia (1986) 462-464.

Nakanishi, K., Oltz, E.M. and Grunberger, D. 1989. Preparation of caffeic acid esters as anti-inflammatory agents and cell growth inhibitors. International Patent No. WO 89 000 851, 32 pp.

Nakrashevich, V.F., Stoikov, S.A. and Bronnikov, V.1. 1988. Harvesting pollen from combs. Pchelovodstvo, 10: 29-30

Narayana, N. 1970. Studies in Indian honeys and bees waxes. Centr. Res. Inst., Poona, India, 13 pp.

Nardi, M. (1986) Legislazione ed indicazioni di mercato della pappa reale. Atti del Convegno "Apinfiera" Faenza (Ra) 13-17.

Naum lyorish 1974. Bees and people. Mir. Publisher, Moscow, 212 pp.

Negri, G. 1979. Nuovo erbano figurato. Hoepli, Milano, Italy, 459 pp.

Neumann, D., Go~tze, G. and Binus, W. 1986. [Clinical study of the testing of the inhibition of plaque and gingivitis by propolis.] Stomatologie der DDR, 3612): 677-681

Neychev, H. and 7 others 1988. Immunomodulatory action of propolis. II. Effect of water-soluble fraction on influenza infection in mice. Acta Microbiologica Bulgarica, 23:58-62

Nikolov, N., Marekov, N., Bankova, V., Popov, S., Ignatova, R. and Vladimirova, I. 1987. Method for the preparation of a water-soluble derivative of propolis. Bulg. Patent Appl. 79903/28,05

Nilsson, S., Praglowski, J. and Nilsson, L. 1977. Atlas of airborne pollen grains and spores in Northern Europe. Ljungfoeretagen, Oerebro, Sweden, 159 pp.

NozNick, P.P. and Li, Kwoh H. 1967. Cigarette filters. US Patent #m#!#m#)% (1967).

Nye, M.J., Shuel, R.W., Dixon, S.E. Gluconic acid in the food of larval honeybees. J. Apic. Res. (1973)12 (1): 9-15.

Obreg6n Fuentes, A.M. and Rojas Herna'ndez, N. 1990. [Antimicrobial action of alcoholic extracts of propolis.] Revists Cubana de Farmacia, 24(1): 34-44 (Es)

Ochi, T. 1981. A new method to collect propolis. Honeybee Science, 2 (1): 16

Ohta, N. 1983. [Experiences with api-acupuncture]. Honeybee Science, 4(1): 21-24

Okonenko, L.B. and 6 others. 1988. [Vitamin E. and propolis as antioxidants in the presence of excessive polyunsaturated fatty acids.] Voprosy Pitaniya No.4, 68-70

Okonenko, L.B. 1988, [Salmonella infections and propolis.] Zdravookhr. kaz. 1: *55-57*

Okada, 1.1971. [An artificial rearing of a coccinellid beetle Harmonia axyridis Pallas, using a diet of larvae and pupae of the worker honeybee.] Collecting Breed., Tokyo, 33(10): 229-236

Okada, I. and Matsuka, M. 1973. Artificial rearing of Harmonia axyridis on

pulverized drone honeybee brood. Environ. Entomol., 2: 301-302

Okonenko, L.B. 1986. [Propolis as an inhibitor of lipid free-radical oxidation in salmonellosis.], Voprosy Meditsinskoi Khimii, 32(3): 45-48

Olarin, T., Palos, E. and Olarin, A.I. 1989. Treatment of giardiosis [Giardia infection] with propolis tincture. Proc. 31st Intern. Congr. Apic. Warsaw, Poland, August 1987: 470-473

Olstrom, J.M. 1983. Dried honey. Am. Bee J. 123: 656-659

Omar, M.O.M. 1989. Some characteristics of propolis from Upper Egypt. Proceedings of the Fourth International Conference on Apiculture in Tropical Climates, Cairo, Egypt, 6-10 November 1988, 88-92

Olschki, L. S. (ed.). 1977. Ceroplasty in science and the arts Proceedings of the First International Congress, Florence 3-7 June 1975. Florence, Italy, 728 pp.

(�sterreichischer Imkerbund 1986. Strahlenlastung des Honigs: Festsetzung emeslenbelast Grenzwertes. Bienenvater, 107 (6): 2 pp. insert.

Otani, H., Oyama, J. and Tokita, F. 1985. Polyacrylamide gel electrophoretic and immunochemical properties of proteins in royal jelly. Jap. J. Diary Food Sci., 34:21-25.

