

Feasibility Study of Cryogenic Grinding of Spices Using Latent Heat of Water: A Case Study for Chilli (*Capsicum Annum L.*)

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ABSTRACT: *The application of low temperature grinding shows a promising pathway to produce higher quality ground product in terms of flavor and volatile oil retention of spices. The possibility of using evaporative water cooling for grinding chilli was studied to ascertain the quality parameters. Atomized water was sprayed on to the chilli pods being fed in to the mill. The temperature, moisture content and color values of the ground product were measured and the values were compared with conventional grinding. The temperature of the conventionally ground and evaporative water cooled ground chili were 58 ± 2.65 °C and 36 ± 1.5 °C respectively and the corresponding amounts of heat removed by water vapor were 29.33 kJ and 186.50 kJ. The moisture content of conventionally ground chilli and evaporative water cooled ground chilli with water spraying were 9.06 ± 0.41 and 9.65 ± 0.23 percent wet basis and the corresponding color values were 49.19 ± 0.99 (L*), 17.35 ± 1.62 (a*), 23.38 ± 1.29 (b*) and 47.52 ± 1.74 (L*), 18.38 ± 0.14 (a*), 26.93 ± 0.68 (b*). This study revealed that the water can be effectively used as a coolant for reducing temperature rise during grinding in order to preserve the quality of chilli.*

Keyword: *Chilli, evaporation cooling, grinding, spice*

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