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Effect of particle and surface properties on flowability of rice flours

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Abstract

The flowability of basmati and non-basmati rice flour was compared affecting bulk handling of flour related to the particle size, shape and surface roughness (measured by Atomic Force Microscope) as well as dynamic and shear properties depending upon the processing conditions. Particle size (62.3-68.8 μ m) of both the flours was significantly different and further, the flowability of non-basmati rice flour was significantly affected by its particle shape (circularity 0.552), surface roughness (129.46nm) and compressibility (28.50%), making it more cohesive than basmati rice flour. Also, basic flow energy, stability index and specific energy was significantly higher in non-basmati flour, thus required more energy (192.27mJ) to flow than basmati rice flour (167.42mJ). Overall, the flowability was analysed at three different pressures (3,6 and 9kPa) and the non-basmati rice flour was found less flowable as indicated by the flow function coefficient (1.62at 9kPa) in comparison to basmati (2.29at 9kPa) creating difficulty in bulk handling.

Graphical abstract

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