

Comparative Physico -Chemical Analysis of Different Honey Samples

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ABSTRACT

In Ayurveda, honey is widely used in therapeutics as an important vehicle (Anupana) for drug administration through the oral route and also in the preparation of various medicaments. In this present study, attempt was made to compare physico-chemical analysis of different samples of honey collected from different sources. Samples of honey were collected from natural habitat (Sample A), local pharmacy (Sample B), GMP certified pharmacy (Sample C), AGMARK certified company (Sample D). These samples are compared for their physico-chemical characteristics with standards of API.

Results revealed that in Fieche's test except for sample A, other samples turned to in cherry red colour indicating addition of artificial invert sugar in the samples of honey. The Specific Gravity was least in Sample C and was most in Sample D. pH value of Sample A was similar to API standard where as in other samples was more. Least Ash value of 0.023% was found in sample D and most in sample A. The refractive indices of all the samples were similar. Fructose/Glucose ratio was more than 1 in all the samples. All the samples were soluble in water and insoluble in alcohol. n. p. Honey collected from natural habitat (Western Ghats) complied with the API standard.

Key words: Ayurveda; Honey; Physico-chemical analysis; Fieche's Test.

INTRODUCTION

Honey is a natural food produced by bees from nectar or secretion of flowers. In Ayurveda, honey is widely used in therapeutics as an important vehicle (Anupana) for drug administration through the oral route and also in the preparation of various medicaments, like confection, self-generated alcoholic preparation, medicated enema preparation as well as externally for burn wound healing etc. n. p. In this present study, attempt was made to compare physico-

chemical analysis of different samples of honey using API standard. Honey collected from natural habitat and was compared with different market samples, using parameters like Specific Gravity, Fructose/Glucose ratio, artificial invert sugar (which helps to detect the presence of added sugar and jaggery or any other natural and artificial sweetening agents in Honey) etc. The results were favorable for sample collected from natural habitat while market samples contained artificial invert sugar which may be harmful for the healthy and diseased individual.

MATERIALS AND METHODS

Collection of sample

Four different honey samples were collected.

- 1) Natural Habitat (Western Ghats from Belgaum region) - A
- 2) Local Pharmacy - B

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- 3) GMP Certified Pharmacy - C
4) AGMARK Certified Company - D

in alcohol. Determination of artificial invert sugar was determined by Fieche's test

Source of data

Physico chemical analysis data of honey was collected from Central Research Laboratory, KLEU's Shri B.M.K.Ayurveda Mahavidyala, Belgaum, Karnataka.

Organoleptic method

This refers to macroscopic identification of the drug, i.e. colour, odour and taste.

Test for purity ¹

1. Wick was prepared of cloth, then honey applied on it and burnt. If wick caught fire, then honey was pure.

2. Water was taken in a pot and 2-3 drops of honey put in it. If honey dropped goes down without spreading in water, then it was pure.

Analytical methods

Physico-chemical analyses were carried out for samples A, B, C, D. Specific Gravity of all the samples were 1.1, 0.709, 1.423 and 1.46. respectively Ash values were 3.22%, 0.234%, 0.191% and 0.023% respectively. Refractive indices were 1.475, 1.480, 1.488, and 1.484. pH value were 4, 4.5, 5 and 4.5, respectively Fructose/Glucose ratio was 3.44, 2.9, 6.43 and 2.95 respectively. Solubility Test showed, all samples were soluble in water and insoluble

Pharmacognostic method

Table 2: Pharmacognostic properties of different sample of honey

	Stranded*	Sample A	Sample B	Sample C	Sample D
Artificial invert Sugar	Absent	Absent	Present	Present	Present
Refractive Index	> 1.470	1.475	1.480	1.488	1.484
pH	4	4	4.5	5	4.5
Water Content†	< 25 %	24.4%	22.4%	19.4%	21.0%
Sp. Gr.	< 1.35	1.1	1.4230	.709	1.46
Total ash	< 0.50%	3.22%	0.234%	0.191%	0.023%
Fructose/ Glucose Ratio	>1%	3.44%	2.9%	6.43%	2.95%
Solubility Test (water)	Soluble	Soluble	Soluble	Soluble	Soluble
Solubility Test (alcohol)	Insoluble	Insoluble	Insoluble	Insoluble	Insoluble

(Sample A- Natural habitat, Sample B- local Pharmacy, Sample C- GMP certified pharmacy, Sample D- AGMARK certified company). *The Ayurvedic Pharmacopoeia of India Part-I Vol.VI³. †Honey table of Chataway⁴.

Fieche's Test²

This test is used to detect the presence of sugar and jaggery or any other natural and artificial sweetening agents in honey. The procedure involved, 5ml of solvent ether added to 5 ml of honey in test tube, mixed well & put in Petri dish. Ether layer in Petri dish was evaporated completely by blowing it on water bath and after cooling, 2 to 3 ml of Resorcinol (1gm of Resorcinol resublimed in 5 ml of conc.HCl) was added in it. Appearance of Cherry Red color indicates the presence of artificial invert sugar. All four samples were taken for this test and results showed artificial invert sugar to be absent in sample A and present in all the other samples.

RESULTS

Results are listed regarding organoleptic, other tests and analytical data in tables 1&2

Table 1: Organoleptic characters & purity test of different samples of honey

	Sample A	Sample B	Sample C	Sample D
Colour	Light Amber	Dark Amber	Amber	Amber
Taste	Sweet Pungent	Sweet	Sweet	Astringent
Odor	Aromatic	Pleasant	Pleasant	Slightly Aromatic
Fire Test	+++	+	+	++
Water Test	+++	++	++	+++

(Sample A- Natural habitat, Sample B- local pharmacy, Sample C- GMP certified pharmacy, and Sample D- AGMARK certified company)

DISCUSSION

In the Fiech's test, all the samples of honey except the Sample A turned into cherry red colour which indicates that during processing of honey or for adulteration purpose, artificial sugar may have been added by the manufacturers. The Sp.Gr. was least in sample B the most in sample D. pH of sample A was 4 which is similar to API standards, but other samples showed slightly variations. Least Ash value of 0.023% was found in sample D and most was seen in sample A. Water content was least in sample C and highest in sample A. This is due to the dehumidifying technique which the manufacturers use to reduce the moisture content⁵. But this in turn increases the value of HMF (Hidroximethylfurfural) which is harmful to human body⁶. Fructose/Glucose (F/G) ratios of all samples were more than 1, which indicates the ability of honey to crystallize. It was reported that honey remains liquid when its F/G ratio is high, and vice versa. Moreover, honey crystallization is slower when F/G ratio exceeds 1.3, and it is faster when the ratio is below 1⁷. The refractive indices of all the samples were similar. All the samples were soluble in water and insoluble in alcohol.

CONCLUSION

With the help of specific analytical methods genuine samples of honey can be identified. In the present study, honey collected from natural habitat resembled the standard honey.

In the field of Ayurveda, before using Honey for therapeutic use, evaluation with classical and physico-chemical parameters is necessary to establish therapeutic efficacy of honey and also to differentiate the standard and adulterated honey available in market.

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