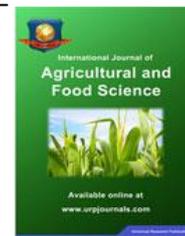




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Original Article

Physico-Chemical Comparison and Preservative Properties of Floral and Non-Floral (Rubber) Honeys

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Abstract

The study on the characterization of two types of honey i.e., floral and non-floral (rubber honey) was carried out on the basis of their physicochemical properties. Both the samples showed fewer variations with reference to their level of total glucose, fructose, sucrose, fructose/glucose ratio, ash, density, viscosity, pH and conductivity content. Both the honey samples are having good preservative properties which have been concluded by the test with commercial fruits. It can be seen that the consumers can opt for the non-floral honeys instead of floral honeys in their day to day life.

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Key words: Floral honey, Non-floral honey, Rubber honey, Preservative properties.

Introduction

Honey, a viscous and aromatic product prepared by bees mainly from nectar or flowers or honey dew, is an excellent and widely used food that is popular all over the world [1]. Nowadays a current tendency is to define the distinctive character of unifloral honeys in order to obtain a standard of quality and authenticity for these products that will allow them to be competitive in the market [2]. The chemical composition of honey is dependent on its origin and thus the composition of nectar and honeydew honeys differ from each other [3]. Honey, produced by the honeybee, is a natural supersaturated sugar solution, which is mainly composed of a complex mixture of carbohydrates. Besides this, it also contains certain minor constituents viz., proteins, enzymes (invertase, glucose oxidase, catalase, phosphatases), amino and organic acids (gluconic acid, acetic acid, etc.), lipids, vitamins (ascorbic acid, niacin, pyridoxine etc.), volatile chemicals, phenolic acids, flavonoids, and carotenoid like substances and minerals [4-

6]. The concentration of mineral compounds ranges from 0.1% to 1.0 %. In comparison with nectar honeys, honeydew honeys are relatively rich in minerals, resulting in higher electrolytic conductivity [7,8]. It contains a number of components to acting as preservatives; these include a-tocopherol, ascorbic acid, flavonoids, and other phenolics and enzymes such as glucose oxidase, catalase, and peroxidase. It is suggested that any of these substances owe their preservative properties to their antioxidative activity [9].

The objective of the current study was to investigate the physical, biochemical and antioxidant properties in different types of bee honeys from different floral and non-floral feed sources and to study their possible interdependence. Also preservative properties of both type of honey have been studied on few fruit samples.

Materials and Methods

The nectar honey is gathered from the nectaries of flowers and honeydew honey comes from the sugary excretion of

some hemipterous insects on the host plant or from the exudates of the plants. In Marthandam, Nagercoil district, Tamilnadu, where the apiculture is the predominant business honey is harvested from the beehives of the bees that collect honeydew from the tender young leaves of rubber trees (*hevea brasiliensis*). Every year rubber trees shed their leaves in December and in the middle of January. During end of January, rubber trees will produce young tender leaf buds. This young leaves secrete sucrose solution which is called leaf exudates. It is collected by honey bees and stored in their honey comp. Based on the agricultural produce (grading and marking) act 1937 by the government of india, the analysis of physical, chemical and bio-chemical properties has been done using standard procedures, which includes the testing of glucose, fructose, sucrose, fructose/glucose ratio, ash, density, viscosity, pH and conductivity of the honey samples. The preservative quality of honey has been studied with red banana, grapes, pineapple and mixture of these fruits by taste, appearance and smell for 30 days.

Results and Discussion

The analysis has been made on both honey samples in order to develop a reliable database that could be used to identify the nature of the samples. The results (Table 1) show a relatively characteristic profile depending on the floral and non-floral origin of honey. It can, in fact, be seen that the sucrose content of floral honeys is lower than that of rubber leaf honeys. The level of this sugar is highly dispersed in this variety, but we were able to distinguish two populations: non-floral honeys with high sucrose that are the case of rapid honey flows, i.e. few enzyme reactions of

