ACETIC ACID PLANT FROM CACAO (*Theobroma cacao* L) PULP LIQUID WASTE WITH FERMENTATION PROCESS

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Abstract

Cocoa pulp is liquid waste from fermented cocoa containing 12-15% glucose. High glucose content can be used as raw material of acetic acid plant. Acetic acid has an important role as raw material in various industries, such as textiles, plastic, and cellulose acetate, solvent and acidity regulator in food.

Acetic acid production from cocoa pulp liquid waste consists of several stage. Cocoa pulp liquid waste in Feed Tank line to Rotary Drum Vacuum Filter. And then filtrate is sterilized and stored in Sterile Filtrate Tank. Solution 10% from Sterile Filtrate Tank enter to Kultur Tank I to be added *Saccharomyces cerevisiae* and nutrient while 90% enter to Fermentor Tank I. Afterward, solution line to Mixing Tank to be added Ca(OH)$_2$ and divided into 2 streams. Solution 10% enter to Kultur Tank II with the addition of *Acetobacter Aceti* and nutrient while 90% enter to Fermentor Tank II. From Fermentor Tank II is obtained mixed of water, ethanol and acetic acid which is purified by distillation process in Beer Still and Rectifying Column. Thus obtained acetic acid with a purity of 98.02%.

Production capacity of 10,000 ton/year, requiring raw materials 506.951 kg/day. Semi-continuous plant operation 24 hour/day, 330 days operation/year. With supporting materials are 32,0649 kg/day *Saccharomyces cerevisiae*, 31,8083 kg/day *Acetobacter aceti*, 32,0649 kg/day (NH$_4$)$_2$SO$_4$, 31,8083 kg/day MgSO$_4$.7H$_2$O, 0.03737 kg/day Ca(OH)$_2$, 9,1253 kg/day antifoam and 222,838,5562 kg/day air.

**Keywords** : Cocoa Pulp, Fermentation Process, Acetic Acid