Bees are a popular symbol for ceaseless, buzzing, systematic and zealous working activity. Bees seem also to accomplish a singular mission by providing mankind with naturally healthy products. Beehives are socially organized colonies of 40 to 60,000 beings (here perhaps beeings), each one dedicated to a specific task, while their global production is an amazing line of products such as bee pollen, propolis, royal jelly, honey, beeswax and bee venom. Bee products are interesting for their nutritional value as well as their healing, regenerating and cosmetic properties and/or attributes, altogether recollected under the modern denomination of apitherapy.

Below are some outstanding characteristics of bee products.

**Bee pollen >** Honey bees (Apis mellifera) collect the pollen from flowers, i.e. thousands of pollen grains per blossom are gathered by the bees and packed in their hind-legs during a pollen collecting trip, then stored in the honeybee combs of the respective colonies to be collected later by the beekeepers. The chemical composition of pollens naturally vary from blossom to blossom. The main components of bee pollen are proteins, amino acids, lipids and sugars. Analytical values vary from 7.5 to 35 % protein content, 15 to
50% sugars (reducing and non-reducing sugars, starch). Further naturally occurring components include enzymes, vitamins C, E, the B complex, minerals (K, Na, Ca, Mg, P, S), free amino acids, flavonoids, carotenoids, oligo-elements (A1, B, C1, Cu, I, Fe, Mn, Ni, Si, Ti, Zn).

Bee pollen is classified as a foodstuff. More adequate would be a definition as a food supplement as it is usually consumed in very small quantities, which means insufficient supplies of nutritional elements such as proteins, carbohydrates, minerals, vitamins for a human daily diet, but a valuable supplementation with these essential nutrients round up the nutritional value of the ingested food – especially of refined industrial foodstuffs. Interesting for nutrition-conscious consumers is the fact that bee pollen can be compared with beef-meat and baked beans in its proteinic and mineral content but is ten times richer in its vitamin content (B1 Thiamin, B2 Riboflavin, B3 Niacin) than these products. Added to the food – for example cereals, fruit bars, dairy products, functional beverages – bee pollen provides a wide spectrum of nutritional substances that are beneficial to the absorption of nutrients by the body and, hence, beneficial to the body growth and organic health. This is equally valid for human and animal diets. However, a restriction of use for human consumption exists for people susceptible of allergic reaction to pollen(s).

Apart from the nutritional benefits, bee pollen enjoys the reputation of strengthening the immune system, lowering the cholesterol level, counteracting many diseases, among which metabolic troubles, arterial problems, neurovegetative illness, prostate problems, women’s climacterial troubles during the menopause and concentration problems. As a natural medicine, bee pollen is purported to generally improve physical and mental strength and even enhance sexual power by providing highly efficient nutrients to the body. As a regenerating agent for the skin it is used in cosmetic creams and lotions, with the same allergenic restriction as for human consumption.

**Propolis** > Propolis is a natural sealing resin used by worker bees to line the inner sides of the combs, close and stick possible cracks in the walls of the hives or reduce their entrance while it acts as a natural, antibacterial and antifungal protection for the hives. Honey bees (Apis mellifera) collect wax and resins from plants, blossoms, shrubs and leaf buds which are then mixed with saliva and other bee excretions. The chemical composition of propolis is subject to variations according to its botanical source and the season of the year but it generally shows a very complex compound structure, among which resins, composed of flavonoids and phenolic acids or their esters, waxes and fatty acids, essential oils, pollens and other organic substances and minerals.
Bactericidal and fungicidal effects are attributed to propolis. It is used in dental care and dermatology (wound healing, mycosis, regeneration of the epiderm in the case of burn wounds, ulcers, excema). Propolis is integrated in the medicinal formulations for the treatment of cardiovascular, respiratory and blood systems. It is said that propolis improves the immune system and enhances the liver protection. As such it is used in cancer treatments. The cosmetic use of propolis is a prolongation of its dermatological applications, i.e. it is a welcome ingredient in cleansing and regenerating creams, soaps and masks.

As far as the food sector is concerned, propolis and its antimicrobial, fungicidal and antioxidant properties are interesting as a preservative agent or a dietary ingredient. Raw propolis is mostly processed into capsules, paste, dry and liquid extracts or tablets and consumed as a dietary supplement to be added to solid or liquid food.

Royal jelly > Royal jelly, also called gelée royale, is a gelatinous, whitish-yellowish substance, secreted by some glands of the nurse worker bees to feed the young bees, especially the queen bee. Royal jelly is collected by hand by the beekeepers out of the queen larva cells. As a natural bee product, the chemical composition of royal jelly is subject to variations. Its basic analysis, however, shows a highly complex combination of rich substances such as proteins, sugars (fructose and glucose), essential amino-acids and lipids, pro-vitamin A, vitamins B1, B2, B6, C, E, H, minerals and oligo-elements, and a high moisture content. Royal jelly also contains hormones (for example acetylcholine) as well as hormone-like substances and antibiotic components.