Paillon, F. 1960. La fabrication des produits alimentaires au miel. Girardot et Cie., Paris, 238 pp.

Palmer, D.J. 1961. Extraction of bee venom for research. Bee World 42(9): 225-226

Pan, A.T.F. and Matsumoto, K. 1975. [An air-permeable waterproofing composition containing paraffin, fatty acids and beeswax.] Patent Applic. No.2256365, 11 pp. French. In: Chem. Abstr. 83: 195180c.

Pa'pay, V. and 4 others. 1985. Isolated compounds from Hungarian propolis and <u>populi gemma</u>. Studies in Organic Chemistry - Flavonoids and Bioflavonoids, 25: 233-240

Papay, V. and 3 others 1987. Chemical and pharmacological study of propolis from various locations. Acta Pharmac. Hung., 57:143-151

Paterson, P.D. 1975. The traditional making of honey bee throughout tropical Africa. In:

Honey: a comprehensive survey; by Crane (ed.): 405-407

Paysen, J. 1987. Wet honey, a method for drying honey on a commercial scale. Amer. Bee J., 127 (4): 273-282

Pectihacker, H. and Huettinger, E. 1986. [Harvesting propolis with high pressure air.] Bienenvater, 107 *(5):* 160-161

Pence, R.J. 1981. Methods for producing and bio-assaying intact honeybee venom for medical use. Amer. Bee J., 121(10): 726-731

Pepeljnjak, S., Jalsenjak, I. and Maysinger, D. 1981. Influence of microencapsulated propolis extract on Bacillus subtilis strain IP-5832. Acta Pharmaceutica Jugoslavica, 31(1): 27-32

Persano, A.L. 1987. Hidromieles: Historia, recetas y methodos para su elaboraci6n. Editorial Hemisfeno Sur, S.A., Buenos Aires, Argentina, 152 pp.

Persano Oddo, L., Krell, R. and Ricciardelli D'Albore, G. 1988. Contribution to the identification of the geographical and botanical origin of honeys produced in Zambia and Malawi. Apicoltura, 4:113-138

Petri, G., Lemberkovics, E. and Foldvari, M. 1988. Examination of differences between propolis (bee glue) produced from different floral environments. In Flavours and Fragrances: a world perspective (eds. Lawrence, B.M., Mookherjee, B.D., Willis, B.J.). Elsevier Sci. Publ., Amsterdam, 439-446

Phadke, R.P., Nair, KS. and Nandekar, KU. 1969. Indian beeswaxes. 1. Their physicochemical constants. Indian Bee J., 31(2): 52-55

Phadke, R.P.and Nair, K.S.. 1970. Standards for Indian honeys and beewaxes. Indian Bee J. 32(3/4): 68-74

Phadke, R.P., Nair, K.S. abd Babdedjarm K.U. 1971. Indian bees-waxes. 2. The nature of their chemical constituents. Indian Bee J. 33 (1/2): 3-5

Phadke, R.P. and Nair, K.S. 1973. Studies on Indian honeys. 5. Distinguishing characteristics of the apiary honey from the wild variety. Indian Bee J. 35 (1-4): 36-

39

Piek, T. ed. 1986. Venoms of the Hymenoptera. Academic Press, London, U.K.

Platt, J.L. and Ellis, J.R.B. 1985. Removing water from hon~y at ambient pressure. US Patent, 4,536,973: 6 pp.

Polishchuk, L.A. and Denisova, L.M. 1970. Carbon paper. USSR Pat. No.275732

Popescu, H., Polinigencu, C., Atansiu, P. and Predescu, E. 1985. Antiherpes ointment. Patent application, Rom. RO 86,003 (Cl. A61 K9/06) 30 Jan.1985, Appl. 108,265, 24 Jul.1982, 2p. (in Chem. Abstr. 1985, 103, 26, # 220838q)

Popravko, S.A. 1977. [Chemical composition of propolis and its standardization.] Pchelovodstvo, 97 (8): 21-23

Poryardin, V.T. 1960. Pchelovodostva, 37: *55,* (as cited in Sharma and Singh, 1980).

Posey, D.A. 1978. Ethnoentomological survey of Amerind groups in lowland Latin America. Florida Entomologist, 61(4): 225-229

Pourtallier, J., Taliercio, Y. and Mussot, J.M. (1970) Controle de la qualite' de la gele'e royale. Revue bibliographique des travaux sur la composition, les proprie'te's et les utilisations de la gele'e royale. Bulletin Apicole No. 2:145-160.

