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Harnessing the untapped nutritional and medicinal potentials of the tropical jackfruit Arthocarpus communis frost as a plant edible vaccine in Nigeria

Ubi Godwin M, Umego C T and Imaobong G U
Cross River State Fadama Coordination Office, Nigeria

Arthocarpus communis commonly called jackfruit, Nagka or 'Bread of the tropics' is the largest edible fruit known (up to 40 kg) on earth. It grows rapidly in the tropics and spread across diverse vegetational and climatic belts. In cross river state, Nigeria, the tree is relatively unknown and thus avoided by many inhabitants. The bread of the tropics is heavily endowed with high starch, protein, minerals, nutritional and medicinal contents especially, vitamins C, E and K and has been widely used in the treatment of diarrhoea and dysentery amongst children. The fruit can be adequately metabolically engineered as an edible vaccine for the treatment of many nutritional and medical disorders. For now, it lacks market value because of ignorance and unpopularity in this area. Hence, this paper provides an insight into the usefulness, nutritional and medicinal values of this relatively unknown bread of the tropics as invaluable plant edible vaccines.

ubi840@yahoo.com

Saccharification and liquefaction of cassava starch: An alternative source for the production of bioethanol using amylolytic enzymes by double fermentation process

Sidra Pervez, Afsheen Aman and Shah Ali Ul Qader
University of Karachi, Pakistan

Background: Cassava starch is considered as a potential source for commercial production of bioethanol because of its availability and low market price. It can be used as a basic source to support large-scale biological production of bioethanol using microbial amylases. With the progression and advancement in enzymology, starch liquefying and saccharifying enzymes are preferred for the conversion of complex starch polymer into various valuable metabolites. These hydrolytic enzymes can selectively cleave the internal linkages of starch molecule to produce free glucose which can be utilized to produce bioethanol by microbial fermentation.

Results: In the present study, several filamentous fungi were screened for production of amylases and among them Aspergillus fumigatus KIBGE-IB33 was selected based on maximum enzyme yield. Maximum α-amylase, amyloglucosidase and glucose formation was achieved after 03 days of fermentation using cassava starch. After salt precipitation, fold purification of α-amylase and amyloglucosidase increased up to 4.1 and 4.2 times with specific activity of 9.2 kUmg-1 and 393 kUmg-1 respectively. Concentrated amylolytic enzyme mixture was incorporated in cassava starch slurry to give maximum glucose formation (40.0 gL-1) which was further fermented using Saccharomyces cerevisiae into bioethanol with 84.0% yield. The distillate originated after recovery of bioethanol gave 53.0% yield.

Conclusion: An improved and effective dual enzymatic starch degradation method is designed for the production of bioethanol using cassava starch. The technique developed is more profitable due to its fast liquefaction and saccharification approach that was employed for the formation of glucose and ultimately resulted in higher yields of alcohol production.

sidra.pervez@yahoo.com