Oxalic Acid Plant from *Sorghum Bicolor* L Through Acid Oxidation By Using Nitric Acid Process

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Abstract

Oxalic Acid Plant (C$_2$H$_2$O$_4$.2H$_2$O) made of starch from *Sorghum Bicolor* L by using nitric acid process has a capacity of 5000 ton/year (15200 kg/hour). This plant is countinously operated at 24 hour/day for 330 day/years. Oxalic Acid generally consumed by metal treatment, metal cleaning, oxalate coating and dyeing industries. The selected location in Purwodadi, Central Java is based on raw material oriented and the ease of transportation.

Production process of oxalic acid consist of 3 stage: 
In the first stage, starch is solubilized in water to slurry 15%. In the second stage, starch is catalitically hidrolized by aquoeous H$_2$SO$_4$ at temperature of 73-80 °C for 6 hour to produce glucose with a concentration 50-60% wt. Then, the solution is reacted by HNO$_3$ as an oxidator at 63°C, 1 atm to convert 60% of glucose into oxalic acid. After oxidation, the crude of oxalic acid is purified through filtration, evaporation, grease separation, crystalisation, centrifugation, to get 98% of the crystalized oxalic acid dyhidrat product.

To get maximum capacity 5000 kg/year, it requires 15200 kg/day of sorghum and 12366 kg/day of HNO$_3$. Additional raw materials is 2593 kg/day of H$_2$SO$_4$ and 4174 kg/day of Fe$_3$(SO$_3$)$_4$.9H$_2$O as catalist. It needs the utility consumption, is a sanitation water 66 m$^3$/day, cooling water 605 m$^3$/day, and boiler water 125 m$^3$/day.

Keyword : Oxalic Acid, Sorgum bicolor L, Nitric Acid Oxidation Process