Pourtallier, J., Davico, R. and Rognone, M.C. (1990) Les analyses dans le controle de la purete' de la gele'e royale. Abeille de France et l'Apiculteur 753: 405-407.

PRC. 1990. Japanese honey products, by Pacific Research Consulting Inc., (PRC), New Food Products in Japan, 15(1), 15(2) abd 15(3)m as cuted ub Katrabgem 1991.

Princeton, N.J. 1970. High pressure continuous wire extrusion. Western Electric, 18

Proserpio, G. and Martelli, A. 1982a. Propolis: Its use in cosmetics. Part I. Il Prodotto Chimico, 9:15-21

Proserpio, G. and Martelli, A. 1982b. Propolis: Its use in cosmetics. Part II. II Prodotto Chimico, 10: 25-30

Proserpio, G. 1981 L'ape cosmetica. Erboristeria Domani Libri, Milano, Italy. 140 pp. Proserpio, G. 1988. Impieghi cosmetici dei prodotti dell'alveare. Erboristeria

Domani, 36-41

Prosperi, P., Ragazzini, F. and Francalancia, L. (1956) Sull'impiego terapeutico della pappa reale delle api negli stati di denutrizione della prima infanzia. Atti del I[0] convegno nazion~e per lo studio deU' ap~icazione dei prodotti d~e api nel campo medicobiologico, Bologna, Italia 134-136.

Prosperi, P. and Ragazzini, F. (1956) Applicazioni cliniche della gele'e royale in campo pediatrico. Riv. Clin. Pediat. 58 (3): 319-332.

Przybylaski, J. and Scheller, 5. 1985. [Early results in treatment of Legg-Calve-Perthes illness with intra-articular injections of aqueous solutions of propolis.] Zeitschrift fur Orethopa~due, 123(2): 163-167

Pyke, E.J. 1973. A biographical dictionary of wax modellers. Oxford University Press, Oxford, U.K. 216 pp.

Quadri, 5. (1956) Applicazione della gelatina reale nelle distrofie della prima infanzia. Clin. Pediat., Modena 38 (9): 686-690.

Quagho, P., Messi, P. and Fabio, A. 1988. [An investigation about the presence of bacteria of the genus Clostridium in honey samples.] L'Igiene Moderna, 15 (3): 486-496

Qureshi, N. and Tamhane, D V.1985. Production of mead by immobilized whole cells of ~haromces cerevisiae. Appl. Microbiol. & Biotechn. 21: 280-281

Radu-Tudorache, G., Oita, N., Luca, A. and Hritcu, V. 1978. [Observations concerning the biostimulant effect of royal jelly on young calves.] Cercetari Agronomice in Moldova, 2:131-133

Rai, B.K., Allicock, P. and Delph G. 1977. Honeybee and injection of monocrotophos into coconut palm. Indian Bee Journal, 39:13-14

Rekka, E. and Kourounakis, P.1990. Antioxidant activity of and interlenkin production affected by honeybee venom. Arzneimittelforschung 40(8): 912-913

Rembold, H. (1965) Biological active sustance in royal jelly. Vitamins and hormones 23:359-382.

Rembold, H., Lackner, B. and Geistbeck, I. (1974) The chemical basis of honeybee, Apis mellifera, caste formation. Partial purification of queen bee determinator from royal jelly. J. Insect Physiol. 20: 307-314.

Revathy, V. and Banerji, S.A. 1980. A preliminary study of antibacterial properties of Indian honey. Ind. J. Biochem. & Biophys. 17(Suppl. No.242): 62

Ribot, E. 1960. (Beeswax and sperm oil as separation agents substitute for liquid paraffin). Zuckeru. S~sswarenw., 13: 190, 196

Ricciardelli D'Albore, G. and Battaglini Bernardini, M. 1978. Origine geographique de la gele'e royale. Apidologie, 9 (1): 1-17

Riccardelli D'Albore, G. and Persano Oddo, L. 1978. Flora apistica Italiana. Istituto per la Zoologia Agraria, Firenze, Italy, 286 pp.

Ridi, M.S. el, Mofty;, A. el, Khalifa, K. and Solimen, L. 1960. Gonado tropic hormones in pollen grains of the date palm. Z. Naturf. 156(1): 45-49

Rigby, J. and Hepburn, R. 1981. Beeswax candles from a silicone rubber mould.

