BIOCHEMICAL COMPOSITION OF WINGED BEAN (PSOPHOCARPUS TETRAGONOLOBUS (L.) DC) DURING SEED DEVELOPMENT WITH EMPHASIS ON POLYSACCHARIDES

By

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ABSTRACT

The biochemical changes during seed development was investigated in three varieties of winged bean. Results indicate that there is an increase of crude protein, fat and mineral phosphorus with the advancement of seed maturity. The amount of starch was observed to decrease from 5.05% at 30 days after flowering to a zero value at maturity (70 days after flowering). Similar trends have been reported for soya beans.

Winged bean also show low values of trypsin inhibitor (50-450 TI units/gm sample) at early seed development (30 days after flowering) and subsequently reaches a peak at full maturity (1000-1150 TI units/gm sample). Falling in line with other legume seeds, soluble sugar accumulation proceeds with the development of the seed while a slight reduction of non-starch polysaccharides have been observed. In the absence of starch in mature seeds probably the soluble sugars are acting as an immediate energy source for germination. All the developmental stages of winged bean seeds contain significant amounts of phosphorus and other minerals. In terms of essential minerals calcium (370.0-554.0 mg/100 g) and iron (7.2-11.8 mg/100 mg) winged bean proves to be a superior source. In-vitro protein digestibilities of seeds ranged between 67.72 and 72.42%. Sensory evaluation led to the selection of 40 day old stage as the ideal stage for harvesting winged bean for "green pea" production.

Galactose (27.03-34.46%) appears to be the major sugar component in non-starch polysaccharide of the five varieites of mature winged bean seedsanalysed, indicating that the polysaccharide to be a galactan. Presence of small amounts of arabinose indicates that a certain amount of galactans to be present in the form of arabinogalactan. A minute proportion of arabinose would have come from hemicellulose as well.

Glucose (14.09-26.36%) assumed to be derived from cellulose come next to galactose. Xylose which may have come from hemicellulose and cellulose was found in small amounts (2.73-4.02%). Considerable amounts of uronic acid (6.62-7.92%) indicated the presence of pectin.

The isolated non-starch polysaccharide fraction had very low solubility (9.16-14.65%) in water when subjected to ordinary cooking temperatures. The low solubility in water may be a reflection of the complex nature of the polysaccharide as well as the type of bonding exhibited by them with other molecules such as protein, lignin and minerals.