Fresh royal jelly is a perishable good that has to be stored immediately at max. –18°C whereas freeze-dried royal jelly powder can be stored in a dry place at max. 20°C. Odour and taste show a sourish note. To avoid trading bad or adulterated royal jelly, it is submitted to a strict analysis of the sensory quality, the moisture content, the total protein index, the percentage of sugars and 10-hydroxy-2-decenoic acid. This quality check is of importance for the consumption of royal jelly as a much appreciated diet supplement. The active principles contained in royal jelly enhance the absorption of nutrients out of the ingested food by the digestion organs. Metabolic and physiological benefits of that type provide the consumers with a feeling of energetic strength, physical and mental balance. This is one of the major aspects of royal jelly and its functionality as a diet supplement. However, a restriction of use for human consumption exists due to possible allergic reactions to proteins.

As a natural bee product, royal jelly is widely considered as a medicinal substance with healing properties. It shows bactericide and antibiotic properties that help cure furuncles and abscesses. It is purported to improve the cardio-vascular function, to lower
the blood pressure and the cholesterol level, to have a positive effect against sleep deficiency and concentration troubles as well maybe counteracting climacterial problems, with success. In the research for anti-cancer medications, royal jelly is tested on its ability to stimulate the production of antibodies to improve the immune system of the patients. Its anti-inflammatory properties may have a positive influence against arteriosclerosis. As to the geriatric field of application, royal jelly is part of regenerating cures where it is both ingested as a kind of “life elixir” and used to revitalize the epiderm. Men and women in their sixties and more indeed reported a feeling of wellness, balance and energy as well as a visible improvement of skin elasticity due to the intake and superficial use of royal jelly. Generally speaking, royal jelly is a valuable ingredient for so-called anti-aging cosmetics on a natural basis but it is certainly not a guarantee to remain young forever.

**Bee honey >** A natural product of the honey bees (Apis mellifera) and subject of the strictest scientific scrutiny, honey is a natural foodstuff, an ecological ingredient, a rich nutrient for body and mind, an unmatched sweetening agent, a flavouring agent for food, beverages and tobacco, a substance with healing properties as well as a component for natural cosmetics. A multitalent out of the beehive! Yet the trade of bee honey follows product-specific quality requirements that are widely adopted by both the importers and the food manufacturers in their purchase specifications. The essential criteria that define honey quality are as follows: odour, flavour, colour, HMF content (hydroxymethylfurfural), moisture content, pH value, diastase, sugar spectrum, conductivity, consistency and viscosity. No adulteration of any kind is permitted.

On the nutrition side, honey offers many essential elements through its rich composition. Like other natural bee products, its chemical components vary from one honey type to the other. Carbohydrates (glucose, fructose, saccharose, maltose etc., i.e. mainly mono-, di- and trisaccharides) are a major component of honey, amounting to an average percentage of 79%. Honey also contains water, glucuronic and acetic acids, amino acids, enzymes (diastase, saccharase, glucose-oxidase, catalase, invertase, inulase etc.), aromatic substances and essential oils, natural colour pigments, minerals, proteins, dextrins, pollen grains and low percentages of vitamins. Honey is a pure source of energy. 100 g of honey represent 300 to 320 kcal, or, better said for human consumption on a daily basis: a spoonful with 10 g of honey supplies 32 kcal, equal to 1.6 % of women’s and 1.28 % of men’s daily energetic needs, based on a general level of energetic needs for women (2000 kcal per day) and men (2500 kcal per day).
Both a foodstuff and a food ingredient, honey can be consumed in its natural floral variety or integrated in a multitude of food applications. There is an endless number of possibilities to consume honey either at home or in industrial foodstuffs, confectioneries, beverages, marinades, dressings, dairy products, preserves, convenience products, frozen food, functional products for kids, sportsmen/women, elderly people, as well as organic foodstuffs, kosher- or halal-certified products and vegetarian food.

Not only does the food industry largely use honey as a safe and healthy raw material but also the pharmaceutical industry generously refer to the antibacterial, antiseptic, anti-inflammatory and lenient properties of honey to cure ailments of all kinds. As to the cosmetic industry, honey offers its aromatic, soothing and nourishing properties to the epiderm by means of skincare creams, lotions, masks and shampoos – an allround body care for well-being purposes.

People suffering from pollen allergies may develop an allergy to certain honey types due to their pollen contents.

Apitherapy > The above mentioned bee products – plus bee venom and beeswax – build up a true therapeutic catalogue of natural substances with beneficial effects on body and mind and are used as such for apitherapy purposes. Wellness from the beehive, however, does not occur through an operation of the Holy Spirit. Suppliers of natural bee pollen, propolis, royal jelly and honey – in crude and/or organic quality – comply with strict regulations and quality requirements. Market experience, product knowledge, quality management from sourcing to selling along with a stringent analytical programme are the very basis for a professional trade and the warrant of product safety for the end consumers. Since 1901 the Germany-based company Alfred L. Wolff has invested in an overall quality policy around the trade of these natural bee products. ISO 9001, HACCP, Organic (bio), Halal, Kosher Certifications mean supply standards and product safety along the whole supply chain.

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