World Academy of Science, Engineering and Technology
International Journal of Environmental and Ecological Engineering
Vol:11, No:10, 2017

Selection of a Potential Starter Culture for Milk Fermentation

Authors : Stephen Olusanmi Akintayo, Ilesanmi Fadahunsi

Abstract : The ability of Lactic acid bacteria (LAB) to grow and survive in milk is being exploited in industrial and biotechnological applications. Although considerable studies have been reported on the fermentation of milk, however, not so much work has been documented on the selection of LAB strains from milk of the Nigerian local cattle breeds for their starter culture potentials. A total of 110 LAB were isolated from raw milk of Sokoto gudali cattle breed. The isolates were screened for their proteolytic activities on skimmed milk media with isolates A07, F06 and A01 showing the highest zone of clearance of 18.5mm, 18.5mm, and 18.0mm respectively and were selected for the studies of their growth in different constituents of milk. A01, F06, and A07 were identified as Pediococcus acidilactici, Lactococcus raffinolactis, and Leuconostoc mesenteriodes respectively using cultural, biochemical, physiological and molecular characterization techniques. Leuconostoc mesenteriodes showed the highest growth in all the milk components that were used in this study. The three LAB species selected showed a growth range of 6.46 log cfu/ml to 10.91 log cfu/ml in lactose with Leuconostoc mesenteriodes showing the highest growth of 10.91 log cfu/ml while Pediococcus acidilactici recorded the lowest growth of 9.78 log cfu/ml. In medium containing leucine as the only amino acid, the viable counts of Pediococcus acidilactici, Lactococcus raffinolactis and Leuconostoc mesenteriodes in log cfu/ml at zero hour were 6.39, 6.36 and 6.38 respectively which increased to 9.31 log cfu/ml, 9.21 log cfu/ml, 9.92 log cfu/ml respectively after 24 hours. Similarly, in all other substrates (casein, lysine, glutamic acid, aspartic acid, stearic acid and oleic acid) tested in this study, Leuconostoc mesenteriodes showed the highest growth. It was observed that the highest quantity of lactic acid (15.31mg/ml) was produced by Leuconostoc mesenteriodes. The same trend was also observed in the production of diacetyl and hydrogen peroxide by the three tested microorganisms. Due to its ability to grow maximally in milk components, Leuconostoc mesenteriodes shows potential as starter culture for milk fermentation.

Keywords : Leuconostoc mesenteriodes, lactic acid bacteria, Sokoto gudali, starter culture
Conference Title : ICEIAM 2017 : International Conference on Environmental, Industrial and Applied Microbiology
Conference Location : Chicago, United States
Conference Dates : October 26-27, 2017