

ISOLATION AND MODIFICATION OF DURIAN SEED (*Durio zibethinus* Murr) STARCH BY ACID HYDROLYSIS

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Durian (*Durio zibethinus* Murr) seeds has been found as fruit refuses. Durian has large size which has high content of starch. The purpose of this research was to isolate the starch from durian seeds, and modified it through acid hydrolysis. The isolation of native starch was conducted by using conventional methods, while the modification was by acid hydrolysis using hydrochloric acid (HCl) 2N. Starch quality testing were include microscopic, solubility, acidity, loss on drying, ash content, and microbial limit. Physicochemical properties characterization were include flowability, density, bulk gelatinization temperature and viscosity, amylose content, and degree of whiteness. The results showed that isolation process gave a yield value of 17.68% starch. Starch quality investigation showed that the starch met the Indonesian Pharmacopoeia standards. Brabender viscoamylograph testing showed an increase in viscosity, showing that acid modified durian seed starch had a higher viscosity level compared to native one. Modification of starch also improved its flowability.

Key words: durian, starch, acid modification

I. Background

Durian seed has high starch content and thus has potential as an alternative food source or as pharmaceutical filler material. Durian seed as a food source has not become commonly accepted in Indonesia. However, in Thailand durian seed has become quite popular especially in making porridge mixed with durian fruit. This durian seed porridge produces a lot of potential calories for humans (Aak, 1997).

Starch is a plant-based carbohydrate produced as a result of photosynthesis, which is stored in certain parts of the plant as a food reserve. The properties of starch depend on the type of plant as well as the place of storage. The difference can be seen in its viscosity and adhesiveness of its mucilage, or other properties (Claus, 1965).

There are two types of starch that are commonly used in the pharmaceutical industry, i.e. native starch and modified starch. Native starch is produced from tubers and has not been subjected to physical or chemical changes or physicochemically processed. Native starch is commonly used in the pharmaceutical industry as a filler and binder in the production of tablets, pills, and capsules. Native starch has two main drawbacks when used to create tablets, i.e. it does not have flow

capability and compressibility (Rismana, 2006).

Starch that has been modified through hydrolysis using hydrochloric acid produces starch with a more spacious structure, allowing water to evaporate more quickly during drying. Whereas starch with a denser structure will have a higher water binding property, in addition a break in the hydrogen bond in the linear chain occurs and reduces the amorphous area that can easily be penetrated by water (Afrianti, 2004).

One of the characteristics of starch is its insolubility in cold water, because its molecules are in a straight chain or branch out not in pairs, thus forming a network that connects the starch granules. Another difficulty in using starch is that apart from its lengthy cooking time, the paste that is formed is also quite hard. Because of that, starch has to be modified in order to obtain the right characteristics for certain applications (Afrianti, 2004). Among the desired characteristics for starch is a stable viscosity at high and low temperatures (Wirakartakusuma, 1989). With that, starch will be able to have more uses in the food and pharmaceutical industry.

In this research, the physicochemical properties of durian seed starch are tested before and after modification using acid hydrolysis. Does modification of the durian