



## **ISOLATION OF TRACE ELEMENTS FROM WINTER HONEY SAMPLES OF UMRER TEHASIL.**

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### **Abstract**

Honey is known as a valuable, nutritious and medicinal product from ages. Honey as a foodstuff should fulfill definite requirements which concern its characteristic properties and mineral contents. The objective of the work was to study mineral or trace elements present in the nine honey samples collected from Umrer Tehasil. Most abundant elements present in honey samples were P, Fe, Al, Mn, Zn, Cu, Ca, Mg, Na and K. Similarities and variations were observed in trace elements of honey samples. Presence of these minerals in honey makes an excellent food for humans, especially for children. The percentage of different elements in honey varies during the growing season and across geographical areas.

**Key words:** Honey, trace elements, geographical areas.

### **Introduction:**

The honey is well known as a valuable nutritious and medicinal product from ages. Honey as food stuff should fulfill definite requirements which concern its characteristic properties and mineral content. Bees in search of honey fly in a radius upto 3 km about that area. With regard that honey being the product of bee's work, which is made without man's interferences, its quality does not change during their technological process (Bogdanov, et. al, 2003)

For a honey consumer, the most important thing is to be satisfied with their expectations and the authenticity of honey. Therefore, parameters of honey made an important issue to define type of honey and its geographical origin. In order to control the quality and also to protect consumer, several physico-chemical parameters were used. The mineral

or trace elements content is also one of the parameter used for honey quality. These parameters were used to study the geographical and botanical classification of honey (Terrab et. al 2004, Conti, 2000 and Celechovska and Varlova 2001).

Variations were observed among the composition of minerals in honey samples of different origin (Pisani *et. al*, 2008). In the present work, the study of trace elements is used to determine the quality of honey as it is one of the parameter for the certification process.

### **Materials and methods:**

Nine honey samples were collected from different regions of Umrer tehasil of Nagpur district. All samples were stored in airtight glass jars at room temperature. Fe, Cu, Mn, Zn levels of trace elements were determined by using atomic absorption spectrophotometer, Na, K levels were determined by using flame photometer whereas Ca and Mg levels were determined by using EDTA titration (James and Prichand, 1974)

### **Results and discussion:**

Honey was characterized according to parameters which indicate its origin, authenticity, ripeness and freshness. Today various techniques are applied to determine the elemental composition of honey. Among the other methods, spectrophotometer, total X-ray reflection, fluorescence spectrophotometer are commonly used. In the present study ten different trace elements: P, Fe, Al, Mn, Zn, Cu, Ca, Mg, Na, P and K were reported from nine Umrer honey samples (Table-1, Fig.-I). Levels of these elements were high (Fredes and Montenegro, 2006, Saif-ur-Rehman *et. al*, 2008) whereas Cu and Mn was found in much lower amount.

Values of k in the present study lie in between 54.36-76.12 ppm. lowest values in sample no. 04 and highest values in sample no. 06. These values were more as compared to the remaining nine elements. This is