South African Bee Journal, 53 (4): 11-13

Rodriguez L6pez, C. 1985. Determinaci6n espectro-fotome'trica del color de las mieles. Vida apic., 16: 24-29

Rojas Herna'ndez, N.M. and Cue'tara Bernal, K. de la. 1990. [Antibiotic effect of propolis against strains of Staphylococcus aureus of human clinical origin.] Revista Cubana de Farmacia, 24(1): 45-50

Rombauer, I.S. and Rombauer Becker, M. 1975. Joy of cooking. Bobbs-Merrill Company, New York, 915 pp.

Ross, P.B. 1990. The effects of propolis fractions on cells in tissue culture. M.Phil. Thesis, University of Wales College of Cardiff, U.K. xii + 193 pp.

Roubik, D. (ed.) 1995. Pollination in Tropical Agriculture. FAO Bulletin 68/... (in preparation).

RSFSR 1977. (Standard for propolis). RST RSFSR :317-77

Ruttner, F. ed. 1983 Queen Rearing. Apimondia Publishing House, Bucharest,

Romania.

Ryan, J.K., Jelen, P. and Sauer, W.C. 1983. Alkaline extraction of protein from spent honeybees. J. Food Science, 48: 886-888, 896.

Sagawa, M. 1983 Success and failure in api-acupuncture. Honeybee Science, 4 (1): 27-28 Sakai, T., Sasaki, M. and Suzuki, T. 1978. [Stability of pulverized drone honeybee brood

as a diet for mass-rearing of predacious insects: effects of storing conditions and gamma-irradiation on the development of a lady beetle Harmonia ~~~y~ffidis.] Bull. Faculty Agriuclture, Tamagawa University 18:69-76

Salajan, G. 1970. Inst. Agron. "Dr. Petru Groza" Luc. Stut. Ser. Zootech. 26:165 as cited in Stanley and Linskens, 1974, p.113 and Schmidt and Buchmann, 1992.

Salama, A., Mogawer, H.H. and El-Tohamy, M. 1977 Royal jelly a revelation or a fable. Egyptian Journal of Veterinary Science 14 (2): 95-102.

Salem, S.N. 1981. Honey regimen in gastrointestinal disorders. Bull. Islamic Med. 1:

358-362

Salmon, R.E. and Szabo, T.I. 1981. Dried bee meal as a feedstuff for growing turkeys. Can. J. Anim. Sci., 61: 965-968

Sanyal, S.K. and Roy, S.K. 1967. Low temperature behaviour of temporary corrosion protectives. Labdev J. Sci. Technol., 5(3): 216-220

Sangalli, A. 1990. La propoli. L'Ape Nostra Amica, 12 (4): 16-25

Sargant, J. 1971. Two hundred years of wax modelling: a history of Madame Tussaud's. Central Assoc. of Bee-Keepers, Ilford, U.K. 10 pp.

Sasaki, M., Tsuruta, T. and Asada, 5. (1987) Role of physical property of royal jelly in queen differentiation of honeybee. In Chemistry and biology of social insects (edited by Eder, J., Rembold, H.). Munich, German Federal Republic, Verlag J. Papemy 306-307.

Sato, T. 1977. (Pollens for skin cosmetics.) Japanese Kokai, Patent application No. 90634/1977, 3 pp.

Savina, K.A. and Romanov, F.T. 1956. Propolis as a medicinal remedy. Pchelovodstvo 33(8): 59-60

Serkedjieva, J. 1992. Anti-influenza virus effect of some propolis constituents and their analogues (esters of substituted cinnamic esters). J. Natural Products, 55(3): 294-302

Scales, J.T. and Winter, G.D. 1961. The adhesion of wound dressings. An experimental study. In: Wound healing, D. Slome, (ed.)

Scheller, S. and 6 others. 1989a. The ability of ethanolic extract of propolis EEP to protect mice against gamma irradiation. Zeitschrift fur Naturforschung, C, 44:1049-1052

Scheller, S. and 7 others. 1989b. [Trials of immunoregulation in patients with chronic bronchitis.] Immunologia Polska 14(3/4): 204-305

Scheller, S. and *5* others. 1989c. [Immunization trials in two cases of alveolitis fibroticans with decreasing conductivity of the immune system: effect of ethanol extract of propolis (EEP), Esberitox N. and a calcium-magnesium preparation.]

