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NUTRITIVE VALUE OF WINGED BEAN, Psophocarpus tetragonolobus.L.

by

S. Sachithanantham Sri Kantha, M.Sc.(Agric.)

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Department of Biochemistry,
University of Peradeniya,
Sri Lanka.

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SUMMARY

Thirty two cultivars of the winged bean, Psophocarpus tetragonolobus, grown in Sri Lanka have been analysed. Weight of a seed ranged from 0.18 - 0.42g with a mean value of 0.28 g while the weight of a full mature tuber ranged from 7.1 - 53.3 g with a mean value of 34.7 g. The average weight of edible portion in tuber ranged from 4.6 - 42.3g/tuber with a mean value of 25.4g. Around 65 percent of the weight of the tuber forms the edible portion.

Proximate chemical analysis shows that the protein content of seeds ranged from 29.8 - 42.9g/100g fresh weight with a mean of 36.7g/100g. The protein content of fresh tubers ranged from 2.3 to 8.1g/100g with a mean of 5.5g/100g. The range of protein values exhibited by fresh leaves falls between 4.6 and 11.8g/100g with a mean of 7.4g/100g. The protein contents of fresh immature pods and flowers range from 1.3 - 2.7 percent (mean 2.1 percent), and 1.3 - 2.7 percent (mean 2.1 percent) respectively. The oil content of the seeds ranged from 11.0 - 24.0g/100g with a mean of 17.8g/100g.

Detailed chemical analysis shows that the winged bean seed protein is rich in lysine which is the limiting aminoacid in the Sri Lankan staple diet, the rice. Sulphur containing aminoacids and tryptophan seem to be the first and second limiting

aminoacids in this protein. The fatty acid profile of the seed oil shows that oleic and linoleic acid fractions formed the major fatty acid components with mean values of 40.2 and 31.6 percent respectively.

The levels of two anti-nutritional factors, trypsin inhibitors and phytohaemagglutinins were determined in the seeds, tubers and leaves. The range of trypsin inhibitor content in the raw mature seed, tuber and leaf were 10.6 - 49.5, 0.2 - 33.1 and 0.2 - 1.0 mg TI/g sample respectively. Phytohaemagglutinin content in the raw mature seeds ranged from 3,200 - 25,600 haemagglutination units/g sample.

Soaking the seeds for 10 hours at room temperature ($28 \pm 2^{\circ}\text{C}$) resulted in hydration of the seed and is recommended as an initial processing step. Maximum tenderisation and complete inactivation of the two anti-nutritional factors, trypsin inhibitor and phytohaemagglutinin, resulted when the seeds soaked in tap water or in NaHCO_3 (0.5 percent) solution, and boiled in NaHCO_3 (0.5 percent) or NaCl (0.5 percent) solutions. Tenderisation of the seeds occurred in soaking as well as boiling steps, but to a greater extent during boiling. Inactivation of trypsin inhibitors and phytohaemagglutinins resulted only during boiling. Depending on the individual preferences, either NaHCO_3 or NaCl may be used for tenderisation of the seed during cooking while this study prefers the usage of NaCl since it is easily accessible at village consumer level in comparison to sodium bicarbonate.

Winged bean food preparations (winged bean "rotti", winged bean "thosai", winged bean-butter cake, winged bean bread and winged bean milk) were made from the processed winged bean flour. Supplementation of winged bean flour at 10 percent levels to wheat flour resulted in acceptable food items. Of the preparations, all except the winged bean bread were found to be acceptable to the taste panel. Winged bean milk is suggested as a substitute for coconut "milk", in traditional food preparations. Initial processing of winged bean flour and winged bean tuber for food items with longer shelf-life is suggested.