LACTIC ACID PLANT FROM RICE BRAN WITH FERMENTATION PROCESS

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Abstract

Lactic acid (C₃H₆O₃) product has characteristic colorless liquid like syrup, dilute in water, and commonly is used in industries as pH control, natural antibacterial, preservative. The plant has a capacity of 68,000 kg/day. The selected location in Bojonegoro, East Java is based on raw material oriented and the transportation ease.

Production process of lactic acid consist of three stages: pre-treatment, fermentation, and purification stages. At the pre-treatment stages, rice bran containing 32.4% starch is hydrolysis with H₂SO₄ catalyst at 120°C and atmospheric. At the fermentation stage, the substrate is fermented by using Lactobacillus delbrueckii to produce lactic acid at 45°C and atmospheric condition, and glucose is converted to lactic acid with yield 93.8% based on sugar consumed. At the purification stage, the crude lactic acid is purified from 10% into 50%.

To obtain the product capacity, it needs about 119,298.25 kg/day of rice bran, 16,426 kg/day of H₂SO₄, 15,517.8 kg/day of Ca(OH)₂, 45.3 kg/day of Lactobacillus delbrueckii; 139.4 kg/day of (NH₄)₂HPO₄ and 301.5 kg/day of active carbon. The plant consumes the utility for 84 m³/day of sanitation water, 14,305.3 m³/day of cooling water, 15,013.2 m³/day of boiler feed water; 203.7 m³/day of water process; and 3,219 m³/day of make up water.

Keyword: Lactic acid, rice bran, fermentation