

## ABSTRACT

Banana is one the most important fruit. It gets damaged during handling incurring huge loss. An investigation on Mechanical Damage of Banana during handling was undertaken to suggest the improvements in handling practices to minimise fruit damage. In the first phase of the programme, experiments were conducted to determine various physical, mechanical and rheological properties of banana fruit. The effect of maturity and post harvest period on mechanical properties such as bio-yield strength, modulus of elasticity, ultimate strength, firmness, puncture and shear strength, coefficient of restitution and natural frequency, physico-chemical characteristics viz. weight, dimensions, true density, pulp/peel ratio, total soluble solids and total acidity were determined. Kinds of forces, viz. Impact, vibration and compression were identified as the agencies causing the fruit damage. The fruit response under impact, vibration and compression was determined.

In the second phase of research fruit damage under impact, vibration and compression forces was evaluated. The weight loss, total soluble solids, firmness pulp/peel ratio total acidity and peel damage area and or volume were used as the criteria for representing the degree of damage as it can not be evaluated directly. Regression models were developed to predict the damage with one to four dependent variables. The critical levels of various forces could be predicted from the regression models.

In the third phase characteristics of corrugated fibreboard and such as thickness, substance, bursting strength, puncture resistance and moisture and banana leaf cushions of 0.01, 0.02, 0.03 and 0.04 m thickness viz. coefficient of restitution, spring constant, modulus of elasticity and energy absorbed were determined.

In the last phase shipping container was fabricated from corrugated fibreboard (7ply) and the effect of stack load as well as duration of static load on deformation was determined. Compression load failure and deformation was also recorded under quasi-static compression. The shipping container was filled with banana and banana leaf cushions of various thicknesses and the damage was determined under compression.