



Determination of Heavy Metals (Ni and Mn) in Different Brands of Honey present in the Market

• Aabha Rani • Ankita Anand
• Jyoti Chandra

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Corresponding Author : **Jyoti Chandra**

Abstract: *The current study aimed to analyze some marketed honey to determine the heavy metals (Mn and Ni) present in different brands of honey. Based upon the results we concluded that heavy metal Mn and Ni were present in all the selected brands of honey but were present in permissible limit.*

Keywords: Honey, Heavy metals, AAS.

Aabha Rani

B.Sc. III year, Chemistry (Hons.), Session : 2019-2022,
Patna Women's College (Autonomous),
Patna University, Patna, Bihar, India

Ankita Anand

B.Sc. III year, Chemistry (Hons.), Session : 2019-2022,
Patna Women's College (Autonomous),
Patna University, Patna, Bihar, India

Jyoti Chandra

Assistant Professor, Department of Chemistry
Patna Women's College (Autonomous),
Bailey Road, Patna-800 001, Bihar, India
E-mail : jyoti.che@patnawomenscollege.in

Introduction:

Honey, produced by the honey bee, is a natural supersaturated sugar solution, which has been consumed as a high nutritive value food and is composed of a complex mixture of carbohydrates (Saxena et al., 2010). This natural product is so valuable as the only concentrated form of sugar available worldwide and is also used as a food preservative (Krell, 1996). It also contains certain minor constituents like enzyme glucose oxidase phenolic acid and minerals (Blasa et. al., 2006; Bilandzic et. al., 2011). The biochemical properties of honey and its quality are related to honey maturity, climatic conditions, production methods, processing and storage conditions as well as the nectar source of honey (Guler et. al., 2007; Bogdanov, 1999; Crane, 1979; Oddo and Bogdanov, 2004). Elements are minor constituents of honey. The kind of this elements in honey is related to the type of raw floral materials that is the nectar: the pollen and the honey which are collected by bees (Baroni et. al., 2009; Juszczak et. al., 2009). The presence of metals in honey may threaten the health of human. These metals can damage the quality of human life when they accumulate to a toxic concentration level. The

objective of the current study was to determine the concentrations of some heavy metals in honey. The result of such studies can help to prevent the problems occurring due to the consumption of honey and improve the healthy honey consumption.

Heavy metals:

Heavy metals are natural elements characterized by their relatively high atomic mass and their higher density. They are toxic or poisonous even at very low concentrations in medicines. Heavy metals are often not well defined and include all toxic metals (including lighter ones). For example; Beryllium (the fourth lightest element) or such a semi metal as Arsenic.

Materials and Methods:

- Sampling
- Chemicals and reagents
- Sample collection
- Sample preparation
- Acid digestion
- Filtration
- Standardization
- Analytical procedure

Three brands of honey were collected from the local market in Patna.

The samples were labelled with their brand names:- Dabur, Patanjali and Saffola.

The chemicals used were 65% (w/w) HCl and 65% (w/w) HNO₃. The preparation of sample to be analyzed in Atomic absorption spectrometer (AAS) was carried out in the following steps as follows:

- Acid digestion
- Filtration

Results and Discussion:

The results obtained showed that the amount of heavy metals present in different brands of honey

where in the permissible limit. Mn and Ni were present in all the three selected brands of honey. But the amount of these metals were below detection limits and this stated the concentration of the heavy metals in honey for daily intake was below safety level. From the result, it could be concluded that among all the three brands, Patanjali has highest level of Ni followed by Dabur and Saffola (Table 1). Dabur has highest concentration of Mn followed by Patanjali and Saffola (Table 2). It was reported that the sources of heavy metal pollution in agriculture soils mainly came from the effluent of waste air, water and gases emitted by automobiles, sewage irrigation and the use of agrochemical materials.

Table 1. For Nickel (Ni) concentration

Sample level	Concentration (mg/L)	% RSD	Mean Absorbance
Dabur	0.112	0.56	0.3614
Patanjali	0.122	0.62	0.3974
Saffola	0.045	1.07	0.3676

Table 2. For Manganese (Mn) concentration

Sample level	Concentration (mg/L)	% RSD	Mean Absorbance
Dabur	0.245	0.66	0.3614
Patanjali	0.217	1.02	0.3974
Saffola	0.146	1.57	0.3676

Conclusion:

A comparison of the current study with standard value indicated that both studied heavy metals contain where within standard range. Though heavy metals were present in honey due to environmental pollution, but were present in permissible limit. If they were present in excess then they would have converted all the healthy effect of honey into harmful effects. So, it is necessary to determine the heavy metals content in honey.

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