

Bromelain ③

Enzymes ①

A living system contains its activity through enzymes. An enzyme is a protein molecule that act as a biological catalyst with three characteristics. First, the basic function of enzyme is to increase the rate of a reaction. Second, most enzymes act specifically with only one reactant (called substrate) to produce products. The third is that enzymes are regulated from a state of low activity to high activity or vice versa.

Properties of enzymes

1. Enzymes are sensitive to heat and are denatured by excess of heat, cold.
2. Enzymes are created in cells but are capable of functioning outside of cell. This allows the enzymes to be immobilized without killing them.
3. Enzymes are sensitive to pH, the rate at which they can conduct reaction is dependent upon the pH of where

where the reaction taking place.

4. Enzymes are reusable and some enzymes are capable of catalysing many hundred of thousands of reactions.
5. One enzyme will catalyse only one reaction e.g. - invertase will only produce glucose and fructose, when a glucose solution is passed over bed of enzyme.

~~Ques~~ Enzymes are classified into following categories

- ① Hydrolases - for catalysis of hydrolytic reaction
- ② Transferases - for the transfer chemical group from one molecule to other.
- ③ Oxido-reductases Catalyses oxidations - reduction reaction
- ④ Lyases catalyse the addition of groups to double bonds or vice versa.
- ⑤ Isomerases are responsible for intramolecular arrangements
- ⑥ Synthetases Catalyse the ~~decompositions~~ coupling of two compounds hydrolysis of Phosphoanhydride bonds along with

(B)

(3)

and also for the conversion of starch to fermentable sugars in fermentation.
Dcastase has been given orally for respiratory tract inflammation, local swelling and oedema.

Papain

Biological source: - It is a mixture of proteolytic enzymes derived from the latex of unripe fruits of, *Carioca papaya*, belonging to the family Cariocaceae.

Preparation: - The fruit latex is collected in aluminium trays after making vertical incisions and to the latex potassium metabisulphite is added in a proportion of 5 gm per kg of latex. Extraneous matter are cleaned by passing it through sieve and the latex is dried in vacuum at a temp of 55-60°C to obtain papain.

Prep. Description: -

Color: - Light brown or white coloured.

odour - characteristic

Paste - characteristic

Best active pH of 5-6.

Solubility:- Soluble in water and glycerine

Chemical constituents :- It is a mixture of Papain and Chymopapain.

Uses:- It is used in the classification of beverages, as a meat tenderizer, in cheese manufacture as substitute of renin.

Acts as anti-inflammatory agent, it relieves symptoms of epizootomies. It is also used in various industries like the textile industry for the degumming of silk fabrics and in leather industry for dehairining of skin.

Identification test

To 10 ml of a liquid containing 2% powdered skimmed milk, adjust the pH 5.5 with diluted acetic acid, add 0.01 g of papain & warm to 37°C, the liquid coagulates.

Bromelain (3)

Biological Source:

Bromelain is obtained from pineapples, Ananas comosus and Ananas bracteatus, Bromeliaceae family.

Character

The optimum pH of bromelain is 5.0-8.0. Its solution pH below 3.0 and above 9.5 inactivates the enzyme. The optimum temperature is between 50-60°C. Still it is effective between 20-65°C too. The moisture content should not exceed 6%.

It is obtained in light brown coloured powder.

constituents :- Bromelain not a single substance but a collection of enzymes and other compounds. It is a mixture of sulfur-containing protein digesting enzymes, called proteolytic enzymes or proteases. It also contain peroxidase, acid phosphatase, protease inhibitors and calcium.

Preparation - From fruit and skin

Fruits were cut into small pieces, weighed, macerated and juice collected. Juice was pressed and collected filtered through cheese cloth. pH of juice was adjusted to 6. The enzyme is precipitated by adding ammonium sulphate until saturation. The enzyme was partially purified by redissolving enzyme in sodium cyanide and repeatedly precipitating it first with 0.6% aluminium sulphate and then with acetone. The precipitate is then thoroughly washed with acetone and ether and dried in vacuum oven at low temperature.

USES

- Bromelain is an effective fibrinolytic, anti-edematous, anti-thrombotic & anti-inflammatory agent.
2. used in the treatment of angina pectoris, bronchitis, debridement of wounds, cancer, and osteoarthritis.
 - (3) Used mainly as digestive enzyme.
 - (4) Used in certain cosmetics such as facial cleaners and bath preparation.
 - (5) Antibiotic potentiation is one of the primary uses of bromelain in foreign countries (may be due to the enhanced absorption as well as increased permeability of the diseased tissues).
 - (6) used in alcohol and beer industries, hydrolysis of protein, meat tenderiser, baking industry etc., textile industry etc.