

Exploration of Pectin – Utilizing Yeast From Soil of Bogor and Wleri Fruit Orchards

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ABSTRACT

There is a high demand on pectin-utilizing yeasts for industrial, agricultural and environmental purposes. Further exploration of yeast from various sources are important to enrich yeast culture collections. Nine yeast strains were isolated from various soil sources sampled based on biological sampling in Bogor and Central Java. Enriched media containing pectin as carbon sources was employed for isolation of the yeast. The isolated yeast were identified according to the methods described in monographs by Kreger – Van Rij (1984), Barnett *et al.* (2000), Guilliermond and Tanner (2006). The strains isolated were taxonomically separated into 3 groups. Group I contains 3 strains, and this group is closely related to *Candida tropicalis*. Group II contains 4 strains, and this group is included in this genus *Rhodotorula*. Group III contain 2 strains, and this group is closely related to *Williopsis saturnus*, which is a synonym of *Hansenula saturnus*. Pectinolytic enzymes (Polygalacturonase) were produced by all of the tested strains. Polygalacturonase was produced as high as 1.7 U.ml⁻¹ by strain no. 111 of group I, 1.7 U.ml⁻¹ by strains no. 123 of group II, and 1.0 U.ml⁻¹ by strain no. 211 of group III.

Key words : yeast, pectin, polygalacturonase

INTRODUCTION

Yeasts are eucaryotic microorganism, also may be defined as uni cellular fungi reproduced by budding or fission. Fligel (1977) has pointed the advantages of this morphological definition which leaves out others such as historical consideration discussed by Lodder and Kreger-Van Rij (1952). Budding yeast cells may be stage in the life cycle of multicellular fungi (Kreger-Van Rij, 1984). Yeasts are widely distributed in nature, can be found in the soil, water, fermented food, plant materials such as leaves and fruits, and also can be found in coastal water and sediments (Kimura *et al.*, 1985).

Exploration of yeast from various sources is important to increase yeast collection (Hazra, 2005). Some workers tend to use available yeasts for their study. On the other hand, there is a high demand on yeasts for industrial, agricultural, and environmental purposes. Bacteria and fungi are commonly used by many workers to study pectolytic enzymes. However, studies on the enzymes production in yeast was quite limited. Some studies have been conducted from yeast of *Kluyveromyces fragilis* (Sakai *et al.*, 1984), from *Galactomyces reesei* (Sakai and Yoshitake, 1984), from *Trichosporon penicillatum* (Sakai *et al.*, 1982; Sakai and Okushima, 1982), from *Saccharomyces fragilis* (Lim *et al.*, 1980).

Isolated yeasts are likely to produce pectinolytic enzymes (Kaur *et al.*, 2004; Leizeron and Shimoni, 2005), as they are able to utilize pectin as a sole carbon source. Pectinolytic enzymes were reported to be produced extracellularly (Schomburg and Salzmann, 1991). Improved strains are important to be developed. For that purpose, it is necessary to increase various strains by appropriate methods such as isolation which is parallel to genetic engineering.

Isolates of yeasts were identified based on their morphology, physiology, and biochemical (Kreger-Van Rij, 1984; Barnett *et al.*, 2000). The result can be compared with the taxonomic description of pectin or pectic substance utilizing yeast identified previously. In this study, Production of pectinolytic enzyme (polygalacturonase) was investigated.

MATERIALS AND METHODS

Source and Sampling

Soil as sources of yeasts used for this experiment was obtained from Bogor and Central Java. The sample of soil was collected from fruit plantation (mango, papaya, and banana), soil, and soil from garden.

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