Preparation of moisture sorption isotherms to improve quality and stability of processed food products

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In recent years, an increasing amount of attention has been given to sorption properties of food products. Moisture sorption isotherms of different type of food products of Harischandra Mills Ltd. (HML) namely noodles, coffee powder, Kurakkan flour, rice flour, Papadam and curry powder, were developed by plotting the Equilibrium Moisture Content (EMC) vs. water activity (a_w) values. Water activity measurements were taken by a Hygrometer. For calibrating the results of the test method, saturated salt solutions ($MgCl_2.6H_2O$, K_2CO_3, $Na_2Cr_2O_7.2H_2O$, $NaNO_3$, KCl) were used. Dew point temperatures were also determined by using Psychometric Chart and dew point temperature curves were plotted a_w vs. dew point temperature (t_d), for all the six products.

Since there were no significant differences for the a_w values obtained from the test method and the calibration test, the test method can also be used as a valid test for determining a_w for different food products.

Product Distribution Calendar (PDC) of HML, was prepared by using the obtained results to demonstrate the product stability, when the products were being packed under low country wet zone (LCWZ) conditions and delivered to other climatological regions of Sri Lanka with different temperatures. Most possible bad consequence in keeping of the tested products in regions where below the t_d of the product at LCWZ, is formation of dew underneath of the polythene pouch due to temperature dropped and formed dew can be adsorbed by the product itself. This adsorption process may lead to increase moisture content of the product and as a result cooking quality, keeping quality and organoleptic property of the products may be down graded. Therefore, when delivery of these products to cooler regions below their t_d (24, 24, 24, 25, 23, 23 ^{0}C respectively) values, further drying can be recommended to avoid increase of moisture due to formation of dew. On the other hand if these products are moved to the regions with low relative humidity values than the LCWZ conditions, where moisture desorption process occur. Therefore, preventing of quality deterioration due to moisture transmitting to the macro environment from the product inside, barrier properties of the packing material have to be improved. As the PDC and secondary data of HML, all of her products can be delivered to any thermo climatological region without affecting microbial deterioration even if quality deterioration may happen due to formation of dew, as maximum EMC remained less than 15% when keeping in any region of Sri Lanka.

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