

A STUDY ON PHYSICO-CHEMICAL PROPERTIES AND PROCESSING METHODS OF
WINGED BEAN (*Psophocarpus tetragonolobus* (L.) DC) SEEDS

By

TUAN HAJIREEN HARIS MISKIN

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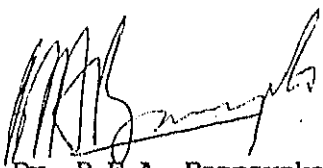
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SRI LANKA

Approved :

Supervisor


(Dr. B.F.A. Basnayake)

Examiner


(Dr. A.R. Ariyaratne)

Examiner


(Mr. S.S.G. Perera)

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ABSTRACT

The physical properties and processing methods of winged bean seed were investigated. The seed shape varied from spherical to oblate and the axial dimensions indicated uniformity in seed size within each cultivar. The relationship between density and seed moisture content was negative and linear. The porosity increased non linearly while the seed hardness decreased with increase in the moisture content.

The angle of repose of winged bean seeds was lower than that of most other grain legumes and the coefficient of friction increased with increase in moisture content on all structural surfaces tested. Isotherms of winged bean seed displayed a sigmoid shape and the hysteresis effect in the moisture content was more prominent at intermediate relative humidities. The hygroscopicity of winged bean seed indicated that they should be stored below 11.4% seed moisture to prevent deterioration. The specific heat and thermal conductivity of winged bean seeds increased linearly with increase in seed moisture content. However, the thermal diffusivity remained constant with increase in seed moisture.

Pre-treatment of winged bean seeds by conduction heating and boiling in water gave optimum hulling efficiencies of 98.8% and 96.5% respectively. Hulling untreated or water soaked seeds resulted in unsatisfactory efficiencies. The abrasive mill performed better than the friction mill in hulling winged bean seeds. Boiling did not affect winged bean flour whiteness whereas an increase in heating time and temperature in conduction heating resulted in a gradual decrease in

flour colour. The hulls of winged bean seed constituted 16.5% of the dried weight of seeds. Winged bean seeds contained 35% protein and 18% oil, and boiling or heating had no noticeable effect on their composition. However, heating and boiling reduced trypsin inhibitors by 68.5% and 37.5% respectively. Conduction heating followed by milling in a pearling cone was found to be the most suitable method for dehulling mature winged bean seeds on a commercial scale.