

Role of Honey as a Dietary Adjunct for Improvements of Glycemic Status and Body Weight in Healthy Individuals

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ABSTRACT

Introduction: Honey is a common sweetener for foods and a powerful medicinal tool. Physiological and Biochemical effects of honey vary with the botanical source of nectar. Natural honey is considered a valuable medicinal food and has been found to be useful in management of diabetes and dyslipidemia. The present study was conducted to evaluate the effect of honey on fasting blood glucose level and BMI in normal healthy individuals.

Material and methods: 70 gm honey dissolved in 130 ml of water was administered daily on empty stomach for 30 days to the 30 normal healthy subjects under study. Estimation of blood glucose was done before and after administration of honey by GOD-POD method. Measurement of anthropometric parameters (weight, waist/hip circumference and BMI) and blood pressure of the subjects was recorded at the beginning and after completion of the study.

Results: Honey administration lowered blood glucose levels in healthy individuals and a significant reduction in BMI and fasting blood glucose level was observed in our study.

Conclusion: Present study suggests the hypothesis that honey might have potential to modulate fasting blood glucose and BMI of normal healthy subjects, which are risk factors for chronic metabolic disorders.

Keywords: Honey, Fasting Blood Glucose, BMI

INTRODUCTION

Honey was probably the first sweetener discovered by man, and its use dates back to the origins of mankind itself.¹⁻² Natural honey is widely used all over the world as a complementary and alternative medicine in various disorders. Honey is considered a valuable medicinal food in Indian system of medicine and has been found to be useful in management of diabetes and dyslipidemia. Honey is a powerful antioxidant and used in the day to day life as natural sweetener. It contains small amounts of proteins, enzymes, amino acids, minerals, trace elements and vitamins. Although honey is a high carbohydrate food, its glycemic index varies within a wide range from 32% to 85%, depending on the botanical source.³⁻⁴ For decades, there has been interest in determining the effects of honey consumption on disorders related to glucose regulation. A study has reported that individuals with reduced glucose tolerance or mild diabetes, who were subjected to an oral glucose tolerance test on one day and oral honey test next day, showed a higher tolerance to honey, indicating that honey could be a valuable sugar substitute for people suffering from these metabolic pathologies.⁵⁻⁶ In the present study it was hypothesized that honey might have potential to modulate BMI values and fasting blood

glucose of normal healthy individuals thus present study was undertaken to evaluate antiglycemic effect of honey in healthy individuals.

MATERIAL AND METHODS

Study was conducted at Government Medical College and Hospital, Banda. Initially, 50 subjects in the age group of 40 to 50 years who were vegetarian and doing sedentary activity were contacted. A written consent was obtained from all participating subjects, who were then explained the study design and purpose of the study. The selection of subjects was done by conducting a oral glucose tolerance test (OGTT). Each participating subject was administered with reference carbohydrate i.e. 75 gm glucose dissolved in 300 ml of water and blood glucose levels were monitored once before administration of glucose and then at 30 minutes intervals for 2 hours (by finger prick Accu-Chek Roche Diagnostics India Pvt Ltd, Mumbai) and blood glucose curves were plotted for reference food (glucose). After performing the OGTT on the 30 subjects who had blood glucose level in normal range were selected for the study.

Blood collection:- All the 30 subjects were asked to attend the testing session after a 12 hour overnight fast, subjects were instructed not to consume unusually large meals or alcohol on the previous day, and to avoid vigorous exercise, cycling and walking before testing session. The blood sample was taken by vein puncture and collected in EDTA with sodium fluoride tubes and then centrifuged at 4°C for 10 minutes at 2500 rpm. Plasma samples were stored at -20°C for further analysis.

Anthropometry:- Measurement of anthropometric parameters (weight, waist/hip circumference and BMI) and blood pressure of the subjects was recorded who participated in the study at the beginning and after completion of the study.

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How to cite this article: Shailendra Singh Bhadauria, Archana Kushwah. Role of honey as a dietary adjunct for improvements of glycemic status and body weight in healthy individuals. International Journal of Contemporary Medical Research 2019;6(7):G8-G10.

