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A Preliminary Study on Alpha Amylase Inhibitor in Black Gram (*Phaseolus Mungo*)

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On worldwide basis legumes make an important contribution to human nutrition. Many plants including legumes are known to have naturally occurring enzyme inhibitors. From a nutritional point of view one of the important enzyme inhibitor is alpha amylase inhibitor, which affects the activity of alpha amylase resulting in underutilization of starch. However, this may prove to be beneficial to diabetic patients. This study was undertaken to detect the presence and to quantitate the alpha amylase inhibitor in black gram.

Black gram seeds (variety MI-1) were soaked overnight and extracts were prepared by using 0.02 M phosphate buffer pH 6.9 containing 0.3 M sodium chloride. The extracts were pre-incubated with properly diluted human saliva for 30 and 45 minutes and alpha amylase activity measurement was carried out.

Experiments revealed the presence of the amylase inhibitor in the aqueous extract. The highest concentration of the inhibitor under the optimum assay condition was found to be 113 IU/gram of protein. Black gram thus contains less amylase inhibitor compared to kidney beans (268 IU/gram; Jaffe *et al.*, 1973)

Using a fixed volume (1 ml) of 1:50 dilution of the saliva but increasing the volume of extract from 0.05 to 0.5 ml, resulted in lesser amount of inhibition of amylase with extract volume higher than 0.1 ml. Maximum inhibition was observed when the ratio between 1:50 diluted saliva to black gram seed extract was 10:1 when the pre-incubation period was 30 minutes. When the inhibitor concentration is expressed in IU/gram of fresh seed, the highest value of 28.6 IU was observed when the ratio was 20:1.

The extent of inhibition of amylase was dependent on the time of interaction between the inhibitor and enzyme. Pre-incubation of the inhibitor with amylase for a period of 45 minutes resulted in undetectable level of inhibition. This may be due to the dissociation of enzyme-inhibitor complex during prolonged pre-incubation.

Te effect of amylase inhibitor present in black gram should be proved by conducting studies under different conditions which prevail in digestive system and during food processing.

References:

1. Jaffe, W.G., Moreno, R. and Wallis, V (1973). Amylase inhibitor in legume seeds. *Nutr. Rep. Int.*, 7:169–174.