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Total soluble solid and pH of *Apis cerana* honey from Arunachal Pradesh

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Abstract

The experiment was carried out in the year 2021-22. In Arunachal Pradesh farmers mainly rear *Apis cerana*. After survey, 21 multiflora honey samples were randomly collected from farmers in localities from East Siang and Lower Dibang Valley and Namsai districts of Arunachal Pradesh. In the study determination of total soluble solid (TSS) and pH of honey was done and the result revealed that, Sille had the highest content of TSS (81.12°Brix) while it is lowest in Namsing (72.20°Brix) and pH of honey is highest in Sille (3.27) and lowest in Mebo (4.76). This might be due to the variation in crops grown by farmers and the nectar source collected by *Apis cerana*.

Keywords: Honey, *Apis cerana*, total soluble solid, pH, farmers, Arunachal Pradesh

Introduction

Honey is the substance made from the gathering of nectar, sugary deposits from plants and animals by several bees, the best-known of which are honey bees. Honey is made and stored to nourish bee colonies which is in their natural scientific models synthesized, purified and stored in combs in jelly liquid. The mechanism of honey synthesis by bees is same all over the world but the differences in honey observed in their physical and chemical properties are basically on geographical and botanical origins. The variation in taste, flavor, aroma and colour determines that honey is produced from many different flora substances majorly from plants (Omoya and Akharaiyi, 2010) [7]. The chemical composition of honey is dependent on its origin. Commercial samples of honey available in various parts of the world are of highly different quality, on the basis of factors like geographical conditions, production season, processing, and source of nectar, packaging and storage period. Honey is naturally highly acidic. Its pH is extremely low, ranging between 3 and 4.5, which inhibits the growth of bacteria and other spoil-ready organisms (Geiling, 2013) [6]. Acidity of honey due to the presence of organic acids and it depends on the flower type used by the honey bee for nectar (Nanda et. al., 2003) [5]. °Brix or TSS is closely connected to the amount of sugar existing in honey, making it an essential marker of conceivable adulteration

Materials and Methods

Collection of honey sample

Experiment was conducted during 2021-2022. Twenty-one *Apis cerana* multiflora honey samples were randomly purchased directly from farmers in village areas of Namsai (27.6692 °N, 95.8644 °E), Roing (28.1179 °N, 95.8226 °E), Namsing (27.9256 °N, 95.4887 °E), Debing (27.8292 °N, 95.1629 °E), Sille (27.9006 °N, 95.3020 °E), Mebo (28.1200 °N, 95.2994 °E), Riga (28.4341 °N, 95.0427 °E), Arunachal Pradesh. The samples were filtered in the laboratory with sterile seitz filter with a pore size of 0.02 mm This was done to remove particles. The honey filtrates were stored in bottles at room temperature prior use.

Determination of pH of Honey

The pH of honey was determined according to the method described by the International Honey Commission (Bern, 2002) [3]. Ten grams of each honey sample was diluted with 75ml distilled water (Chakir et al., 2016) [1]. The pH was measured using a digital pH meter (EUTECH INSTRUMENT pH Tutor) which was calibrated at room temperature. To ensure accurate pH measurement, the instrument was calibrated every time before use and recalibrated every two or three hours to compensate for any possible loss of sensibility.

Determination of total soluble solids (TSS)

The amount of total soluble solids ($^{\circ}$ Brix) was determined using a refractometer (MA871) at 25 $^{\circ}$ C (Kamal *et al.*, 2019) [4]

Result and Discussion

The results obtained from the examined honey samples on total soluble solid and pH in the are displayed in Figure. Total soluble in the examined samples ranged between 72.20 and 81.12 $^{\circ}$ Brix (Data are mean of three samples collected from each locality). The values of total solids obtained were in line with the reports of Babarinde *et al.* (2011) [2] and Saxena *et al.* (2010) [8], they found 72.2–76.5% and 78.4–82.8%, respectively. Sugars i.e. glucose and fructose mainly comprise the total solids present in honey accounting for about 85% (Babarinde *et al.* 2011) [2]. The $^{\circ}$ Brix or TSS is closely connected to the amount of sugars existing in honey, making it an essential marker of conceivable adulteration.

Data presented in Figure revealed, Sille had the highest content of TSS while it is lowest in Namsing. This might be due to the variation in crops grown by farmers and the nectar source collected by *Apis cerana*.

From Figure, again it can be seen that the investigated honey was acidic (pH 3.27–4.76) (Data are mean of three samples collected from each locality) and its pH remained within the recommended limit (pH 3.40–6.10) of the Codex Alimentarius Commission (1981), which ensures honey freshness. pH of honey is highest in Sille and lowest in Mebo. pH values of analysed honey corroborated the values reported elsewhere previously (Saxena *et al.* 2010) [8]. It is clarified that fermentation of honey sugar is largely induced by the acidic environment and contributes to the characteristic honey flavor. This acidic environment provides stability against spoilage of honey caused by microorganisms. Moreover, high acidity is an indicator of the high amount of minerals.

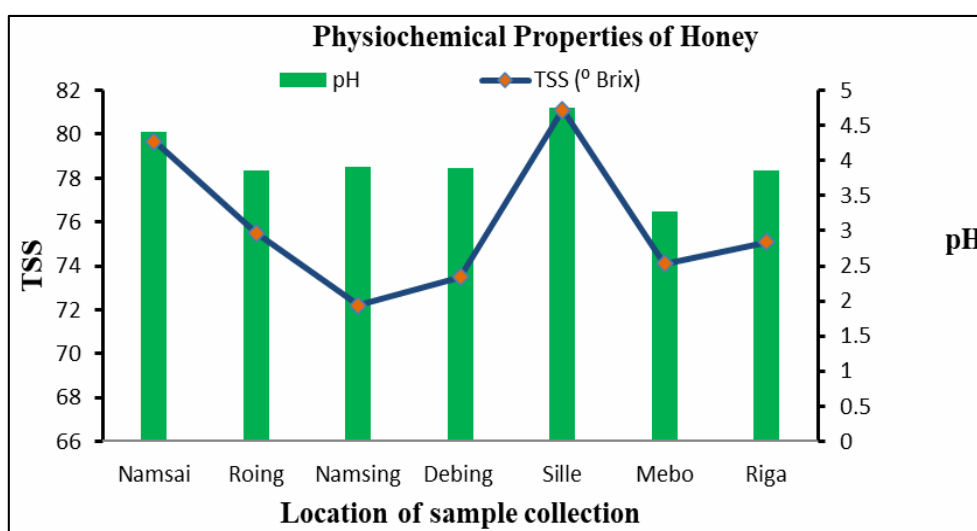


Fig: Total soluble solid and pH of multifloral *Apis cerana* honey of Arunachal Pradesh

Conclusions

The results obtained in this study shown that the TSS content and pH value of honey is within the recommended limit, therefore, all values of results were in the limits permitted by the legislation, which confirm the quality of all honey samples.

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