

## Abstract

The water content of honey bee products honey 17.76 %, royal jelly 14.91% , pollen 14.54% while in propolis 6.36%, The lowest value was detected in propolis ( dry matter ) while the highest in honey .

Ash content of honey bee products in honey 0.296 % , royal jelly 5.51% , propolis 17.23% and pollen 1.88% the lowest value was detected in honey while the highest in propolis (dry matter) .

The carbohydrate content of honey 81.59% , royal jelly 20.02% , propolis 25.49 % and pollen 46.4% , the lowest value was detected in royal jelly while the highest in honey .

Glucose and Fructose detected in honey only .The ratio of fructose / glucose in this study was ( 43.19/39.5) = 1:09.

Crude fiber 2.29%) and pollen ( 6.59 %). Total lipid in honey 0.0016% , royal jelly 34.71% , propolis 43.78% and in pollen 15.62% the lowest value was detected in honey while the highest in propolis(dry matter) .

Crude proteins in honey 0.32%, royal jelly 24.83 % , propolis 1.23%, and pollen 14.95%, the lowest value was detected in honey while the highest in royal jelly . Hydroxy methyl furfural ( H.M.F.) was determined in honey 1.73 mg/kg . Total polyphenols concentration of honey 0.31% , royal jelly 0.41%, propolis 4.82% and in pollen 1.4%. The amino acid contents of honey bee products show glutamic acid , aspartic acid , proline and leucin. Carotenoids in honey, royal jelly, propolis and pollen were ( 60.52, 382.26, 303.63, 604.23, ) mg / 100 gram respectively . Vitamin C was ( 25.33, 75.06, 59.8, 321.1) mg / 100 gram respectively. Vitamin B1 was ( 0.079, 1.503, 1.586, 0.695 ) mg / 100 gram respectively, and vitamin B2 was( 0.160, 1.96, 0.215, 0.940) mg / 100 gram respectively.

The results of minerals indicated that, , potassium (123.33 ppm), iron (122.65 ppm), calcium (75.1ppm), sodium (73.59ppm) are the major

minerals in honey. Data also showed that, iron (305.9 ppm), zinc (300.7 ppm), magnesium (91.20ppm) and calcium (81.23ppm) are the major minerals of royal jelly. Potassium (624.66ppm), iron (514.82ppm), magnesium (210.3ppm), and calcium (137.7ppm) are the major minerals of propolis. The major minerals of pollen are, iron (204 ppm), calcium (110.6 ppm), magnesium (43.10ppm), and sodium (41.88ppm).

invertase, diastase and glucose oxidase enzyme were measured on honey bee products results showed that, invertase enzymes in honey and pollen were 19.16 and 1.40U/kg respectively. diastase in honey (7.33G.U). Glucose oxidase activity in honey (420mg/hr) and pollen (18.05mg/hr). Honey is the rich source of the enzymes.

Diabetic patients (265) attending clinics in Sudan and Kingdom of Saudi Arabia were recruited randomly for this study.

Data showed that, 81.9% of the patients showed an improvement of polyuria, 16.9% had no change and 1.2% get worse. In this study 57.1% polydipsia was improved, 40.3% with no change and 2.6%, becoming worse.

General health of the majority (91.2%) of the patients improved 7.7% they found no improvement and the general health of 1.1% of the patients becoming worse after using the honey products.

In this study 43.4% showed improvement in their sexual life after using honey bee product, 54.0% showed no change concerning impotence.

General results indicated that, patients having the diseases in the last 5 years their symptoms improved better than patients having the diseases for more than 10 year. The data in this study illustrated that, patients taking tablets, their polyuria, and polydipsia improved better than those taking insulin or any other medicine.

Data showed that 55.6% and 50% of patient taking tablets or not taking any medicine their impotence improved, whereas only 18% of patients taking insulin their impotence improved.

In this study the mean ( $\pm$  SD) of fasting blood glucose level of all patients was  $218.1 \pm 75.0$  mg/100 ml of blood in the first week. In the second week both the fasting and postprandium blood glucose were increased ( $P = 0.9$ , not significant), from the third week both start to decrease till the end of the survey. In week three the mean fasting blood glucose significantly ( $P < 0.05$ ) dropped to  $193.0 \pm 105.2$  and the postprandial was drop to  $243.74 \pm 139.47$  mg/100 ml of blood and both (fasting and postprandial blood glucose levels) continued to drop significantly ( $P < 0.001$ ), the fasting blood glucose drop to  $167.5 \pm 33.76$  in week.

The fasting blood glucose level of patients taking honey, was significantly decreased ( $P < 0.05$ ) in week four compared to the initial value (from  $219.5 \pm 68.6$  to  $195.8 \pm 90.0$ ) and continued to drop significantly ( $P < 0.001$ ) to  $141 \pm 63.7$  mg per 100 ml of blood in week 12. Results also showed that the postprandial blood glucose level dropped significantly from  $307.5$  mg/100 ml to  $203.3$  mg/100 ml in week 12. Data showed no significant association between the effect of all the constituents assessed of honey bee products and the reduction of fasting or postprandium blood glucose levels of patients involved in this study.

## CHAPTER ONE

### **INTRODUCTION**