bees on sugars, and floral honeys with a lower sucrose content that are cases of slow honey flows, where enzymes could transform most disaccharides into monosaccharides. Also the amount of glucose and fructose are higher in non-floral honey and there is a mass percentage difference as 1.826 and 1.791 for glucose and fructose respectively. The fructose/glucose (F/G) ratios, however, are equal for both. In common, electrical conductivity, viscosity and specific gravity are more in floral than non-floral honey. Table 1 shows that floral honey is having more ash content. It indicates that the mineral traces are rich in floral honey. The problem of food spoilage has plagued humans since ancient times. In earlier times, food was preserved with salt, sugar, spices, and wood smoke. With the development of new products, chemical antimicrobial agents and many organic acids were relied on to achieve a longer shelf life and greater assurance of protection from microbial spoilage. With growing concern over the presence of chemical residues in foods the demand for nontoxic natural preservatives is increasing. Many natural substances in honey species with different plant origins may play an important role in functional properties such as antioxidative and antibacterial activities. From the present study, the preserving properties of both honeys confirm that both are equally good in preserving banana, grapes, pineapple and mixture fruits for the study period of 30 days. Higher rate fermentation was noticed for pine apple fruits preserved in both honey. It concludes that both honey have equal preservative qualities. It is obvious from the present studies that each honey species has inhibited the bacterial growth.

Table 1 Physio-chemical properties of floral and non-floral (rubber) honey

Parameter	Floral Honey	Rubber Honey
Odour	Strong Desirable smell	Desirable Smell
Colour	Dark Brown	Golden Brown
Taste	Strong Sweet	Strong Sweet
pH	4.1100	4.0700
Conductivity (mho)	1.2 x 10 ⁻⁸	0.8 x 10 ⁻⁸
Density (Kgm ⁻³)	1.3868	1.3792
Specific Gravity	1.3868	1.3792
Viscosity (poise)	34.360	34.030
Glucose (%)	31.392	33.218
Fructose (%)	35.322	37.113
F/G Ratio	1.1252	1.1173
Sucrose (%)	1.1639	1.2950
Moisture (%)	15.600	15.800
Ash (%)	0.7170	0.6820
Acidity (%)	0.1035	0.1265

Conclusion

Today, the characterization of the flavor and quality control of floral honeys is a subject of great interest in apiculture. The characterization of two types of honey i.e., floral and non-floral was carried out on the basis of their physicochemical properties. Both the samples showed fewer variations with reference to their level of total glucose, fructose, sucrose, fructose/glucose ratio, ash, density, viscosity, pH and conductivity content. The fact

that both the honey samples are having good preservative properties which has been concluded by the test with commercial fruits. It can be seen that the consumers can opt for the non-floral honeys instead of floral honeys in their day to day life.

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References

1. M. Blasa, M. Candiracci, A. Accorsi, M.P.Piacentini, M.C. albertini, E. Piatti, Raw Millefiori honey is packed full of antioxidants, *Food chemistry* 97 (2006) 217-222.
2. L.C. Vazquez, M.C.D. Maroto, M.A. G. Vinas, M.S.P. Coello, Differentiation of monofloral citrus, rosemary, eucalyptus, lavender, thyme and heather honeys based on volatile composition and sensory descriptive analysis, *Food chemistry* 12 (2009) 1022-1030.
3. M.N. Rashed, M.E. Soltan, Major and trace elements in different types of Egyptian mono-floral and non-floral bee honeys, *Journal of Food Composition and Analysis* 17 (2004) 725-735.
4. V. Kaskoniene, P.R. Venskutonis, V. Ceksteryte, Composition of volatile compounds of honey of varies floral origin and beebread collected in Lithuania. *Food Chemistry* 111 (2008) 988-997.
5. M.Liviu Al, D. Daniel, A. Moise, O. Bobis, L.Laslo, S. Bogdanov, Physico-chemical and bioactive properties of different floral origin honeys from Romania, *Food chemistry* 112 (2009) 863-867.
6. T. Nagai, R. Inoue, N. Kanamori, N. Suzuki, T. Nagashima, Characterization of honey from different floral sources. Its functional properties and effects of honey species on storage of meat. *Food Chemistry* 97 (2006) 256-262.
7. M.L. Felsner, C.B. Cano, R.E. Bruns, H.M. Watanabe, L.B. Almeida-Muradian, J.R. Matos, Characterization of monofloral honeys by ash contents through a hierarchical design. *Journal of Food Composition and Analysis* 17 (2004) 737-747.
8. J. Lachman, D. Kolihoiva, D. Miholova, J. Kosata, D. Titera, K. Kult, Analysis of minority honey components: Possible use for the evaluation of honey quality. *Food chemistry* 101 (2007) 973-979.
9. M. Ozcan, D. Arslan, D.A. Ceylan, Effect of inverted saccharose on some properties of honey, *Food Chemistry* 99 (2006) 24-29.

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