SUMMARY

Amin Lukas Krisanto Siregar and Mayong Nanda Hardianta, Departement of Chemical Engineering, Brawijaya University, April 2018, ***Effect of Phosphate and Nitrogene Concentration on Citric Acid Production by Solid State Fermentation Method***, Supervisor: Chandrawati Cahyani dan Vivi Nurhadianty.

Citric acid is an organic acid widely used for the food, cosmetics, pharmaceuticals, and beverages industries. Citric acid is produced by various method, one of them is Solid State Fermentation. This method is a method that can increase the value of agro-industrial waste that has not been utilizer. In Solid State Fermentation method, carbon source is needed as fermentation substrate. Banana peel as an agro-industry waste can use as fermentation substrate because it contains 11,45% cellulose, 9,82% lignine, 25,52% hemicelullose, and 2,4% glucose that can be used as carbon source in the fermentation process. In addition to carbon sources also needed other nutrients to increase yield of citric acid. Nutrition needed such as nitrogen, phosphate, and trace elements such as magnesium, potassium, and alcohol. But in excess amounts, these nutrients can decrease citric acid production. So in this reaserch was conducted to determine the exact composition of nutrients in optimum citric acid yield.

In this research, variation of NH_4NO_3 concentration was 2,3,4 gr/L and KH_2PO_4 was 0,5; 2,5; 5 gr/L. The fermentation process was using 100 grams of banana peel with *Aspergillus niger* mold fungus for three days. Aeration rate 0,18 m^3/dry mass of banana/hour, the initial pH is 5,5 and the fermentation temperature uses room temperature. The citric acid content of the fermentation product was isolated using calcium-precipitation method. Citric acid was quantitatively analyzed by UV-Vis spectrophotometry and qualitively by FT-IR method.

The results showed that in the variaotion of nitrogen concentatrion (NH_4NO_3) with constant phosphate concentration (KH_2PO_4) condition the yield citric acid incrased at NH_4NO_3 from 2 to 3 g/L with the highest citric acid yield is 3,862% and at NH_4NO_3 concentration more than 3 gr/L, yield of citric acid decrease at 0,245%. While on the increse of phosphate concentration (KH_2PO_4) with constant nitrogene concentration (NH_4NO_3) condition, yield of citric acid decreased with the highest yield is 3,862% at KH_2PO_4 concentatrion of 0,5 g/L and the lowest is 0,245% at 5 g/L.

Based on this research, other quantitive analysis methods such as HPLC and UV-Vis pyridine-anhydra acetate spectrophotometry are needed to obtain more accurate results.

Keywords: *Aspergillus niger*, banana peel, citric acid, nitrogene, phospate.