

Benha University

4th year Exam.

Faculty of science

January 2013

Botany department

PLANT ENZYMES

Q1: Define the following:

1- Co-factor

2-Co-enzyme

3-R-enzyme

4-Z-enzyme

Q2: Compare between amylose and amylopectine.

Q3 : Mention to some general properties of enzyme

Q4: Explain the types of transferase enzymes.

GOOD LUCK

Answer

Q1: Define the following:

1-Co-factor

A substance, such as a metallic ion or a coenzyme that must be associated with an enzyme for the enzyme to function. Cofactors work by changing the shape of an enzyme or by actually participating in the enzymatic reaction.

2-Co-enzyme

Coenzyme - a small molecule (not a protein but sometimes a vitamin) essential for the activity of some enzymes molecule - (physics and chemistry) the simplest structural unit of an element or compound carboxylase, thiamine pyrophosphate - a coenzyme important in respiration in the Krebs cycle coenzyme A - a coenzyme present in all living cells; essential to metabolism of carbohydrates and fats and some amino acids NAD

3-R-enzyme

An enzyme in plants that catalyses hydrolysis of α 1-6-glucan branch points in starch, in the reaction: branched α 1-4(α 1-6)-glucan + H₂O = linear α 1-4-glucans. The α 1-6 linkage acted on carries an α 1-4-glucan chain about four residues long that cannot be cleaved by starch phosphorylase

4-Z-enzyme

Enzyme found associated with amylase, that attacks the few β -1, 3-links present in amylose. Pure, crystalline β -amylase will convert only 70% of amylose to maltose; it requires the presence of the Z-enzyme for complete conversion.

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 α linked glucose units 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 α linked glucosidic units. With 1:6 c-linked in branched, and contain of 2000 or more glucose units.

Q3 : Mention to some general properties of enzyme

1-Enzymes are proteins that are biological catalysts

2-They reduce the activation energy required for a reaction to occur and thus speed up a reaction

3-Temperature, above a certain point (optimum temperature) causes them to break down and they are gradually destroyed (denaturing)

4-They work best at a particular pH (optimum pH) and are once again destroyed by low or high pH's

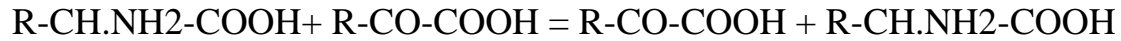
5-They have a specific shape, with one particular part, known as the active site, that is specific to the substrate they speed the reaction of. These means they are specific to one type of reaction.

Q4: Explain the types of transferase enzymes.

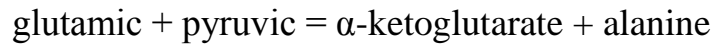
Many enzymes are capable of catalyzing the transferase of some group or radical from one organic molecule to another.

1-transaminases (Aminotransferases):

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



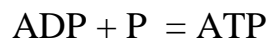
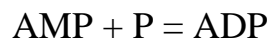
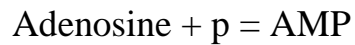
Glutamic transaminase:



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.