

## **Study of Lactic Acid Bacteria Protease for Antioxidant Peptides Production**

### **ABSTRACT**

**By:**

**Lolita Candra Paramesti**  
**18/431488/TP/12344**

This study aims to examine the protease activity of *Lactobacillus plantarum* Mut 7, *Lactobacillus casei* WGK 5, and *Streptococcus thermophilus* Dad 11 isolated from Indonesian fermented food and the antioxidant peptides activities generated during milk fermentation. Protease activity of each isolate was examined qualitatively and quantitatively. The supernatant of cultivated isolate in MRS Broth at 37<sup>0</sup> C for 24 hours was inoculated into skim milk agar to know their ability on clear zone formation. Each isolate also inoculated in milk and incubated at 37<sup>0</sup>C for 18 hours. The fermented milk was centrifuged to separate supernatant as crude enzyme and cell pellet. Both were used to hydrolyze casein at 37<sup>0</sup>C for 120 minutes and examined the antioxidant activity of its hydrolysate. Fermented milk produced using each isolate was also examined its antioxidant activity. The results show clear zone formation in skim milk agar with cloudy circle in the middle. It could be due to protease activity and also acid production by lactic acid bacteria. Hydrolyses of casein by extracellular protease from *S. thermophilus* Dad 11 and *L. plantarum* Mut 7 produced casein hydrolysate of 29.49 µg/ml and 37.49 µg/ml, respectively. Hydrolyses of casein by cell pellet of *L. casei* WGK 5 from fermented milk only produced casein hydrolysate of 4.5 µg/ml. The antioxidant assays ensured that casein hydrolysates produced by protease activity from *S. thermophilus* Dad 11, *L. plantarum* Mut 7, and *L. casei* WGK 5 have antioxidant activity of 35.68%, 42.64%, and 34.96%, respectively. Fermented milk produced by *S. thermophilus* Dad 11, *L. plantarum* Mut 7, and *L. casei* WGK 5 antioxidant activity of 83.04%, 74.21%, and 83.98%, respectively. This research conclude that *S. thermophilus* Dad 11, *L. plantarum* Mut 7, and *L. casei* WGK 5 possess protease activity that increase antioxidant activity.

**Keywords:** *Antioxidant, casein, lactic acid bacteria, peptides, protease*

**Supervisor:**

Prof. Dr. Ir. Tyas Utami, M.Sc.; Assoc. Prof. Jirawan Apiraksakorn, Ph.D.