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Effect of *Madhu* (Honey) in Alloxan Induced Diabetic Rats-An Experimental Study

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ABSTRACT

Honey is a natural sweet substance produced by honey bees. It has been used both as food and medicine since ancient times. The medicinal quality, taste, texture, color and aroma of honey differs according to the geographical area and the species of plants from which it has been collected. In *Ayurveda* texts have discussed in detail various aspects of Honey (*Madhu*) with difference in properties and pharmacological action. As it used from Ancient time in various purposes, its importance are already seen. Traditionally, it is used in various forms of food and has religious importance too. Further it is used in medicines and cosmetics. It is used in various diseases like diabetes, wound, eye diseases, asthma, throat infections, tuberculosis, dehydration, hiccups, exhaustion, dizziness, hepatitis, constipation, worm influx, due to its variance in property. So, present review is giving an idea to various important aspect of honey with its composition and effect of *madhu* on healthy and diabetic albino wistar rats.

KEYWORDS

Honey, Types, Properties, Composition, Diabetes



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INTRODUCTION

Ayurveda is the basic knowledge of life, since ancient period¹. The utility of this science is to help maintain the health and to cure of diseases². It imparts knowledge about the do's and don'ts to be followed in our daily routine³. To achieve this Aim of life, various *Ahar* and *Aushad dravyas* are mentioned in our ancient scriptures, where three types of dravya viz., those of animal origin, those of vegetable origin and metals including minerals. Honey is mentioned under the category of animal origin. It is used to fulfill the desire of health and to cure diseases. Different types of honey are found in accordance to the geographical variations⁴. Climate changes including the temperature also plays a major role for its quality⁵. Therefore, several types of bee honey are mentioned in *Ayurveda*⁶. Among them, '*Makshika*' is considered as the best variety in medicinal purposes⁷. According to modern science, the best honey is made by *Apis mellifera* (Family: Apidae)⁸. On the basis of age (duration) of Honey, it is classified as Fresh and old, having its own different properties⁹. Fresh Honey induces nourishment, is laxative and doesn't pacify much *Kaphadosa*. Old Honey is absorbent, drying, reduces body fats and depletes all the tissues¹⁰. Generally, Honey has *madhur* (sweet) with *kashya* (astringent) *rasa*

(taste); *ruksha* (rough), *laghu* (light) properties. It has *shita* (cold) potency and help to promote appetite, complexion and voice¹¹. It is aphrodisiac, union- promoting, cleansing, healing, wholesome for eyes, pleasing, permeates through minute channels¹², alleviates pitta¹³, *kaphadosa*¹⁴, *sthulya* (obesity)¹⁵, *prameha* (~Type2DM)¹⁶, *hikka* (hiccough)¹⁷, *swas* (bronchial asthma)¹⁸, *kasa* (cough)¹⁹, *atisar* (diarrhea)²⁰, *chardi* (vomiting)²¹, *trishna* (thirst)²², *krimi* (worms)²³, *vis ha* (poison)²⁴, *arsa* (piles)²⁵, *daha* (burning sensation)²⁶, exhilarates and pacifies three dosas²⁷, it pacifies *kaphadosa*, due to lightness and *vata* and *pitta dosa* due to sliminess, sweetness and astringency²⁸. Honey is the best '*yogavahi*' substance ie. it carries the properties of the drugs added to it²⁹. It is used in different formulations³⁰ and has an important role as an antioxidant³¹, anti-inflammatory³², antibacterial agent³³ and wound healing properties³⁴.

CHEMICAL COMPOSITION OF BEE'S HONEY

Honey is a combination of carbohydrates, proteins, amino acids, vitamins, minerals, antioxidants and other compounds³⁵. Some enzymes like invertase, glucose oxidase, catalase, and acid phosphorylase are present³⁶. It also contains some vitamins like B₂, B₄, B₅, B₆, B₁₁ and C³⁷ and some



minerals like calcium, iron, zinc, potassium, phosphorous, magnesium, selenium, chromium and manganese³⁸. Acetic, butanoic, formic, citric, succinic, lactic, malic, pyroglutamic, gluconic acids, and a number of aromatic acids are also found in Honey³⁹.

