

Benha University

Pre-master Exam.

Faculty of science

January 2013

Botany department

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## **PLANT ENZYMES**

**Q1:**

Mention to five precautions must be taken during the preparation of a crude enzyme solution.

**Q2:**

Compare between amylose and amylopectine.

**Q3:**

Discuss the transferase enzymes and give two examples

**Q4:**

Discuss two factors only affecting on enzyme activity.

*GOOD LUCK*

## Answer

### Q1:

Mention to five precautions must be taken during the preparation of a crude enzyme solution.

- 1- The cells must be kept cold during disruption.
- 2- The medium must be buffered about neutrality.
- 3- Enzymes which contain sulfhydryl group (-SH) are liable to oxidation during extraction. To prevent such an oxidation, mercaptoethanol is added.
- 5-Ethyldiamine acetic acid (EDTA) is also added to chelate heavy metal ions.

### Q2:

**Compare between amylose and amylopectine.**

#### **amylose:-**

- 1-which account for 20-25% of most vegetable starches.
- 2-more water soluble and less viscous.
- 3-give a pure blue coloration with iodine.
- 4-molecules consist of 1:4 $\alpha$  linked glucose unites straight unbranched. And contain from 300-400 glucose units in the chain.

#### **amylopectin :-**

- 1- Is less water soluble and more viscous in solution.
- 2- It give a reddish colouration .
- 3- Is more complicated, but the chain are extensively branched, of 24-30, 1: 4  $\alpha$  linked glucosidic units. With 1:6 c-linked in branched, and contain of 2000 or more glucose units.

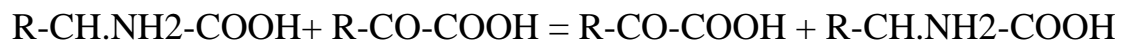
### Q3:

Discuss the transferase enzymes and give two examples

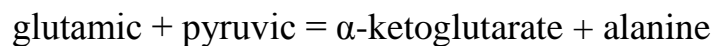
Many enzymes are capable of catalyzing the transferase of some group or radical from one organic molecule to another.

#### **1-transaminases (Aminotransferases):**

the transaminases act on certain amino acids in the presence of  $\alpha$ -keto acids, with the result that the keto acid becomes aminated and the amino acid deaminated as follows



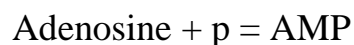
Glutamic transaminase:



#### **2-transphosphorylases**

this enzyme catalyze the transference of phosphate groups from one molecules to anther

Such as



#### **3- transglucosylases**

This enzyme catalyzing the transference of glucosidic radical from one molecule to anther

Example: sucrose = D-glucose-1-phosphate + fructose.

#### **Q4:**

Discuss two factors only affecting on enzyme activity.

##### **1- Enzyme concentration**

The rate of enzyme reaction increase linearly with the enzyme concentration. Suppose at a specific enzyme concentration all the active centers of the enzymes are occupied with the substrate molecules and no longer affect an increase in the reaction rate by adding more substrate. Now if we increase the enzyme concentration. we actually increase the number of available active centers, thus increasing the chance of reactive contact between enzyme and substrate.

##### **2-Substrate concentration:**

when other factors are limiting, the rate of any enzyme catalyzed reaction usually increase with increase in the concentration of the substrate up to a certain maximum, after which the relative amount acted upon per unit of time decreases with increase in the substrate concentration. this is due to:

a- reversibility of the reaction

b- Production of inhibitory products.

C-gradual inactivation of the enzyme by impurities in the system.

d- Furthermore as the concentration of the dissolved or dispersed substrate in a reaction mixture increases.