

## SENSORY EVALUATION OF HONEY SOLD IN DIFFERENT LOCATIONS IN NIGERIA

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### ABSTRACT

*This study was undertaken to carry out sensory evaluation of honey sold in five towns in Nigeria. The towns are Bida, Minna, Suleja, Kontagora, all in Niger State and Obollo-Afor in Enugu State. Samples of honey procured from these sales outlets were subjected to sensory evaluation by trained panellists. The sensory evaluation of flavour, taste, colour, consistency and overall acceptability of the five samples of honey indicated that they were significantly different from each other ( $P \leq 0.5$ ). From the results obtained, it was observed that the honey from Bida had the best quality and organoleptic attributes followed by the one from Obollo-Afor, while the ones from Minna, Kontagora and Suleja had the least quality and organoleptic attributes. It was concluded that honeys from Bida and Obollo-Afor are fit for consumption in their current forms while honeys from Minna, Kontagora and Suleja are recommended for further processing before consumption.*

**Keywords:** Sensory evaluation, Honey, Quality, Organoleptic attributes

### INTRODUCTION

Honey is a sweet food made by bees using nectar from flowers. The variety produced by honey bees (the genus, *Apis*) is the one most commonly referred to and is the type of honey collected by beekeepers. Honey has a long history of human consumption, and is used in various foods and beverages as a sweetener and flavouring. Flavours of honey vary based on the nectar source, and various types and grades of honey are available (Aparna and Rajalakshmi, 1999; Vaughn and Bryant, 2001). Honey is a mixture of sugars and other compounds. With respect to carbohydrates, honey is mainly fructose (about 38.5%) and glucose (about 31.0%), making it similar to the synthetically produced inverted sugar syrup, which is approximately 48% fructose, 47% glucose, and 5% sucrose (National Honey Board, 2010). The remaining carbohydrates of honey include maltose, sucrose, and other complex carbohydrates. As with all nutritive sweeteners, honey is mostly sugars and contains only trace amounts of vitamins or minerals. Honey also contains tiny amounts of several compounds thought to function as antioxidants, including chrysin, pinobanksin, vitamin C, catalase, and pinocembrin (Mato et al., 2003). The specific composition of any batch of honey depends on the flowers available to the bees that produced the honey.

High-quality honey can be distinguished by fragrance, taste, and consistency. Ripe, freshly collected, high-quality honey at 20 °C should flow from a knife in a straight stream, without breaking into separate drops. After falling down, the honey should form a bead. The honey, when poured, should form small, temporary layers that disappear fairly quickly, indicating high viscosity. If not, it indicates excessive water content (over 20%) of the product. Honey with excessive water content is not suitable for long-term preservation (Wikipedia, 2011). Many foods and food ingredients have the potential to

be adulterated. Those that are expensive (e.g. vanilla, extra virgin olive oil) (Cotteet al., 2004) and whose compositions or yields may vary as a result of fluctuations in weather during growth and harvest seasons (e.g. coffee, oranges) (Briandlet et al., 1997) may be particularly susceptible to this practice. Economic adulteration, i.e., the extension of a food or food ingredient by a cheaper and inferior product or component, is of considerable concern to food manufacturers, regulatory agencies, and consumers alike. Honey is highly prized by consumers as a natural sweet substance. It is defined as “the natural sweet substance produced by honeybees from the nectar of plants or from secretions of living parts of plants or excretions of plant sucking insects on the living parts of plants, which the bees collect, transform by combining with specific substances of their own, deposit, dehydrate, store, and leave in the honeycomb to ripen and mature”. While demand for honey is increasing, production is in decline for a variety of socio-economic factors. Extension of honey by addition of other sweet substances such as sugars or industrial syrups at some stage during production or processing could be an attractive means of economic adulteration. Identifying this type of adulteration is important for financial reasons.

In an attempt to limit variability and the possible marketing of sub-standard or adulterated products, Codex Alimentarius (2001) has proposed compositional standards for honey. There are, of course, differences between the standards of different countries or regions and, in the Middle East for example, the Gulf Standard suggests a minimum level of apparent reducing sugars of 650 g/kg (Al-Jedah et al., 2003) instead of the minimum of 600 g/kg for fructose + glucose (Codex Alimentarius, 2001). The objective of this study is to carry out sensory evaluation on honeys obtained from five towns in Nigeria to ascertain their acceptability or otherwise among consumers.

## MATERIALS AND METHODS

### Collection of Honey

The honeys used as samples for the sensory evaluation were obtained from five towns in Nigeria which are Bida, Minna, Suleja, Kontagora (all in Niger State) and Obollo-Afor in Nsukka, Enugu State. The sample from Bida (350 ml) was collected on 15<sup>th</sup> August, the sample from Suleja (150 ml) was collected on 19<sup>th</sup> August while that of Minna (123 ml) and Kontagora (60 ml) were collected on 21<sup>st</sup> August, 2011. The sample (70 ml) from Obollo-Afor was collected on 30<sup>th</sup> September, 2011.

