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Water diffusion co-efficient of paddy, rice, black gram and dhal

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ABSTRACT : A hydration experiment for BPT 5204 paddy, NLR 92 paddy, BPT 5204 rice, NLR 92 rice, black gram and dhal was conducted by soaking in water at temperatures of 30, 40, 50, 60 and 70^{0}C in water bath up to 180 min. The moisture content for all the samples increased with increase in soaking time and temperature. Hydration data were analyzed using Fick's second law of diffusion model to estimate effective diffusivity which plays an important role in developing guidelines for soaking operation. The effective diffusivity varied from 2.63 x 10^{-11} to 3.75 x 10^{-11}, 1.99 x 10^{-11} to 3.33 x 10^{-}11, 3.21 x 10^{-11} to 4.84 x 10^{-11}, 3.2 x 10^{-11} to 4.57 x 10^{-11}, 1.16 x 10^{-11} to 1.0 x 10^{-10} and 3.06 x 10^{-11} to 7.28 x 10^{-11} m^2/s from the soaking temperature 30 to 70^{0}C for BPT 5204 paddy, NLR 92 paddy, BPT 5204 rice, NLR 92 rice, blackgram and blackgram dhal, respectively. It was observed that effective diffusivity was increased as temperature increased from 30 to 70^{0}C.

KEY WORDS : Paddy, Rice, Black gram, Dhal, Hydration, Fick's diffusion equation, Effective diffusivity

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