Heilkunst, 102(6): 249-255

Scheller, S. and 7 others 1989d. Trace elements in propolis and in its ethanolic extract (EEP) as determined by neutron activation analysis. Z. f. Naturf., 44:170-172

Scheller, S. and *5* others. 1989e. Antitumoral property of ethanolic extract of propolis in mice-bearing Ehrlich carcinoma, as compared to bleomycin. Zeitschrift fur Naturforschung. C. 44:1063-1065

Scheller, S. and 4 others. 1990. Free radical scavenging by ethanol extract of propolis. Int. J. Radiation Biol. 57(3): 461-465

Schmidt, J.O. 1992. Allergy to venomous insects. In: The hive and the honeybee. J.M. Graham, ed. Dadant & Sons, Hamilton, Illinois, 1209-1269.

Schmidt, J.O. and Buchmann, S.L. 1992. Other products of the hive. In: The hive and the honeybee J.M. Graham, ed. Dadant & Sons, Hamilton, Illinois, USA. 927-988

Schumacher, M.J., Schmidt, J.O. and Egen, W.B. 1989. Lethality of "killer" bee stings. Nature, 337: 413

Shambaugh, P., Worthington, V. and Herbert, J.H. 1990. Differential effects of honey, sucrose, and fructose on blood sugar levels. J. Manipul. Physiol. Therapeutics, 13 (6): 322-325

Sharma, H.C. and Singh, O.P. 1983. Medicinal properties of some lesser known but important bee products. Proc. 2nd Int. Conf. Apiculture in Trop. Climates, IBRA, New Delhi, March 1980. 694-702

Shawer, M.B., Ah, S.M., Abdellatif, M.A. and El-Refai, A.A. 1987. Biochemical studies of bee-collected pollen in Egypt. 2. Fatty acides and non-saponifiables. J. Apic. Res., 26(2): 133-136

Shen, Z. and Zhao, Y. 1986. [Plant growth substances in beeswax. 1. Gibberellin-like substances.] Zhiwu Shenglixue Tongxun No.2, 31-32

Shinoda, M. and *5* others 1978. [Biochemical studies on vasodilative factor in royal jelly.] Yakugaku Zassii, 98:139-145

Shipman, W.H. and Cole, L.J. 1967. Increased resistance of mice to X-irradiation after injection of bee venom. Nature, 215: 311-312

Shipolini, R.A. 1984. Biochemistry of bee venom. In: Handbook of natural toxins, Vol. 2, A.T. Tn, (ed.), Marcel Dekker, New York, 732 pp.: 49-85.

Simal, J., Huidobro, J.F. and Muniategui, S. 1988. [Study of the sterol fraction of bee-collected pollen.] Grasas y Aceites, 39(6): 327-333

Simu'th, J., Trnovsky, J. and Jeloskova', J. 1986. Inhibition of bacterial DNA-dependent RNA polymerases and restriction endonuclease by UV-absorbing components from propolis. Pharmazie, 41(2): 131-132

Sista, M., Das, K., Mandal, K. and Gupta, K. 1986. Preparation and *in vitro* dissolution study of wax-embedded prolonged release dosage form containing chlorpheniramine maleate. Indian Drugs, 24(1): 34-36

Smith, A.K. and Circle, S.J. 1972. Chemical composition of the seed. In: Soybeans:

Chemistry and Technology. Smith and Circle (eds.), Avi Publ. Co., Westport, CT,

USA : 61-90

Smith, F.G. 1951. Preliminary report on Trigona wax. E. Afr. Agric. J., 16 (4): 185-187 Smith, F.G. 1954. Notes on the biology and waxes of four species of African Trigona bees (Hymenoptera: Apidae). Proc. R. Ent. Soc. Lond. Ser. A, 29 (4/6):62-70

Spanish Dairy Corporation 1975. Preparation of yoghurt with honey. In: International Symposium on Apitherapy, Madrid, 1974. Apimondia Publishing House, Bucharest, Rumania, p.55-56

Speedy Bee 1988. Miller Honey (Co.) develops dehydrated, pure honey. Speedy Bee, 12 *(5):* 11

Soldati, A.G. and Piazza, S.M. 1985. Elaboraci6n de hidromiel. Fac. de Agronomia, Univ. de Ia Plata, La Plata, Argentina, unpublished communication.

Sosnowski, Z.M. 1984. Method for extracting propolis and water soluble dry propolis powder obtained thereby and cosmetic and pharmaceutical preparations containing same. European Patent Application, No.0 109 993, 25 pp.