## RESULTS AND DISCUSSION

The results of the sensory evaluation of honeys sourced from five different towns in Nigeria are presented in Table 1.

Table 1 shows the mean sensory scores of 16 panellists that evaluated the five samples of honey. Based on the mean scores of the 16 panellists, the flavour, taste and consistency of the five honey samples were not significantly different from each other ( $P > 0.5$ ). This showed that the flavour, taste and consistency of the samples were equally preferred. The approximate score for flavour falls between 5 and 6 (liked slightly and liked moderately) while the score of consistency was approximately 5 (liked slightly). The taste, flavour and consistency of all the samples were liked.

There was significant difference in the mean scores of colour among the samples ( $P < 0.05$ ). The colour scores of samples from Bida and Obollo-Afor were not significantly different from each other and they had approximate scores of 6 (liked moderately). However, the samples were more preferred to samples from Minna, Kotangora and Suleja with approximate scores of 5 (liked slightly). The colour of sample Bida was preferred equally as sample Obollo-Afor and sample Minna equally as samples Kotangora and Suleja. Nevertheless, the colours of all the samples were liked.

Table 1: Sensory Evaluation of Honey from Different Towns in Nigeria

Parameter	Mean $\pm$ SD				
	Bida	Minna	Kontagora	Suleja	Obollo-Afor
Colour	6.13 <sup>a</sup> $\pm$ 1.09	5.38 <sup>bc</sup> $\pm$ 0.62	4.81 <sup>c</sup> $\pm$ 0.75	4.81 <sup>c</sup> $\pm$ 0.66	5.88 <sup>ab</sup> $\pm$ 0.72
Flavour	5.19 <sup>a</sup> $\pm$ 1.17	5.50 <sup>a</sup> $\pm$ 1.21	5.19 <sup>a</sup> $\pm$ 1.28	5.38 <sup>a</sup> $\pm$ 1.09	5.44 <sup>a</sup> $\pm$ 1.21
Taste	4.94 <sup>a</sup> $\pm$ 1.53	5.69 <sup>a</sup> $\pm$ 1.08	4.9 <sup>4a</sup> $\pm$ 1.61	4.63 <sup>a</sup> $\pm$ 1.31	5.13 <sup>a</sup> $\pm$ 0.81
Mouth feel	5.38 <sup>ab</sup> $\pm$ 1.15	5.63 <sup>a</sup> $\pm$ 1.15	4.63 <sup>bc</sup> $\pm$ 1.36	4.06 <sup>c</sup> $\pm$ 1.34	5.00 <sup>ab</sup> $\pm$ 1.16
Consistency	5.13 <sup>a</sup> $\pm$ 0.89	5.25 <sup>a</sup> $\pm$ 1.07	4.63 <sup>a</sup> $\pm$ 1.31	4.56 <sup>a</sup> $\pm$ 1.41	5.06 <sup>a</sup> $\pm$ 1.18
Overall acceptability	5.55 <sup>a</sup> $\pm$ 1.04	5.64 <sup>a</sup> $\pm$ 0.81	5.09 <sup>ab</sup> $\pm$ 0.83	4.27 <sup>b</sup> $\pm$ 1.62	5.09 <sup>ab</sup> $\pm$ 1.30

Means with different superscripts in the same row are significantly different from each other ( $P \leq 0.05$ ) while those with the same superscript are not significantly different from each other ( $p > 0.05$ ).

The mouth feel of the five samples showed some level of significant difference ( $P < 0.05$ ). The mouth feel of samples from Minna, Bida and Obollo-Afor were not significantly different from each other. They had an approximate score of 5 (liked slightly) but that of sample Minna was preferred significantly more to samples Kotangora and Suleja. The mouth feel of samples Bida and Obollo-Afor was preferred like sample Kotangora, which also had an approximate score of 5 (liked slightly) but were more preferred significantly to sample Suleja, which had an approximate score of 4 (neither liked nor disliked).

The Overall acceptability of the five samples showed some level of significance at 5% confidence limit as revealed by Duncan Multiple range test (DMRT). The acceptability of samples Bida, Minna, Kotangora and Obollo-Afor were not significantly different from each other but the acceptability of samples Bida and Minna with approximate scores of 6 (liked moderately) were preferred significantly more to that of sample Suleja, with an approximate score of 4 (neither liked nor disliked). However, sample Suleja was preferred equally as samples Kotangora and Obollo-Afor with approximate scores of 5 (liked slightly) since there was no significant difference between their scores.

## CONCLUSION

Based on colour, flavour, taste, mouth feel and consistency, the honey from Bida had the highest overall acceptability, followed by the honey from Obollo-Afor, then the honey from Minna; while those from Kontagora and Suleja had the lowest overall acceptability ratings. From these results, it was concluded that the honey from Bida has the best quality attributes followed by that from Obollo-Afor and then Minna; while the ones from Kontagora and Suleja had the least quality attributes. As a result, honeys from Bida and Obollo-Afor were recommended for consumption in their present forms while those from Minna, Kontagora and Suleja are recommended for further processing before consumption.

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