

ASSESSMENT OF HEAVY METALS IN HONEY BY ATOMIC ABSORPTION SPECTROMETER (AAS)

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ABSTRACT

The present study was aimed to determine the heavy metals present in Honey samples from Kalaburgi region. The objective of the work is to determine distribution of the levels of selected heavy metals like iron, zinc, copper, manganese, arsenic, cadmium, molybdenum and aluminium. Total of 6 samples were collected and three samples are natural honey and three are packed honey. Natural honey was collected from different regions of Kalaburgi region, packed honey namely Dabur, Patanjali and Lion honey respectively. The analysis revealed the presence of Fe (0.031 ppm), As (0.0008 ppm), Al (-0.021ppm), Cd (0.0025 ppm), Mo (0.0015 ppm), Cu (-0.004 ppm), Zn (0.043 ppm) and Mn (- 0.004 ppm). The contamination levels of the heavy metals are found to be below detection level. The toxic level present in the Bee honey is the result of the micro polluting agents in the atmosphere. The results helped us to know that acceptable amounts of heavy metals are present in the honey. Thus the honey produced from natural and packed honey is suitable for human consumption.

Keywords:

Heavy metals, Honey samples, AAS, Kalaburgi Karnataka.

*-INTRODUCTION :

Honey is the natural sweet substance produced by honey bees from flower nectar or secretion of plant parts which they collect transform and combined with specific substance and store in comb to ripen and matures. Singh C et al (2014) The major constituents of honey are saccharides which come from nectar of the blossom .It contain sugar, proteins, vitamins, minerals, enzymes. Camila Kulek de Andrade (2013). The presence of these substance make honey highly nutritional .Honey is proved for the treatment of skin ulcers, wounds, burns, in the external eye disease as an antioxidant and as a antimicrobial. Tiwari P et al (2014) Honey gets contaminated mainly by environmental pollution that is by spraying pesticides, insecticides which mainly consists of copper, zinc cadmium and mercury etc. Bees visit different flowers for the collection of nectar. The nectar from which the honey is made may contain the contaminants . The contaminants can be divided into two that is high level of contaminants and low level of contaminants. The high level of contaminants will be toxic for the consumption where as a low level of contaminants is within the desirable or premisable limit. Since

this heavy metals are not degraded they are entering the food chain, physical and biological cycles. Solayman MD et al (2016) If these heavy metals enter in humans or any animals this may result to blockage of intracellular biochemical process, the metals possess carcinogenic and mutagenic properties and cannot be assimilated from human body. The aim of the study was to determine the contamination level of toxic elements like Iron, arsenic, molybdenum, cadmium, aluminium, copper, zinc and magnesium in three natural and three packed honey. The natural Honey samples were collected directly from the bee colonies of Kalaburgi region Karnataka and 3 packed honey namely Patanjali, lion and Dabur Honey were collected. As the consumption of honey is increasing day by day due to its nutritional value and in concern with health. The heavy metal contaminants must be evaluated and is of high interest mainly for quality control and nutritional aspect.

MATERIALS AND METHODS :

Study area:

Gulbarga district, officially known as Kalaburgi district is one of the 30 districts of Karnataka state in Southern India. Kalaburgi is the administrative headquarters of the District. Kalaburgi is situated in Deccan Plateau located at 17°. 33 " North and 76°.83 " East and area of 10951 km.

Experiments :

Three natural honey and three packed honey was collected. The natural honey was collected in tightly closed glass containers and stored in room temperature till analysis. The honey samples were taken and diluted for the experiment that is 25 ml of honey sample diluted into 275 ml of double distilled water. A total of 300 ml of sample was prepared this solution was used for the determination of metals by using flame Atomic Absorption Spectrometer thermo Scientific Model ICE 3000 series. Air acetelyne flame was preferred for the determination of 6 selected elements that is (Iron, cadmium, copper, zinc and Manganese) the temperature of a flame is approximately 2300 °C. Standard stock solution of the respective metals were also prepared. The wavelength(nm) of the emission peak of the five elements analysed and their respective working range measured are Mn-279.5 nm, Fe-248.3 nm, Cd-228.8 nm, Cu-324.8 nm, Zn- 213.9 nm. Nitrous oxide flame was also preferred for the determination of 3 selected samples (Al, Mo and As) . The temperature of nitrous oxide flame is approximately 3000 °C. The wavelength of the emission peak of the three elements analysed where Al-309.3 nm, Mo-313.3 nm, As-193.7 nm.

Results and discussion :**Table. No. 1:** Heavy metal concentration in analyzed honey samples

Elements	Standard Mean	Sample Mean
Fe	0.181	0.031
As	0.245	0.0008
Al	0.147	-0.021
Cd	0.341	0.0025
Mo	0.134	0.0015
Cu	0.445	-0.004
Zn	0.38	0.043
Mn	0.345	-0.004

Concentration are in PPM data presented as mean.

The result of heavy metal concentration of 6 honey samples from Kalaburgi region are presented in Table. No. 1

In the present study it is noticed that most of the samples are contaminated. However the level of contamination is within the permissible limit. The presence of heavy metal in the honey is the evidence of micro polluting metals in the environment. The presence of arsenic element is a strong toxic property that may interfere with physiological function and cause disease in human. The majority of the sample with below the permissible value and fit in the national standards. The present study in Kalaburgi region revealed that the study area is found less contaminated with heavy metals. Switching to organic culture and plantation crops produces honey which do not completely lack heavy metals but are in the acceptable limits and safe for human consumption.

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