

DEVELOPMENT OF MULTI-NUTS POST HARVESTING (MNPH) MECHANISM BY COMPUTER AIDED ENGINEERING ANALYSIS

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ABSTRACT

The Present research work introduces a flexible multi-nuts Shelling, Cutting, Slicing, Squeezing, Cracking and De-hulling Mechanisms like operations by just exchanging an operative tool and raw material fixture set. The different types of nuts such as marking-nuts, walnuts, almond and areca-nuts were considered for the post harvesting operation by using the same working platform in vertical cut plane. The Computer Aided Engineering Analysis (CAE) by finite element analysis to perform a simulation for optimization MNPH Machine is done by considering an actual field condition parameters to do the structural analysis. Sum of the reaction forces along X-axis:38482 N, Y-axis:-3641N, Z-axis: 20757.5N. The structural analysis of the mechanism shows all components in the mechanism are in safe limit for all types of forces exerting during operations. The average product material efficiency for marking nut, walnut, almond, areca was 87.22%, 72.23%, 85.29%, 95.00%. The operational time 0.4hrs to 1.5hr for 100 pieces of all selected nuts whereas, average mechanical damage 12.78, 28.00, 14.71%, 5% and Throughput capacity: 0.60, 2.5, 0.60, 1 Kg/hr respectively. Machine cost with optimum design and fair material selection is approx. \$50.

KEYWORDS: Multi-Nuts Mechanism, CAE, Walnut, Almond, Areca, Marking Nut