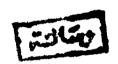
BIOCHEMICAL STUDIES ON HONEY

By:

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INTRODUCTION

TROPERIOR

Honey is the natural food of the boney ber, genter ed by them as nectar from the nectaries of plants, modified and stored in their combs.

The process by which bees convert nectar into home consists primarily of inverting most of the sucrose in nectar to the simple sugars dextrose and levulose, by the use of enzy mes, and the evaporation of the excess water to a consistency generally sufficient to prevent fermentation. It can be also be defined in more inclusive way without signifying the limited amount of the different constituence as follows. Honey is an aromatic, viscid, sweet material derived from the nectar of plants through the collection of honey bees, modified by them for food into a denser liquid It has an and finally stored by them in their combs, & acid reaction, I in its original condition but becoming crystalline on standing consists chierly of two simple sugar, dextrose and levulose, with occasional more complex carbohydporedominant rates, with levulose usually and always containing Material, plant colouring materials, several enzymes, and included pollen grains.

This definition is not entirely complete because into does not take into consideration the fact that tupelo and

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sage honeys are relatively nongranulating, and all honeys now known to contain complex carbohydrates pollen grains are an invariable characteristic of honey but those present are not necessarily indicative of the ploral source.

Honey are classified according to (1) plant source, (2) the type produced and (3) the physical condition in which the product is sold.

In order to be classified or labeled as being from a definite plant source, a honey must have the predominant colour and flavor of honey from the particular plant mentioned. Identification of the probable source of a honey is made by comparison with known samples as to typical colours, flavors, and certain physical properties Concerning the physical and chemical properties of honey, it is generally known and easily demonstrated fact that honey from different plant sources vary in aroma, flavor, colour, density, and in granulation characteristics. Various investigators have found that honeys also vary somewhat in viscosity and in their chemical content of sugars, moisture, enzymes, vitamins, minerals, acids, colloids, pigments, and percentages of unknown compounds as plant growth hormones. No two semples of honey are exactly alike, even though they

2. Z.

may come from the same plant source, but the observable differences may not be very great. Regarding the advantage of honey in food and medicing it is well known that dextrose in honey can be absorbed directly into the human blood stream without further digestion, and the levulose follows with but slight modification hence the great value of honey is stomach complaints such as ulcers and in malnutrition, especially with children, and in typhoid fever. Honey is a great producer of hemoglobin in the blood. It is useful in liver and heart troubles and does not produce gas. It is good wherever maltose or sugar of milk are indicated. It may be used in baby feeding, for example, to advantage, for a nine month's child a teaspoonful being added to every 80 z. of whole milk. However, the present investigation was carried out on three different kinds of honey bees gathered from three different plant sources i.e. coutton, elever and citrus grown in the field of Moushtohor reculty of Agriculture, Ain Shams University, to study the physical and chemical properties of each product, and how for clever bee honey as an example of such products can be adultrated by the commercial glucose and artificial glucose. Anna Cipi Mana

Such biochemical studies were carried out for the Aim of improving this natural products commercially by adding or removing the desirable or the undesirable materials which affect the physical and chemical properties of such natural product.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Moisture :

mckert and Allinger (1939) studied the physical and chemical properties of 37 types of California honeys, they found that the average value of moisture was 16.5. These findings were in agreement with that reported by Addal Andrson and Perold (1964), and Latef, et al. (1966).

tained 11.13 moisture. However, Japanese honeys were analysed by Watanabe et al. (1961) and showed that the moisture content was 21.65. Moreover, Estienne (1964) stated that honey's moisture content was 20.24. Certain Romanian honey's analysed by Baculinschi (1961) showed that the average values of moisture was 16.5, 17.58, 17.33, 16.71 and 17.93 in acacia, linden, clover, sunflower and raspberry respectively. These results were confirmed with that stated by Flechtmannet al. (1963).

Carbohydrate ractions:

Carbohydrate fractions are the major constituents of the honey. They are considered from the nutritional

spirit of view the main source or energy in the body.

Schort and allinger (1939) studied the physical and chemical properties of 37 types of California honeys, they iound that the average percentage of total reducing sugars, levulose, dextrose, sucrose, and dextrin was 77.53, 40.41, 35.54, 2.53, and 0.91 respectively. Also Latie et al. (1956) found that these amount in Pakistan honey was 71.1 - 76.90 total reducing sugars, 39.01 - 53.8 levulose, 27.7 - 34.2 glucose and 1.9 - 2.75 sucrose. However, Estienne (1964) studied the chemical composition of honey and found that: glucose 35.40, fructose 34.9, sucrose 6.39, and dextrins 0.80. Moreover Baculinschi (1961) analysed various Romanian honeys and found that the average values percent of invert sugar, glucose, fructose, sucrose and dextrins given: acacia 76.13, 35.31, 40.22, 3, and 3.08; linden 76.26, 37.32, 38.94, 2.44, and 2.52; clover 76.4, 37.68, 38.70, 2.4, and 2.77; sunilower 76.94, 38.47, 37.34, 2.34 and 2.75; raspberry 74.4, 36.37, 38.01, 2.58, and 3.63.

and Eusteher

Hadorn (1963) recorded that more than 8 % sucrose in honey indicates that the bees have been fed sugar.

A chromatographic method developed by Taufel and Reiss (1952) has indicated that at least 5 saccharides other

than those commonly weem present (glucose, conserve, menerations) can be found in bee honeys. The tests also showed that sucrose loss not accur in all honeys.

The chemical analysis of honey based on paper chromatography method is described by Galanti and Wernimont (1958). Six sugars were found to be present: raffinose, melezitose. Also six disaccharides were isolated from honey and identified by their infrared spectra by Jonathan and Hoban (1959) as isomaltose, moltulose, turanose, nigerose, maltose and sucrose. The first 4 have not been previously identified in honey.

Paper chromatographic analysis of American honeys by Janathan (1961) from all over the states showed (in varing amounts): Levulose, dextrose, succrose, maltose, isomaltose, terranose, maltulose, and dextrantriose to be present in all honeys. Most sugar probably do not occure in the nector but are formed during ripening aging of the honey.

Ohromatographic studies also were carried out on 30 samples of honey from various parts of Bulgaria by studied.

Soretin (1962) showed that in 76 of the 80 samples, fructose and glucose were present. In 4 samples where the honey