RESEARCH PAPER | International Journal of Agricultural Engineering | Volume 5 | Issue 2 | October, 2012 | 278 –283

Thermal properties of different pulses

S. SHIRSAT BHAWNA AND P.S. PHIRKE

Received : 28.09.2012; Revised : 07.10.2012; Accepted : 11.10.2012

See end of the Paper for authors' affiliations

Correspondence to:

S. SHIRSAT BHAWNA
Department of Agricultural Engineering, College of Agriculture, Dapoli, RATNAGIRI (M.S.) INDIA
Email : bhawnashirsat@rediffmail.com

ABSTRACT : Thermal properties determination studies were conducted at five levels of grain moisture content *i.e.*, 11.1, 13, 18, 23 and 25.07 per cent and temperature levels of 12.9, 17, 27, 37, 41.1°C.The maximum bulk thermal conductivity are obtained for these pulse grains for the combination pigeon pea, green gram and Bengal gram moisture content and temperature 18 per cent and 27 °C, respectively. The minimum bulk thermal conductivity are obtained for pigeon pea, black gram, green gram and for the combination moisture content and temperature 11.1 per cent and 27°C. Whereas, minimum bulk thermal conductivity is obtained for bengal gram for the combination moisture content and temperature 18 per cent and 12.9°C. The maximum thermal diffusivity is obtained for these pulse grains for the combination of moisture content and temperature 18 per cent and 27°C, respectively. The minimum bulk thermal diffusivity are obtained for pigeon pea and black gram for the combination moisture content and temperature 11.1 per cent and 27 °C. Whereas, minimum bulk thermal diffusivity are obtained for green gram and bengal gram for the combination moisture content and temperature 27 per cent and 37 °C. The maximum specific heat are obtained for pigeon pea and black gram for the combination moisture content and temperature 23 per cent and 17 °C, respectively. Whereas, maximum specific heat for green gram and bengal gram are obtained for the combination of moisture content and temperature 23 per cent and 37 °C and 18 per cent and 27 °C, respectively. The minimum specific heat is obtained for pigeon pea, black gram and green gram for the combination of moisture content and temperature 18 per cent and 27 °C. Whereas, minimum specific heat is obtained for bengal gram for the combination moisture content and temperature 11.1 per cent and 27 °C.

KEY WORDS : Moisture content, Temperature, Thermal properties, Statistical analysis

HOW TO CITE THIS PAPER : Shirsat Bhawna, S. and Phirke, P.S. (2012). Thermal properties of different pulses. *Internat. J. Agric. Engg.*, **5**(2) : 278-283.

Pulses are the important constituents of diet for large number of an Indian people where majority of population is vegetation. These supply the major portion of protein requirement of the human body. Pulses are major sources of protein in human and animal diet. In India per capita availability of pulses is much lower as against the moderately recommended intake. India counts for 35 per cent pulses cultivation and 26 per cent production of world. In India pulses are grown on 25 millions hectares yield about 15 millions tones (FAO, 1996), annually.

Many of these pulses one subjected to various types of thermal processing before they are placed at the disposal of consumers. The thermal properties have multiple applications in food engineering particularly to the researchers and designers of the food products and large amount of food preparations. These properties are used in heat transfer calculation and to establish critical control point during different processes. These properties are also employed in food technology as control index and to compare the efficiency of equipments and industrial plants. In addition, they are used to control low material during process aspect and concepts are provided simple method too. The knowledge of thermal properties *viz.*, specific heat, thermal conductivity and thermal diffusivity for thermal process of food grain are essential engineering data for control and analysis of many processing operations (Mohsenin, 1978).

These properties are dependent on the moisture content and temperature in case of biological materials.

In situation where heat transfer occurs of unsteady state *i.e.*, change with time, thermal properties are important parameters used to characterize the heat and mass transfer ability of the biological materials.

Pulses drying researchers have developed elaborative method and have extensively studied the drying of shelled corn and other pulses. Most, if not all of the principles governing the drying and storage studies of the other grain