Lactic acid production by *Lactobacillus casei* from different sources of starch hydrolysates

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Lactates are widely used as acidulants and preservatives of foodstuffs, precursors for stearoyl-2-lactylates, and for the production of industrial polymers such as poly lactic acid and acrylic acid. Lactic acid is produced using different carbon sources such as glucose, lactose, sucrose and hydrolysed starch. In this study the starch in locally available rice, corn and palmyrah tuber flour was hydrolysed to have DE 95 or above using Teramyl (□-amylase) and glucoamylase and used for lactic acid production. A control medium (M1, pH 6.0) contained (gl^{-1}) glucose, 47.5; lactose, 2.5; yeast extract, 10; K_2HPO_4, 0.5; KH_2PO_4, 0.5, sodium citrate 1.0; $MgSO_4$, 0.05; $MnSO_4$, 0.0031; $FeSO_4$, 0.002 and ascorbic acid, 0.05. Calcium carbonate 5.0g was added to the medium to neutralize the lactic acid produced. *Lactobacillus casei* was cultured at 42°C while shaking at 100rpm. The inoculum was prepared in the control medium M1 and 10% (v/v) inoculum was used for inoculation. Rice hydrolysate was diluted to have $50gl^{-1}$ glucose and supplemented with all nutrients present in the control medium (named as M2). To the M2 medium glucoamylase $6.3ml^{-1}$ was added (named as M3). M1 (control medium), M2 and M3 media were used for fermentation. The glucoamylase was added to complete the hydrolysis of remaining oligosaccharides. In M1, M2 and M3 media 30.3, 6.5 and $6.8gl^{-1}$ lactic acid was produced at 28h, and residual glucose was 15.5, 42 and $40gl^{-1}$ respectively. As sugar utilization and lactic acid production in rice hydrolysate media were very low compared to M1, it was decided to use corn and palmyrah tuber hydrolysate. Hence, in the next set of experiments, corn hydrolysate was diluted to have $50gl^{-1}$ glucose and supplemented with all nutrients present in the M1 medium (named as M4). To the M4 medium glucoamylase $6.3ml^{-1}$ was added and named as M5. M4, M5 and M1 media were used for fermentation. In M4, M5 and M1 media at 28h 35.5, 36.5 and $38.5gl^{-1}$ lactic acid was produced at 28h, and residual glucose was 10, 10.6 and $8.8gl^{-1}$ respectively. When palmyrah tuber flour was hydrolysed and diluted to have $50gl^{-1}$ glucose, supplemented with all nutrients present in the M1; at 28h $35.8gl^{-1}$ lactic acid was produced and $8.2gl^{-1}$ residual sugar was present. These results indicate that lactic acid could be produced from corn and palmyrah tuber hydrolysates supplemented with nutrients.