UREASE AND TRYPSIN INHIBITOR ACTIVITY IN SOYBEANS AS AFFECTED BY EXTRUSION

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The potential nutritional value of whole soybeans is limited by naturally occuring anti-nutritional factors. The most important of these is the trypsin inhibitor which is heat labile and is known to interfere with protein digestion. Soybeans also contain the heat labile enzyme urease. Urease activity can readily be determined and is frequently used to indicate adequacy of processing.

This paper describes the destruction of urease and of trypsin inhibitor (AOCS, 1982) in whole soybeans as a result of 'Insta-Pro' extrusion. Temperature (121°C - 171°C) and time exposed to temperature (14 sec's - 42 sec's) are multiplied and presented as 'heat sums'. The moisture content of soybeans used in this study was approximately 9%.

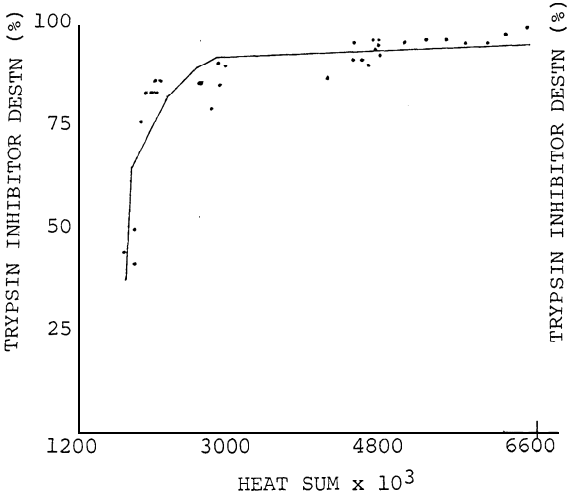

Fig. 1 Percent destruction of trypsin inhibitor with increasing heat sum

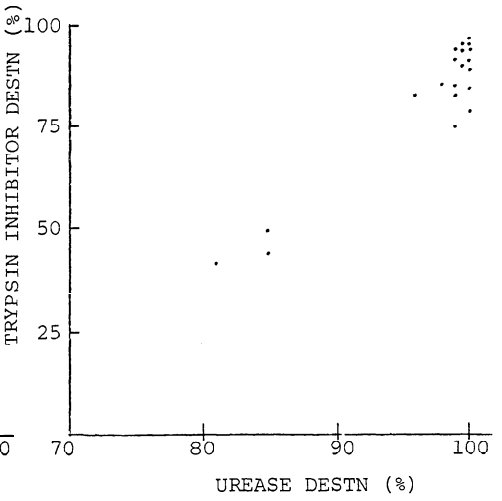

Fig. 2 Percent urease destruction versus percent trypsin inhibitor destruction

The function describing the curve in Fig. 1 is $y = 92.7\,(1-0.03979^{(HS-1.532)})$ where HS is Heat Sum and y is percent trypsin inhibitor destruction ($R^2 = 0.94$). The precision of the curvature coefficient (0.03979) was low due to the lack of points in the range of steepest change. No attempt was made to quantify the relationship shown in Fig. 2 due to the bi-polar scatter of points. However, it appears that destruction of urease is correlated with the destruction of trypsin inhibitor.

Changes in the soybean moisture content may influence the relationship between heat sum and trypsin destruction. However, for the soybeans used here, temperature and time exposed to that temperature (ie. heat sum) can be used to determine trypsin inhibitor destruction. More data is required to quantify the relationship between urease and trypsin inhibitor destruction.

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