Spitznagel, H.U. 1988. Processing your propolis the right way. Newsl. Can. Hon. Bee Res. Assoc., (Aug.): 5-6

Sp�ttel, W. 1950. (Honey and dried milk). J.A. Barth, Leipzig, Germany, 323 pp.

Stanley, R.G. and Linskens, H.F. 1974. Pollen: biology, biochemistry, management. Springer Verlag, Berlin, Germany, 307

Stein, I. 1989. Royal jelly: the new guide to nature's richest health food. Thorsons Publishers, Ltd., Wellingborough, U.K., 128 pp.

Steinkraus, K.H. and Morse, R.A. 1966. Factors influencing the fermentation of the honey in mead production. J. Apic. Res. 5:17-26

Subrahmanyam, V.M. 1993. Storage of skin grafts in honey. Bee Well 3(1): *6* (also in Lancet, 1/93)

Szente, L. and Szejtli, J. 1987. Formulation of propolis with B-cyclodextsrin. Acta Pharmaceutica Technologica 33(4): 218-221

Taber, 5. 1991. Bee Management, Part I - Comb Honey Production. Am. Bee J.

131(3):179-180

Tabio, C., Alvarez, J.D. and Berisiartu, M. 1988. [Preliminary characterization of multifloral pollen from the El Cano area of Havana City Province, Cuba.] Ciencia y Te'cnica en la Agricultura, Apicultura, 4: 73-81

Takahashi, M., Matsuo, I. and Ohkido, M. 1983. Contact dermatitis due to honeybee royal jelly. Contact Dermatitis. 9 (6): 452-455.

Takenaka, T. Nitrogen components and carboxylic acids of royal jelly. In Chemistry and biology of social insects (edited by Eder, J., Rembold, H.). Munich, German Federal Republic, Verlag J. Papemy (1987): 162-163.

Takenaka, T., Yatsunami, K. and Echigo, T. 1986. Changes in quality of royal jelly during storage. Nippon Shokuhin Kogyo Gakkaishi 33 (1): 1-7

Tamua, T., Fuj ii, A. and Kubiyama, N. Study on mutagenicity of royal jelly. Honeybee Science (1985) 6 (1): 7-12.

Tamura, T., Fujii, A. and Kubiyama N. 1987. [Antitumor effects of royal jelly.]

Nippon, Yakurigaku-Zasshi, 89 (2): 73-80

Taylor, R.L. and Carter, B.J. 1976. Entertaining with Insects, or: The Original Guide to Insect Cookery. Woodbridge Press, Santa Barbara, California, USA, 160 pp.

Telatin, L. Proprieta' terapeutiche della gelatina reale in neuro-psichiatria. Atti del 10 convegno nazionale per lo studio dell'applicazione dei prodotti delle api nel campo medio-biologico, Bologna, Italia (156): 211-214.

Thikonov, A.I. and 3 others 1991. Composition and manufacture of sublingual tablets containing hydrophobic phenolic propolis. Acta Med. Scand., 40 (1): 23-27

Thoenes, S.C. and Schmidt, J.O. 1990. A rapid, effective method of non-destructively removing honeybee larvae from combs. Amer. Bee J., 130: 817

Tikhonov, A.I., Mamontova, IN.S. 1987 [Production and study of a lyophilized phenolic polysaccharide preparation from propolis.] Farmatsevtichnii Zhurnal 3: 67-68

Tikhonov, A.I., Salo, D.P., Pryakhin, O.R. and Gritsenko, V.1. 1978. Standardization

of propolis. Pharmaceutical Chem. J., 11(12): 1694-1699

Tong, S.S. C. and 3 others 1975. Elemental analysis of honey as an indicator of pollution:

forty-seven elements in honeys produced near highway, industrial and mining areas. Archs Envir. Hith, 30 (7): 329-332

T6th, G., Lemberkovics, E. and Kutasi-Szab6, J. 1987. The volatile components of some Hungarian honeys and their antimicrobial effects. Amer. Bee J., 127 (7): 496-497

Townsend, G.F. and *5* others. 1960. Studies on the in vitro antitumor activity of fatty acids: I. 10-hydroxy-2-decenoic acid from royal jelly. Cancer Res., 20: 5-3-510.