MATERIALS AND METHODS

Source of Test Material

Collection of Honey was done from single natural source. The doses are calculated by API.

STUDY DESIGN

A) Review of literature

B) Collected samples of *MADHU* (Honey) was subjected to following procedure- Identification, Collection & Authentication of *MADHU*

Identity and Purity test –According to API.

EXPERIMENTAL STUDY

a. Effect of *Madhu* (Honey) on weight and blood glucose level of healthy Albino-Wistar Rats.

b. Effect of *Madhu* (Honey) on weight and blood glucose level of Alloxan induced diabetic Rats.

Animal study was conducted as follows:

i) **Animals:** 24 Albino- Wistar Rats weighing between 140 to 200 g selected for the study purpose.

ii) **Ethical clearance:** before starting

experimental study “form B” was submitted to institutional ethical committee from CPCSCA approved institution.

Human to animal dose conversion: by Paget and Barners (1964) formula.

● Induced 200gm rat dose = $0.018 \times \text{Adult dose}$

● Adult Dose according to API = 10 gm

● 200gm rat dose = 0.018×10

● = 0.18

● Per kg dose = $0.18 \times 5 = 0.9 \text{ gm/kg}$

Experiment 1- Effect of *madhu* (Honey) on healthy Albino Wistar Rats. Groups:-: A-6 Rats received CMC 1% sol 5 ml/kg/day orally

B- 6 Rats received fresh *Madhu* 600mg/kg/day orally Duration: 1 month

Evaluation

1. Weight

2. Blood Glucose level

Experiment 2-Effect of *madhu* (Honey) on Alloxan diabetic Rats.

Groups:- C- 6 Rats received CMC 1% sol 5ml/kg/day/oral D-6 Rat received fresh *Madhu* 600mg/kg/day/oral

Duration: 1 month

Evaluation

1. Weight

2. Blood Glucose level

RESULT

Madhu (Honey) increased weight in healthy and Alloxan induced diabetic rats. But in



healthy rats increased weight was statistically significant and in Diabetic rat it was Non- significant. In Blood Glucose level, after administration of *Madhu*

(Honey) for one month, it had Non-significant increases in sugar levels. (As shown in table no. 1&2)

Table 1 Healthy Albino -Wistar Rats

Observation	Group A	Group B	Gp. A Vs B
	Mean+-SEM	Mean+-SEM	Mean+-SEM
Weight	181.75+- 4.20	197.38+- 4.72	0.0328
Blood Glucose	80.36+- 2.81	88.43+- 2.80	0.069

Table 2 Alloxan induced diabetic Rats

Observation	Group	Group B	Gp . A Vs B
	Mean+-SEM	Mean+-SEM	Mean+-SEM
Weight	163.22 +-3.61	172.19 +-3.15	0.090
Blood Glucose	216.41+- 11.99	194.01+- 6.55	0.131

DISCUSSION

In *Ayurveda*, different types of Honey are mentioned with different properties and pharmacological actions. According to *Ayurveda*, *Madhu* is *madhur* (sweet), *kashaya* (astringent), *rasa* (taste), *laghu* (light in digestion), *ruksha* (dry) in *guna* and has *lekha* (scrapping) effect. By virtue of these properties of *Madhu* despite being sweet in taste can be used in patients with diabetes (as well as obesity) as *tarpan* (instant energy) without much increase in glucose level. This experimental study proves the efficacy and safety of honey in healthy and alloxan induced diabetic rats. This may provide safety data of Honey in Diabetic patients under clinical research for further studies.

CONCLUSION

On the basis of study, it was found that *Madhu*(Honey) can increase weight in healthy as well as Alloxan induced Diabetic rats. It may be safe for administration in Diabetes under control condition.



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