

## Studies on physical properties of coconut (cv. BANAWALI)

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### ABSTRACT

Physical properties of Banawali coconut were evaluated for the design of the dryer. The maximum length of coconut varied from 23.14 cm to 15.34 cm and mean maximum length was 19.61 cm. The minimum length of coconut varied from 18.20 cm to 11.60 cm and average minimum length was 15.54 cm. The medium length of coconut varied from 19.50 cm to 12.14 cm with average medium length of 16.17 cm. It was observed that there was a very little variation between Breadth and the Thickness of the coconut. The geometrical maximum and minimum diameter was 19.67 cm and 16.38 cm. The mean value of the geometric mean diameter was 14.07 cm. The sphericity was in the range of 75.74 % to 95.29 % with average value of 86.01%. It indicates that Banawali is like a sphere as the average value 86.01%. The mass of coconut was in the range of 1094 gm to 550 gm. The average mass of the coconut was 831.57 gm. There was a wide variation in the mass of coconut of Banawali variety. The bulk density of dehusked nut was in the range of 422.27 to 459.66 kg/m<sup>3</sup> with mean value of 440.96 kg/m<sup>3</sup>. As the moisture content decreases from 81.65 % w.b. to 40.15% w.b. the bulk density of nut also decreases with 459.66 to 422.27 kg/m<sup>3</sup>. The variation of the bulk density with moisture content was linear. The true density of nut was in the range of 445.20 kg/m<sup>3</sup> to 514.20 kg/m<sup>3</sup> with mean value of 479.70 kg/m<sup>3</sup>. The true density of nut varies linearly with the moisture content. As moisture content decreases from 78% w.b. to 40% w.b. true density of nut also decreases from 514.20 to 445.20 kg/m<sup>3</sup>. The porosity of Dehusked nut was in the range of 6.97% to 10.95% with mean value of 8.96%.

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Coconut is commercially cultivated in 93 countries especially on the small and marginal holdings over an area of 11.8 million hectares and produced about 10.26 million tones (Singh and Udhaykumar, 2004). Coconut is a major irrigated horticultural crop in konkan region of Maharashtra. Maharashtra occupied eleventh place in area and seventh place in coconut production. The total area under coconut cultivation in the Konkan region is about 16789 ha. With production of 244.4 million nuts (Nagawekar *et al.*, 2003).

The banawali, a different group of tall cultivars is a native of Goa state mainly cultivated in Benaullim village and popularly known by the village name. It was brought first in the Sindhudurg district of Maharashtra and in the local language it was pronounced as Banawali. The coconuts of this type are smaller in size as compared to WCT. The banawali being a member of tall growing cultivars of coconut is highly cross-pollinated and therefore, lots of variations are noticed in the colour, size, shape, and yield. Knowledge of physical and mechanical properties constitutes important and essential engineering data in the design of machines, storage structures, processes and controls (Mohsenin, 1970).

### METHODOLOGY

#### Material used:

Fully matured (12-14 months old) coconuts of

Banawali variety were collected from the Horticulture Farm of Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth Dapoli. The outer husk was removed by using locally made tool *i.e.* koyata. The fruit containing the nut enclosed by the husk of fibrous layers with smooth outer skin. Beneath the hard shell of the nut is the coconut meat, a white edible endosperm that has a concave free surface forming a spherical hollow filled with coconut water. The sample size was 50 coconuts. The properties length, breadth, width, size, geometric mean diameter, sphericity, bulk density, true density and porosity were measured. The moisture content of the coconut was determined by the AOAC method for 130° C for 1 hour. The average moisture content of the freshly harvested nuts was in the range of 94.93 % to 81.81% w.b.

The moisture content was calculated by using formula given below.

$$W_f = W_i \times \frac{100 - M_i}{100 + M_f} \times 100$$

where,

$W_i$  = Initial weight of sample, kg.

$W_f$  = Final weight of the sample, kg.

$M_i$  = Initial moisture content of the sample, % w.b.

$M_f$  = Final moisture content of the sample, % w.b.

#### Size:

The size of the coconut was determined by taking