National Institute of Technology Rourkela

Defence Seminar

Seminar Title	: Design and Development of a Mechanical Peeler cum Decorer and Value- addition of Kadamb (Neolamarckia cadamba) Fruit
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Abstract	: Kadamb fruit (Neolamarckia cadamba) is an underutilized tropical fruit belonging to the family of Rubiaceae and has traditional therapeutic and functional properties including its tree leaves, flowers, roots, and bark. The post-harvest minimal processing for removal of peel and seed to get the edible core of the fruit is done manually which is laborious, time-consuming, causes injury to the person, and may cause contamination. The operations for peeling, de-coring, and seed removal are designed as a continuous automated machine for optimum utilization of the kadamb fruit and to reduce drudgery. The physical, structural, and textural properties of the fruit have been determined before the design of the machine. The proposed machine was designed using CATIA V5 software (CAD, USA) and fabricated which is economically and commercially feasible for farmers, and small and medium-scale industries. The equipment consists of the feed hopper, processing chamber, water spray system, and outlet for edible core and waste. The performance of the equipment was evaluated, and the process parameters such as feed rate and speed were optimized. The optimum peeling efficiency of 74.26% and coring efficiency of 75.64% was achieved at a feed rate of 63.22 kg/h and speed of 210 rpm. Processing time, cost, and quality of the edible core were better than that of the manually produced core suggesting the feasibility and proper working of the peeler-cum-decorer. The cost economic analysis of the equipment was also done. The unit cost of the machine was Rs.25,000.00 (INR). The return on investment (ROI) of 169%, breakeven point (BEP) of 4759 kg of edible core production, and payback period (PBP) of 216 days on the initial investment cost was calculated for the developed machine. The cost of processing was Rs.3.07 (INR) against Rs.24.44 (INR) per kg in the manual method. The developed machine could be a possible solution for processing and value-addition of kadamb fruits for increasing the income for sustainable livelihood of rural population dependent on the collection and sale of fruits. Value addition of matured kadamb fruit was also done in the form of pasta and candy which showed good sensory properties.