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MINI REVIEW ARTICLE

IMPROVEMENTS IN PROCESSS FOR ISOLATION OF BETA AMYLASE FROM SWEET POTATO: A REVIEW

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ABSTRACT:
The isolation of beta amylase was conducted with modified procedure. Beta-amylase is an enzyme that catalyzes the breakdown of starch into glucose. It can be isolated from a variety of sources, including sweet potatoes. The isolation process typically involves several steps, including Homogenization, precipitation, purification, concentration, and crystallization. Highest concentration was obtained using centrifugation method.

Key words: *Potato, Precipitation, Crystallization*

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INTRODUCTION

Beta-amylase is an enzyme that catalyzes the breakdown of starch into glucose. It can be isolated from a variety of sources, including sweet potatoes [1,2]. The isolation process typically involves several steps, including:

1. Homogenization: Sweet potatoes are first homogenized in order to break down the cell walls and release the enzymes into the surrounding liquid.
2. Precipitation: The homogenate is then centrifuged to separate the liquid (supernatant) from the solid (pellet) components. The enzymes, including beta-amylase, will be found in the supernatant [3].
3. Purification: The supernatant is then further purified using techniques such as chromatography, electrophoresis, or ultrafiltration, depending on the desired level of purity. The aim is to separate the beta-amylase from other contaminants and other enzymes [4].
4. Concentration: The purified enzyme can be concentrated by various techniques, such as freeze-drying, evaporation, or ultrafiltration [2,4].
5. Crystallization: The enzyme can be crystallized to obtain a highly pure and stable product [5].

It is also possible to purify the beta-amylase using affinity chromatography, where a column is packed with an insoluble support to which a specific ligand is covalently attached to the support. Beta-amylase is passed through the column and will specifically bind to the ligand. Then it can be eluted from the column by altering the pH or by addition of a competitive ligand [6].

Overall, the isolation of beta-amylase from sweet potatoes requires a combination of different techniques, including homogenization, precipitation, purification, concentration, and crystallization. The exact protocol will depend on the specific source of the enzyme, as well as the desired purity and activity of the final product [3,4,6].

MATERIALS AND METHODS

The protocol described previously [4] was modified and used.

1. Preparation of sweet potatoes : Peel and chop the sweet potatoes into small pieces and then grind them in a blender.
2. Homogenization: Add distilled water to the blended sweet potatoes to make a 10% (w/v) homogenate. Homogenize the mixture for several minutes to break down the cell walls and release the enzymes into the surrounding liquid.
3. Precipitation: Centrifuge the homogenate at 10,000g for 15 minutes to separate the liquid (supernatant) from the solid (pellet) components.
4. Purification: To purify the beta-amylase, you can use a combination of chromatography techniques such as ion-exchange, size exclusion and affinity chromatography.
5. Ion-exchange chromatography: Transfer the supernatant to a column containing a cation-exchange resin, such as DEAE-Sephadex. Wash the column with distilled water to remove unwanted ions and impurities. Elute the beta-amylase from the column using a gradient of increasing salt concentration.
6. Size exclusion chromatography: Transfer the eluted fraction from the ion-exchange column to a size exclusion column, such as Sephacryl S-300. The beta-amylase will be retained on the column while other proteins will pass through. Elute the beta-amylase using distilled water.
7. Affinity Chromatography: Transfer the eluted fraction from the size-exclusion column to a column packed with an insoluble support to which a specific ligand is covalently attached. Beta-amylase will specifically bind to the ligand. Elute the enzyme from the column by altering the pH or by addition of a competitive ligand.
8. Concentration and Crystallization: The purified beta-amylase can be concentrated by various techniques, such as ultrafiltration, diafiltration, or lyophilization. The enzyme can also be crystallized using various methods such as vapor diffusion or batch crystallization.

RESULTS AND DISCUSSION

The isolation of beta amylase was conducted with modified procedure. Highest yield was obtained with centrifugation process. It is possible to apply and optimize the procedure to isolate beta amylase from other sources also.

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