

Determination of water activity of low moisture food products and the influence of different temperature conditions on product moisture content

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Water activity (a_w) of a food is a far better indicator of food deterioration than the total moisture content. Product moisture content could vary during storage and transport when exposed to different environmental conditions. A study was conducted to determine a_w , to obtain safe moisture levels for different temperature regions in Sri Lanka and to find out the applicability of the test method in measuring a_w of low moisture food products.

Chilli powder, kurakkan noodles, black gram flour, turmeric powder and table salt samples with different moisture levels were kept in air-tight containers to equilibrate and Equilibrium Relative Humidity (ERH) was obtained using dry and wet bulb method. Sorption isotherms at 28 °C were obtained by plotting Equilibrium Moisture Content (EMC) value, against a_w (ERH/100). Dew point variation curves for each product were plotted in the same sorption graph to obtain corresponding dew points for different moisture levels. The test method was validated using constant relative humidity salt slurries.

The test method can be successfully applied to obtain a_w and sorption isotherms for low moisture food products as two sorption curves were not significantly different ($p < 0.05$). Sorption isotherm of products except table salt has shown a shape similar to general sorption isotherm of a low moisture food product. Corresponding dew points for safe moisture levels identified by the manufacturer for chilli powder (7.0-10.0%), kurakkan noodles (7.0-9.0%), black gram flour (11.0-13.0%), turmeric powder (9.0-12.0%) and table salt (3.0-6.0%) are 21.5-24.5 °C, 20.0-23.0 °C, 22.5-24.0 °C, 20.0-24.5 °C and 24.5-25.0 °C respectively. Dew formation is possible in all products when transported to C (22.5 - 25.0 °C), D(20.0-22.5 °C), E(17.5-20.0 °C) and F(15.0-17.5 °C) temperature regions in Sri Lanka. Products loose moisture under high temperature regions A(>27.5 °C) and B(25.0-27.5 °C). Equilibrium moisture levels shown in the table below, should be avoided in order to obtain safe moisture levels suitable for different temperature regions in Sri Lanka.

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