

## ABSTRACT

Aqbil Hafizh 24020219130047. *Biohydrogen Production from Rice, Cabbage (Brassica oleracea), and Oranges (Citrus sinesis L osbeck) using Fermentation with Clostridium acetobutylicum Bacteria. (under the guidance of Endang Kusdiyantini and Agung Suprihadi)*

*Biohydrogen is a renewable energy source that involves microbes to convert biomass into biohydrogen. Biohydrogen production can use food ingredients such as rice, cabbage (Brassica oleracea), and oranges (Citrus sinesis L osbeck). This research aims to determine the amount of biohydrogen that can be produced by rice, cabbage and oranges using the bacteria Clostridium acetobutylicum. The substrate was sterilized by autoclaving for 15 minutes at a pressure of 15 pounds per square inch (PSI), then 500 ml of sterile distilled water was added and homogenized. Bacterial cultures were grown in Nutrient Broth (NB) media at room temperature for 72 hours, then inoculated on sterilized substrates. Biohydrogen production is carried out in a batch system for 5 days. The parameters measured were glucose levels, number of bacterial colonies, pH value, and biohydrogen levels. The results showed that glucose content in orange substrate was 9.4 g/100 g, followed by rice substrate at 4.8 g/100 g, and cabbage substrate at 3.8 g/100 g. The number of colonies on orange substrate was 6.95 log CFU/ml, followed by rice substrate at 6.19 log CFU/ml, and cabbage substrate at 6.12 log CFU/ml. The final pH values for three substrates were comparable ( $p > 0.05$ ) with cabbage substrate at 3.7, followed by rice substrate at 3.73, and orange at 3.8. Biohydrogen was not found on three substrates, but it is suspected that biohydrogen was present due to bacterial activity.*

**Keyword:** *food, renewable energy, reactors*