

# Biochemistry of Date Fruit

## *Invertase Enzyme*

By

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### INTRODUCTION

Date fruit contents three important sugars; sucrose, glucose, and fructose. The last two collectively is being called invert sugars and resulting from hydrolysis of sucrose. This hydrolysis takes place by invertase enzyme or chemically by the addition of water and might completed by heating.

It was stated that the consumption of the sucrose involves its hydrolysis resulting in the formation of free glucose and fructose. The enzyme catalyzing this reaction is invertase. In soft cultivars, this conversion is taken place to completion. However, in semi dry and dry types a portion of the sucrose is converted. There are two types of invertase; endoinvertase and ektoinvertase. Crucial information was added in this regard. Green dates contain large portion of insoluble invertase, while the ripe fruit contain large amount of soluble Invertase which is dissolves so readily in water. The soluble enzyme in some Iraqi date fruit has maximum activity at 13 and 15 weeks old age after pollination.

The two cultivars Samani and Zagloul are belonging to the soft types of date fruits and they are of the most luxurious cultivars of Egypt. No any scientific work was done to study the activity of invertase enzyme for both date palm cultivars under investigation.

### PROCEDURE

#### Sampling:

Sample of 10 dates fruit were picked at the age of 12 weeks old from pollination. Sampling was continued thereafter within fortnight until the 20<sup>th</sup> week. The last sample was taken after one week due to the 21<sup>st</sup> week, when the fruits attained their maturity and began to ripe on their palms. All the samples were pitted and their fresh weights were determined.

#### Extraction of invertase:

The individual date fruit sample blended for 2 minutes in 0.1M sodium acetate buffer of pH 5 at room temperature. The mixture filtered by vacuum, and the residue was blended again in the acetate buffer solution. The pellet was discarded and the filtrate was used for invertase assay.

#### Assay of invertase activity:

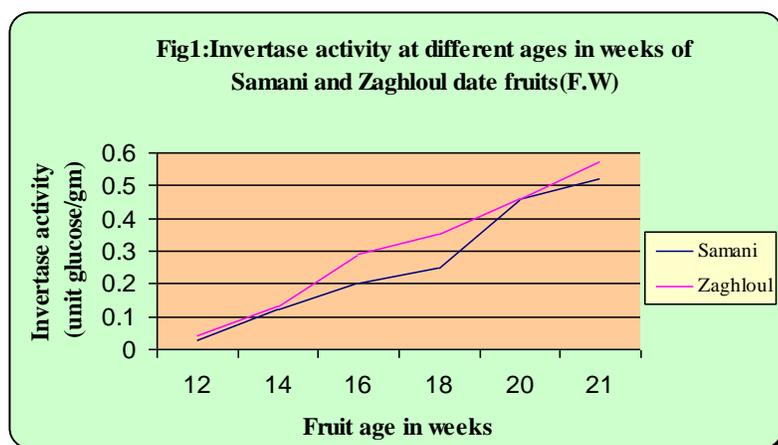
As it well known that invertase is from hydrolysis enzyme group, and it has specified to work only on  $\alpha$  -1-2 glycoside linkage of sucrose; and release glucose and fructose.

The release of the reducing groups during enzyme hydrolysis of sucrose was measured colorimetrically. Sucrose was added to the enzyme extract to give final concentration of 0.1 M substrate. A known volume of the enzyme-substrate (mixture) was used to determine the reducing power, at 10 minutes of substrate addition, release of the reducing grouped was proportional to the

enzymatic concentration. One unit of invertase was defined as the amount of enzyme which catalyzed the production of 1 $\gamma$  glucose of reducing group per minute under the above condition.

## **RESULTS:**

To measured invertase activity in date fruits; samples were taken from the 4<sup>th</sup> week old after pollination. The invertase activity in early stages was not detectable. However, Invertase activity was onset only in the 12 week of fruit age old after pollination for both cultivars under study. In addition the enzyme activity increased gradually toward to the maturity stage at the 21<sup>st</sup> week. The enzyme activity of Zaghloul date fruit at the all stages were always more than Samani date fruit (Fig1). In general, the increasing of date fruit moisture contents and exposing to moderately high temperature lead the natural Invertase to convert much of sucrose to glucose and fructose. The date fruit ripening is strongly correlated with rapid inversion of sucrose by Invertase, which coincided with accumulation of total sugars. The gradual increase in invertase activity is the prime reason for the increase in reducing sugars that accompanies maturation and ripening rather than a loss of membrane system integrity.



## **REFERENCES:**

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