DOI: <http://dx.doi.org/10.21276/ijcmr.2019.6.7.40>

Parameters	Normal Healthy Individuals (n= 30)		Mean % Change	p Value
	Before Supplementation	After Supplementation		
Weight	65.56 ± 1.79	65.04 ± 1.80	0.79	0.003**
W/H Ratio	0.91 ± 0.01	0.90 ± 0.01	0.95	0.302
BMI	24.77 ± 0.66	24.56 ± 0.66	0.82	0.004**
Blood Pressure				
Systolic Pressure	116.00 ± 2.52	116.80 ± 2.22	0.69	0.723
Diastolic Pressure	76.56 ± 1.59	76.80 ± 1.60	0.31	0.911
Values shown (mean ± SE); ** Significant change p < 0.01				
Table-1: Effect of Honey Supplementation on Anthropometric Measurements and Blood Pressure				

Parameters	Normal Healthy Individuals (n= 30)		Mean % Change	p Value
	Before Supplementation	After Supplementation		
FBG	95.67 ± 1.35	92.04 ± 1.68	3.79	0.046*
Values are given in mg/dl (mean ± SE); *Significant change p < 0.05				
Table-2: Effect of Honey Supplementation on Fasting Blood Glucose (FBG) Levels				

Honey supplementation:- 70 gm honey dissolved in 130 ml of water was administered daily on empty stomach for 30 days to the subjects under study.

Monitored Biochemical parameter:- Estimation of blood glucose was done before and after administration of honey. Fasting blood glucose was determined by GOD-POD method.

STATISTICAL ANALYSIS

Statistical analysis was performed by using paired t test. Statistics Program for Social Sciences (SPSS, version 17.0) computer software package was used for statistical analysis of the data.

RESULTS

Effect of honey on Anthropometric assessment:- Honey administration in normal healthy subjects resulted in 0.79% (p<0.003) reduction in body weight. Reduction in BMI in this group was 0.82% (p<0.004). Reduction of 0.95% was observed in waist/hip ratio of subjects which was not statistically significant (Table-1).

Effect of honey on blood pressure:- There was slight increase in systolic as well as diastolic blood pressure in normal healthy subjects, although these marginal changes remained fairly well within normal range of blood pressure (Table-1).

Effect of honey on fasting blood glucose:- Honey consumption for 30 days brought down the fasting blood glucose levels by 3.79% (p<0.046) in subjects (Table-2).

DISCUSSION

The results of study demonstrated that there is certain health benefit associated with consuming honey over a period of time. Present study revealed ability of natural honey to modulate fasting blood glucose in normal healthy individuals which may be attributed to the constituents present in honey. A considerable lowering of fasting blood glucose was found in the present study, the mechanism for the hypoglycemic effect of honey is, however, not well understood. The finding

in several studies revealed that honey causes a reduction in blood glucose levels in both normal and diabetic patients and this is an induction that honey has a mechanism, which is probably insulin sensitization effect.⁷⁻⁹

Yet another study tried to decrease the skin temperature and maintain blood glucose using a compound of honey and water. Their results indicated that the recommended honey and water compound had a significant effect on blood glucose.¹⁰ However, stronger evidence in support of the role of fructose in mediating hypoglycemic effect of honey is provided by Curry and his colleagues. They found that in rat pancreas preparations, there was no insulin response to fructose when very low or no concentrations of glucose were present in the medium. In contrast, it was observed that with higher glucose concentrations, insulin response to fructose was elicited.¹¹

Significant reduction in BMI is due to honey supplementation in normal healthy individuals was observed and these findings are supported by studies of *Chepulis* which demonstrated that honey reduced weight gain when compared with sucrose in short-term feeding in human subjects. Similarly *Bahrani* observed beneficial effects on body weight and blood lipids in 8-week consumption of honey in diabetic subjects.¹²⁻¹³

CONCLUSION

Present findings support the hypothesis that honey might have potential to modulate BMI values and fasting blood glucose of normal healthy individuals which are risk factors for chronic metabolic disorders. Thus consumption of honey by subjects in normal health may serve as prevention towards emerging lifestyle disorders which are a threat in the modern times.

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Source of Support: Nil; **Conflict of Interest:** None

Submitted: 08-06-2019; **Accepted:** 28-06-2019; **Published:** 29-07-2019