

# Determination of Physical and Thermal Properties of Sorghum

M Sardar Baig, K Sivala, L Edukondalu, J Lakshmi and R Lakshmipathy

College of Food Science and Technology, Bapatla, A.P.

## ABSTRACT

The physical and thermal properties of sorghum grain (Mahalakshmi - 946) were determined at a moisture content of 10.5 % (wb). The physical properties namely length, width, thickness, thousand grain weight, sphericity, mean geometrical diameter, surface area, bulk density, particle density, porosity, angle of repose and coefficient of static friction and thermal properties namely thermal conductivity, thermal diffusivity and volumetric specific heat were determined. The mean  $\pm$  standard deviation values of sorghum grain for length, width, thickness, geometrical mean diameter, sphericity and surface area were found to be  $4.21 \pm 0.281$  mm,  $3.64 \pm 0.254$  mm,  $2.32 \pm 0.233$  mm,  $3.29 \pm 0.230$  mm,  $0.78 \pm 0.031$  and  $34.10 \pm 4.638$  mm<sup>2</sup> respectively. The mean  $\pm$  S.D of thousand grain weight, bulk density, true density, porosity, angle of repose of sorghum were found to be  $22.645 \pm 0.004$  g,  $770 \pm 1.0$  kg/m<sup>3</sup>,  $1272.893 \pm 22.386$  kg/m<sup>3</sup>,  $39.497 \pm 0.992$  % and  $31.6220 \pm 1.0895^\circ$  respectively. The mean  $\pm$  SD values of coefficient of static friction were found to be  $0.512 \pm 0.016$ ,  $0.479 \pm 0.012$ ,  $0.453 \pm 0.012$ ,  $0.412 \pm 0.011$  and  $0.392 \pm 0.011$  for Mild Steel, Galvanized Iron, Aluminium, Stainless Steel and Perspex surface material respectively. The mean  $\pm$  S.D values of thermal conductivity, volumetric specific heat capacity and thermal diffusivity were  $0.157 \pm 0.015$  W/mK,  $1.222 \pm 0.13$  MJ/m<sup>3</sup>K and  $0.129 \pm 0.009$  mm<sup>2</sup>/s respectively.

**Key words:** *Coefficient of static friction, Sphericity, Angle of repose, Thermal conductivity, Thermal diffusivity*