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EXTENDED ABSTRACTS

Quality control parameters, antioxidant activity and chemometrics of Brazilian honey

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ABSTRACT

Bee honey presents beneficial properties for human health and is considered a high quality food. However, if the producer does not take the necessary care related to extraction and storage, honey suffers changes in its chemical composition reducing its quality. In order to evaluate the quality of commercial honey, some physicochemical analyses (moisture, electrical conductivity, soluble solids, ash, hydroxymethylfurfural (HMF), proline, color, antioxidant activity, Lund and Lugol reactions) of eleven honey samples from different producers and one corn glucose sample were performed. Honey samples were generally considered of good quality, displaying results within the standards allowed by Brazilian laws. The only analyses that were able to distinguish honey from corn glucose were: Lugol, HMF and proline, as well as the Principal Component Analysis (PCA) of the total results. Good correlation was found between electric conductivity versus ash, electric conductivity versus colour and ash versus colour; ED50 versus ash and colour versus ED50 presented an inverse correlation. All honey's samples presented good quality and are within the legal parameters. The essential analyzes for the differentiation of good quality honeys against the corn glucose sample were: Lugol, HMF and Proline. Beekeeping in Brazil is changing from artisanal and amateur, becoming constantly more entrepreneurial, technical and productive. The Brazilian Service of Support to Micro and Small Companies has been supporting honey producers in very well-established cooperatives. Throughout the country, thousands of jobs are generated relating to beekeeping as well as the manufacture and commerce of related equipment. Honey is considered a high-quality food and is of great nutritional importance, rich in numerous substances considered to be beneficial to our health. Honey has antianemic, emollient, conservative, digestive, laxative and diuretic, anticancer and prebiotic properties. It is a complex food, both from the biological and the analytical points of view, as its composition changes depending on its geographic and floral origin, as well as due to climatic conditions. Brazil has an abundant biodiversity and the rugged Africanized bees, both

presenting great potential for obtaining high quality honey and other derived apicultural products. However, there is still a lot to learn and develop related to the properties and characteristics of our bee products. Honey is a viscous, aromatic and sugary substance. Its aroma, taste, color, viscosity and medicinal properties are directly related to its source of nectar and the species of bee that produced it. Honey is composed of sugars, water, enzymes, vitamins, flavonoids and minerals. A series of other organic compounds, such as organic acids, and even bacteria contribute to its colour, odor and flavor. The composition of honey is mainly dependent on its source(s) of nectar, but variation in the type of soil, species of bee, physiology of the colony, state of maturity and climatic conditions when the honey is obtained may also affect its composition, as well as its final quality. Therefore honeybees produce better honey in regions where the flora and climate favor the collection of nectar. Besides sugars, honey contains dextrin, gum and small quantities of compounds containing nitrogen and phosphor. It also contains small quantities of minerals, organic acids, vitamins, pigments and aromatic substances. The ash content is usually below 0.5%. Most nectar sources are acid (pH 2.7-6.4), as a result of approximately 0.57% organic acids but some may be alkaline (pH up to 9.1). The vitamin content is low, with the presence of: thiamin, riboflavin, pyridoxine, nicotinic acid, pantothenic acid, folic acid, biotin and ascorbic acid (the only vitamin found in reasonable concentrations in nectar and honey). Table 1 presents the basic composition of a sample of commercial honey produced by *Apis mellifera Adansonii* honeybees from Brazil. The standards of honey approved by the Brazilian Legislation are only met by honeys produced by *Apis* species.

Keywords: Honey quality and adulteration; Antioxidant activity; Principal component analysis; Correlations.