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## UTILIZATION OF AGROINDUSTRIAL WASTE AND DAIRY WASTE IN SOLID STATE PRODUCTION OF LACTIC ACID

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### Abstract

The abundant availability of solid agroindustrial waste, sugarcane bagasse from sugar mills and juice extraction units, can be potentially beneficial for the production of fermentation based biochemicals, paper boards and power. However, its role in causing bagassosis, an acute respiratory disease among the personnel handling large dry deposits has also been detected. Disposal of liquid waste whey from dairy industries poses a formidable threat to the aquatic ecosystem due to high BOD and COD content. The present experimental study on solid state production of lactic acid through utilization of pure strains of *Lactobacilli* (1) *L. delbreuckii* (NCIM2025), (2) *L. pentosus* (NCIM2912), (3) *Lactobacillus sp.* (NCIM 2734), (4) *Lactobacillus sp.* (NCIM2084) and coculture (from the first two strains) using sugarcane bagasse and dairy waste whey, exhibits an integrated ecofriendly approach in biochemical production coupled with solid and liquid waste minimization. The study was carried out with 6g sugarcane bagasse, 2 g/L cell dry weight (inoculum), with liquid wetting media based on pure glucose (60, 80 and 120 g/L) or whey substituted glucose production media having pure glucose component reduced to 30, 40 and 70 g/L, (rest being whey sugar lactose to make up total sugar level up to 60, 80 and 120 g/L), at 37 °C and pH 6.5. For pure glucose treatment, the highest individual lactic acid production value for all the strains was evidenced at a dose of 80g/L glucose, where the coculture attained the maximum lactic acid concentration value, 45.5 g/L (pH 3.56). In whey substituted glucose containing production media also, the coculture attained the maximum lactic acid production value of 32 g/L (pH 3.56) at 120 g/L total sugar application. The coculture had maximum lactic acid production and yield on sugarcane bagasse bed, compared with pure strains, utilizing the carbon sources, pure glucose and the whey substituted glucose. The coculture showed potential to perform beneficially in the lactic acid fermentation industries, coupled with removal of water pollutant, dairy whey.

*Key words:* bagasse, ecofriendly, lactic acid, *lactobacilli*, whey

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