

SIIC002

POST HARVEST PHYSICAL AND MECHANICAL PROPERTIES OF *BACCAUREA MOTLEYANA* FRUITS

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Abstract:

Some post harvest physical and mechanical properties of *Baccaurea motleyana* fruits were determined in order to facilitate the design of machines or equipments to handle, process and store the fruits. They consist of the mean moisture content, length, width, thickness, geometric mean diameter, mass, volume, surface area, sphericity, aspect ratio, true density, bulk density, porosity and coefficient of static friction on different types of surface. The physical and mechanical properties were determined at the moisture content (wet basis) of 80.79 (± 1.49) %. The mass, volume and dimensions of *Baccaurea motleyana* fruits were measured by using electronic balance, water displacement method and vernier caliper respectively. The geometric mean diameter, surface area, sphericity, aspect ratio, true density, bulk density and porosity were calculated using different theoretical equations. The mean length, width and thickness of the fruits were 24.69 (± 1.49), 22.49 (± 1.65) and 20.35 (± 2.15) mm, respectively. The average value of geometric mean diameter, mass, volume, surface area, sphericity, aspect ratio, true density, bulk density and porosity were 22.43 (± 1.69) mm, 5.885 (± 1.236) g, 6146.67 (± 1505.64) mm³, 1589.16 (± 238.85) mm², 90.77 (± 2.46) %, 91.04 (± 3.57) %, 1039.70 (± 125.24) kgm⁻³, 484.71 (± 24.95) kgm⁻³ and 97.48 (± 0.61) %, respectively. The mean value of coefficient of static friction on four types of structural surface were found to be varying from 0.158 (± 0.028) for galvanized steel sheet to 0.209 (± 0.034) for rubber surface.

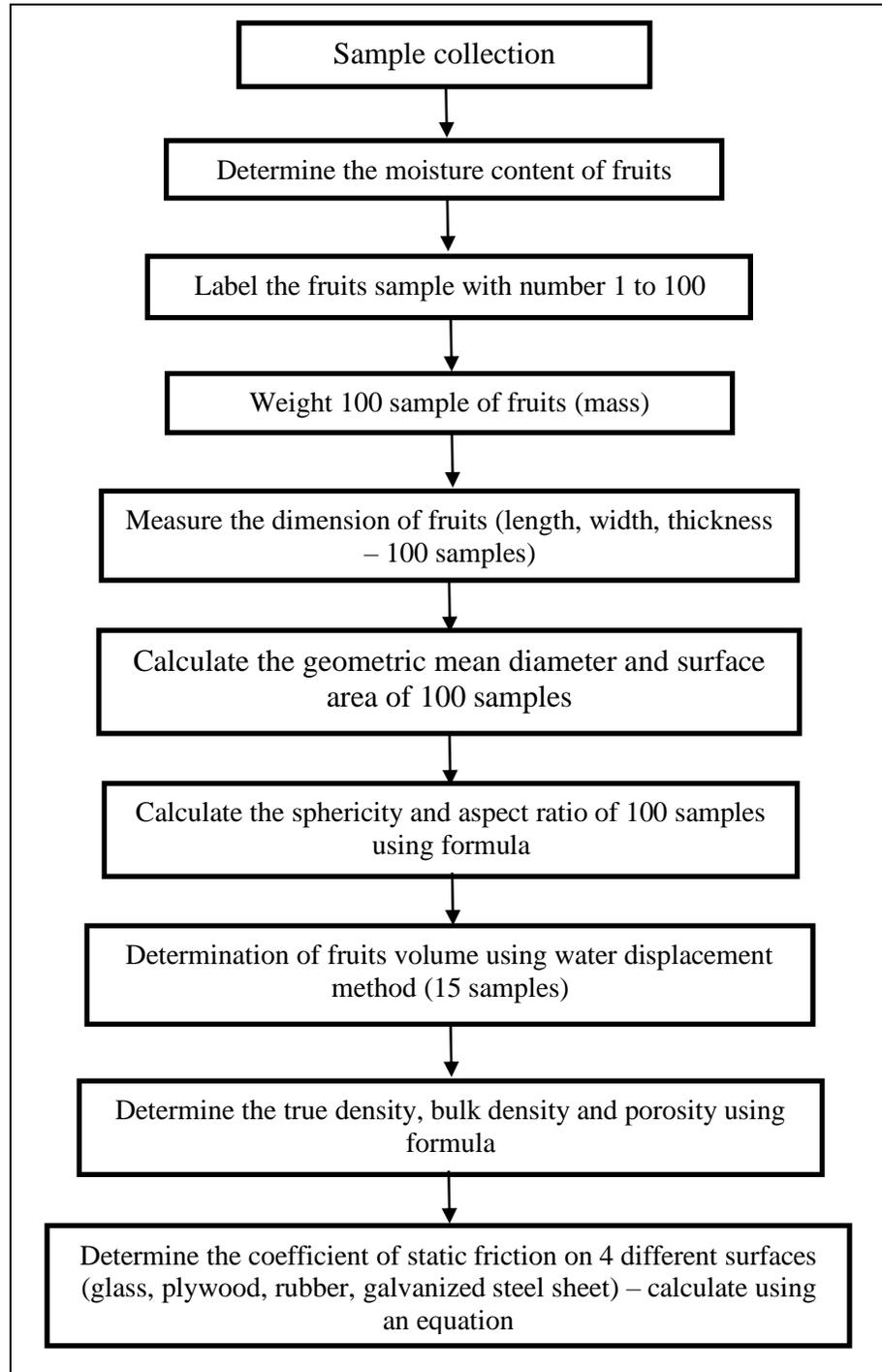
Keywords:

Physical properties, *Baccaurea motleyana*, Rambai, Design, Machine

Objectives:

- To identify some physical properties of *Baccaurea motleyana* fruits, which could be useful to develop the design of technology to handle, process and store the *Baccaurea motleyana* fruits.

Methodology:



Results:**Table 1: Some physical properties of *Baccaurea motleyana* fruits**

Physical Properties	Unit of Measurement	Number of Observation	Mean Value	Standard Deviation
Moisture Content	%	5	80.79	1.49
Length	mm	100	24.69	1.49
Width	mm	100	22.49	1.65
Thickness	mm	100	20.35	2.15
Geometric Mean			22.43	
Diameter (GMD)	mm	100		17.56
Sphericity	%	100	90.77	2.46
Aspect Ratio	%	100	91.04	3.57
Mass	g	100	5.885	1.236
Surface Area	mm ²	100	1589.16	238.85
Volume	mm ³	15	6146.67	1505.64
True Density	kgm ⁻³	10	1039.7	125.24
Bulk Density	kgm ⁻³	10	484.71	24.95
Porosity	%	10	52.84	5.66

Table 2: Coefficient of static friction of *Baccaurea motleyana* fruits on four types of structural surface

Coefficient of static friction	Number of Observation	Mean Value	Minimum Value	Maximum Value	Standard Deviation
Glass	25	0.190	0.149	0.249	0.024
Rubber	25	0.209	0.158	0.268	0.034
Galvanized steel sheet	25	0.158	0.123	0.231	0.028
Plywood	25	0.188	0.141	0.249	0.028

Conclusion:

In conclusion, the technical data obtained in this study may be useful in the design of machine for handling, processing and storing of the *Baccaurea motleyana* fruits.