Moisture sorption isotherms and shelf life of dehydrated tender Coconut (Coco Chips)

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Coco-chips are the sugar coated dehydrated food product developed from tender coconut. Moisture sorption isotherms of coco chips were determined using the gravimetric static method of saturated salt solutions (NaCl, KOH, $MgCl_2$, KI and K_2CO_3) of known humidities at 10, 25 and 35 ^{0}C. The functional relationship between water activity (a_w) and moisture content on dry basis were esablished. The data were used to determine the BET monolayer values and heat of sorption using equations of Iglesias/Chirife and Clausius Claperone respectively. Three different packing materials Nylon/LDPE, Polyester/LDPE and Al/PE/PET were evaluated for coco chips up to six months of storage at ambient conditions (30 ±2 ^{0}C) Suitable packaging materials for coco chips was selected based on the moisture content and free fatty acids (FFA) levels of the product. The treatment means were compared by the Least Significant Difference (LSD) test.

Moisture sorption studies of the product showed that coco chips exhibit a sigmoid shape for adsorption isotherms. With the increasing temperature, a decrease in moisture content was observed indicating water sorption is not favoured at high temperature. The monolayer values were found to vary from 2.21 to 2.99 g per 100 g of sample indicating safe level of moisture to prevent fatty acids oxidation and hydrolysis. The sorption energy at 5.6% db moisture was 3682 Cal/mol indicating the hygroscopic nature of the product and necessity of moisture proof materials for packaging. A shelf stable product could be obtained in Alumenium foil laminated with PET packages without significant changes in moisture and FFA during six months of storage.

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