Townsend, G.F. 1975. Processing and storing liquid honey. IN: Honey: a compresensive survey. by Drane, Heinemann, London, U.K.: 269-292

Tulloch, A.P. 1970. The composition of beeswax and other waxes secreted by insects. Lipids, 5 (2): 247-258

Tulloch, A.P. 1973. Factors affecting analytical values of beeswax and detection of adulteration. J. Am. Oil Chem. Soc. 50(7): 269-272

Tulloch, A.P. 1980. Beeswax - composition and analysis. Bee World, 61(2): 47-62

Tumanov, A.A. and Osipova, N.I. 1966. [Biological determination of traces of substances.] Mat. All-Union Conf., 1963, Gorky, USSR, : 238-246

Uccusic, P. 1982. (Doctor Bee: bee products, their curative power and application in medicine.) Doktor Biene: Bienenprodukte - ihre Heilkraft und Anwendung in der Heilkunst. Ariston Verlag, Genf, Switzerland, 2nd edition in 1983, 198 pp.

Unknown 1982. Treatment of timber for hive parts. Apis, South Africa, March : 5-6

USA. 1978. Beeswax. Affirmation of GRAS status as a direct human food ingredient. USA. Laws and Statutes, 14643-14644 Federal Register 43 (68)

Vakikonina, T.V., Duslikova, E.S. and Bodrova, R.N. 1975. Detection of the adulteration of propolis. USSR patent No.474 325

Valdes, G., Rojas, N.M. and Morales, C. 1987. [Preliminary test of the action of

propolis extract on Candida albicans.] Ciencia y te'cnica en la Agricultura, Apicultura, 3: 41-49

Vanhaelen, M. and Vanhaelen-Fastre, R. 1979a. [Propolis. - I. Origin, microscopical investigations, chemical constituents and therapeutical activity.] J. Pharm. Belg.. 34 *(5):* 253-259

Vanhaelen, M. and Vanhaelen-Fastre, R. 1979b. [Propolis. - II. Identification by high performance chromatography (liquid, gas-liquid and thin-layer) of the constituents. Bioautography of the chromatograms of the antibacterial constituents.] J. Pharm. Belg., 34 (6): 317-328

Vecchi, M.A., Sabatini, A.G., Grazia, L., Tini, V. and Zambonelli, C. Il contenuto in vitamine come possibile elemento di caratterizzazione della gelatina reale. Apicoltura (1988) 4:139-146.

Vick, J.A. and Brooks, R.B. 1972. Pharmacological studies of the major fractions of bee venom. Amer. Bee J., 112 (8): 288-289

Vidyaev, I.P. 1968. (Method of producing preparations for treating wounds and

skin diseases in animals). Russ. Patent No.1106348 (1968)

Vinci, L. 1981. The book of practical candle magic. Aquarian Press, Wellingborough, U.K. 128 pp.

Vittek, J. and Halmos, J. 1968. Cytological analysis of the function of the ndosteum and periosteum in reparative osteogenesis of the rabbit mandible following the application of penicillin and royal jelly. Cslka Stomat. 68 (3): 207-216.

Vittek, J. and Slomiany, B.L. 1984. Testosterone in royal jelly. Experientia 40 104-106. Vorwohl, G. 1968. Natiirliche Diastraseschwache der Honige von Apis cerana Fabr. Z. Bienenforsch. 9(5): 232-292

Wakayama, T. and Lee, C.Y. 1987. Factors influencing the clarification of apple juice with honey. Food Chemistry, 25:111-116

Wagner, H., Dobler, I., Thiem, I. Effect of royal jelly on the peirpheral blood and survival rate of mice after irradiation of the entire body with X-rays. Radiobiologia Radiotherapia (1970)11(3): 323-328.

Walker, P. 1983a. Beeswax: uses and commercial aspects. Bibliography, International Bee Research Association, No.33, l7pp.

Walker, P. 1983b. Beeswax: processing. Bibliography, International Bee Research Association, No.31, 11 pp.

Walker, P. and Crane, E. 1987. Constituents of propolis. Apidologie, 18(4): 327-334

Waller, G.D. 1980. A modification of the O.A.C. pollen trap. Amer. Bee J., 120:119-121

Wang, B.J. and Zhang, H.J. 1988. Studies on the chemical constituents of Beijing (China) propolis. Bull. Chinese Materia Medica, 13 (10): 37-38

Wang, W. 1989. The development and utilization of the resources of bee pollen in China. Proc. 32nd Intl. Cong. Apic., Apimondia, (abstract) p.36

Wang, W., Hu, J. and Cheng, J. 1984. (Biological effect of honeybee pollen: radioprotective activity on hemotopoitic tissues of irradiated mice). J. Hangzhou Univ., 11: 231-240

Warth, A.H. 1956. The chemistry and technology of waxes. 2nd ed. Reinhold Publishing Co., New York

Weiss, K. (1975) Zur kastenspezifischen Erna~hrung der Weiblichen Bienenlarve (Apis mellifica L.). Apidologie 6: 95-120.