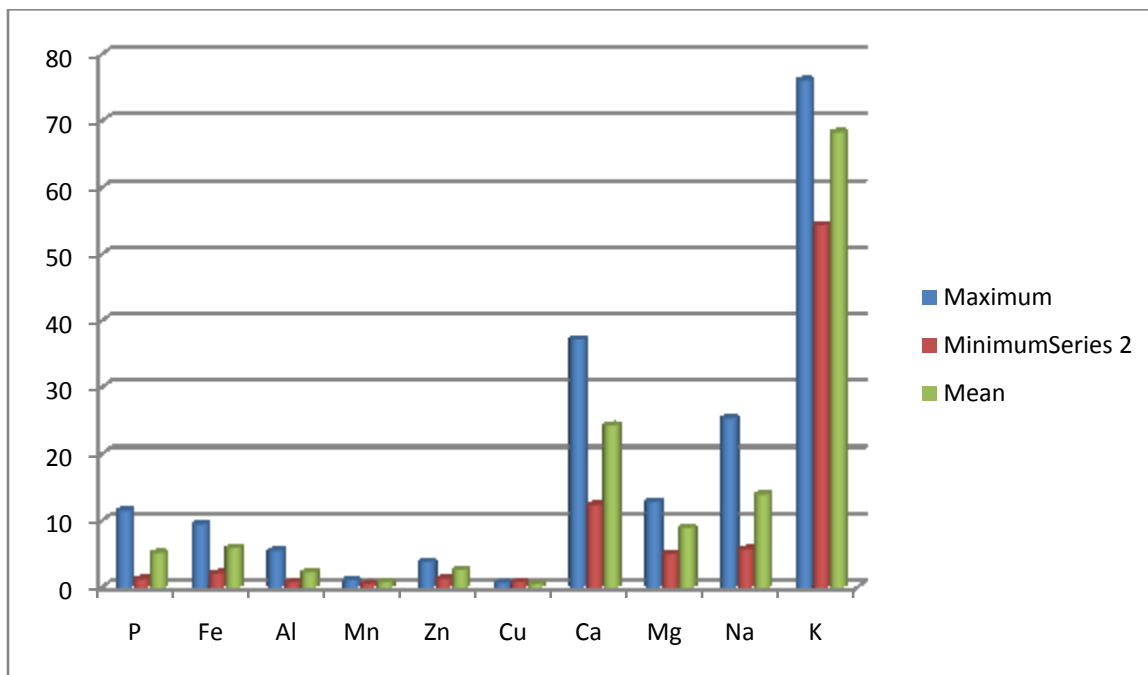
due to the high level of K in the plant tissues (Adebiyi *et. al*, 2004, Saifur-Rehman *et. al*, 2008). Nutritionally the presence of these minerals in honey makes an excellent food for humans, especially for children.

All samples of honey had significant differences as regards to the values of mineral elements. Different elements have different concentrations. The values of phosphorus in nine samples of honey lie in between 1.18 to 11.48 ppm. It is highest in honey sample 07; iron values lies between 2.04 to 9.42ppm lowest in sample no. 01 and highest in sample no 04. All other mineral elements showed variations in different honey samples such as Al values lies in between 0.75 to 5.48 ppm. lowest in sample no. 01 and highest in sample no. 07; Mn values (0.54-1.06) lowest in sample no. 08 and highest in sample no. 02; Zn values lies between 1.25-3.82, lowest in sample no. 06 and highest in sample no. 09; Cu values lies between 0.8-0.67 ppm where lowest in sample no. 04 and highest in sample no.02, Ca values lies in between 12.35-37.2 ppm. highest in sample no. 06 and lowest in sample no. 04. Values of Mg and Na lies in between 4.96-12.34; 5.67-25.36 ppm respectively. Lowest in sample no. 01 and highest in sample no. 08.

**Table-I: Different elements in honey samples.**

Sample No. ⇨ Minerals in ppm⇩	01	02	03	04	05	06	07	08	09	Mean
P	1.18	3.67	2.64	1.67	1.77	6.48	11.48	10.35	6.76	5.10
Fe	2.04	2.85	3.6	9.42	5.76	6.11	7.72	6.37	9.18	5.89
Al	0.75	1.09	1.63	2.54	0.93	1.64	5.48	3.76	2.35	2.24
Mn	0.63	1.06	1.00	0.94	0.57	0.68	0.68	0.54	0.82	0.76
Zn	1.75	1.67	2.09	3.6	3.41	1.25	2.75	3.15	3.82	2.61
Cu	0.37	0.67	0.27	0.8	0.36	0.43	0.53	0.35	0.46	0.47
Ca	16.75	16.47	34.27	12.35	24.22	37.2	28.67	22.35	26.84	24.29
Mg	4.96	5.08	12.08	11.42	10.34	6.48	6.1	12.34	11.63	8.94
Na	5.67	6.48	12.36	23.15	10.34	9.15	10.54	25.36	21.75	13.9
K	72.64	71.33	67.34	54.36	63.55	76.12	69.43	70.18	69.67	68.29

**Fig.I: Maximum and minimum values of Apis florae honey from Umrer.**



### Conclusion:

On the basis of the present work it is concluded that the values of elemental composition of honey showed variations. Cu and Mn were observed in least percent where as K and Ca was observed in higher percent. This composition totally depends on the soil composition, type of plant, season and environmental conditions. Concentration of elements also affects the color of honey. Darker honey has higher mineral contents than a light honey. (The lowering brightness influences on the larger contents of mineral component).



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