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Quantification of kunitz trypsin inhibitor in soybean through densitometry

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Recently, in India, soy-based products are gaining special attention. Government agencies look up to soy-based products as an economical food to combat malnutrition; sports-persons seek them as source for muscles/stamina build-up and health practitioners prescribe them to keep breast cancer, diabetes, cardiovascular diseases at bay. However, high level of anti-nutritional factor trypsin inhibitor in soybean seeds, used as raw material for soy-based products, necessitates the complete inactivation of kunitz trypsin inhibitor (KTI), which sometimes left active due to faulty processing. Of the 2 polypeptides of trypsin inhibitor, KTI polypeptide is the major component of trypsin inhibitor activity. The polypeptide bowman-birk factor is known for its anticancer properties. At present, soy products manufactured in India are from the varieties containing variable amount of KTI. Standard spectrophotometric method given by Hammerstrand *et al.* (1981) is for the estimation of total trypsin inhibitor only and does not distinguish KTI from total trypsin inhibitor activity. Moreover, because of the heat stable nature of bowman-birk factor, it is very difficult to find whether the residual trypsin inhibitor in processed food is because of KTI or bowman-birk factor. Furthermore, this method is cumbersome, as to determine the correct value of trypsin inhibitor suitable dilution is to be made to obtain 40-60% trypsin inhibition. In the present investigation, the protocol for estimation of KTI in soybean seeds through densitometry was standardized. KTI polypeptide was quantified after PAGE profiling of seed protein. Through this method variability for KTI in Indian/exotic genotypes is being assessed and the residual level of KTI in processed soy products also determined.