Weng, C., Hu, Y.C. and Yan, T.C. 1979. A new plant growth regulator (myricyl alcohol) isolated from beeswax. Hua Hsueh Tung Pao, *5:* 453-454

Wheatley, et al. 1950. as cited in Klein, 1991

White, E.C. 1993. Super Formulas: arts and crafts. How to make more than 360 useful products that contain honey and beeswax. Valley Hills Press, Starkville, USA. 120 pp.

White, J.W. Jr., Riethof, M.L., Subers, M.H. and Kushnir, I. 1962. Composition of American honeys. Tech. Bull. IU.S. Dept. Agric. 1261, 124 pp.

White, J.W. Jr., Kushnir, I. and Subers, M.H. 1964. Effect of storage and processing temperature on honey quality. Food Technol. 18(4): 154-156

White, J.W. 1966. Improving the colour of beeswax. Gleanings in Bee Culture 94: 742, 743, 758

White, J.W. 1975a. Physical characteristics of honey. In: Honey, a comprehensive survey, Crane (ed.), Heinemann, London, U.K. : 207-239

White, J.W. 1975b. Composition of honey. In: Honey, a comprehensive survey, Crane (ed.), Heinemann, London, U.K. :157-206

White, J.W. 1975c. Honey. In: The hive and the honeybee. Dadant & Sons Inc., Hamilton Illinois, USA, 491-530

White, J.W. and Doner, L.W. 1978. The 13C/12C ratio in honey. J. Apic. Res., 17 ~ 94-99

White, J.W. Jr., Kushnir, I. and Doner, L.W. 1979. Charcoal column/thin layer chromatographic method for high fructose corn syrup in honey and spectrophotometric method for hydroxymethylfurfural in honey: collaborative study. J. Assn. Off. Anal. Chem. 62(4): 921-927

White, J.W. and Siciliano, J. 1980. Hydroxymethylfurfural and honey adulteration. J. Ass. Off. Analyt. Chem., 63 (1): 7-10

White, J.W. 1980. Hydroxymethylfurfural content of honey as an indicator of its adulteration with invert sugars. Bee World, 61(1): 29-37

White, J.W., Platt, Jr. J.L., Allen-Wardell, G. and Allen-Wardell, C. 1988. Quality control for honey enterprises in less-developed areas: an Indonesian example. Bee World, 69 (2): 49-62

Whiterell, P.C. 1975. Other products of the hive. In: The hive and the honeybee, Dadant & Sons, IHamilton, Illinois, USA, : 531-558

Wollenweber, E. and 4 others 1987. A novel caffeic acid derivative and other constituents of Populus bud excretion and propolis (bee-glue). Z. f. Naturf., 42:1030-1034

Yanishlieva, N. and Marinova, E. 1986. [Application of a new method registering propolis components with anti-oxidative effects.] Khranitelnopromishlena Nauka, 2 (3): 45-50

Yanishlieva, N., Marinova, E. and Antonova, V. 1986. Possibilities of enhancing sunflower oil oxidation stability by adding natural antioxidants (Propolis). (In: Chem. Abs. 1986, 105, 17 # 151751h). Khranitelnoprom Nauka, 2 (2): 15

Yatsunami, K. and Echigo, T. 1985. Antibacterial activity of royal jelly. Bulletin of the Faculty of Agriculture, Tamagawa University No.25, 13-22.

Yener, E., Ungan, S. and Ozilgen, M. 1987. Drying behaviour of honey starch mixtures. J.Food. Sci., 52 (4): 1054-1058

Ziai, M.R. and Blume, A.J.H. 1990. Mast cell degranulating peptide: a multi-functional neurotoxin. J. Pharm. Pharmacol. 42(7): 457-461

Zommer-Urbanska, S., Gniazdowski, R. and Bojarowicz, H. 1989. Working out the technology of propolis unguentum and its application in vas-motor catarrh treatment. Proc. 31st Intern. Congr. Apic., Warsaw, Poland, August 1987: 488-492

Zwaenepoel, C. 1984. Honey: facts and folklore. Alberta Beekeepers' Association, Edmonton, Canada, 24 pp.

Contents - Previous - Next