

## **Using of Microwave Treatment in Soybean Processing.**

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It is known that soybeans contain some special enzyme, such as urease or proteolytic enzyme inhibitors. High temperature heat treatment is necessary to inactivate these enzymes. But such treatment results in protein denaturation, following by decreasing of feed and food value of soy proteins. Using of mild conditions for heat treatment of soybean is a main purpose of soybean processing especially for the production of food protein.

In our research we have investigated the influence of microwave pretreatment on the quality and quantity of oil from soybean and on the activity of urease and trypsin inhibitors. We have used crushing of soybeans, moistening to 15 % fluidity, microwave treatment during 10-20 minutes and oil extraction on the screw press.

We have shown that using of microwave treatment of soybeans instead of traditional heating resulted in increasing of oil yield by 7 %. Moreover such oil had better quality, peroxide value was essentially lower (0.86 mM  $\frac{1}{2}$  O/kg ) by comparison with 2.89 mM  $\frac{1}{2}$  O/kg in a control.

We suggested that the reason of peroxide content decreasing is the reduction of microwave heating time relatively to the traditional heating. Probably the effect of such treatment on the quantity of oil from soybean is owing to high rate of heating in this case. In addition such heating have even distribution on whole volume of treated material.

Moreover we have detected that inactivation time for the urease and trypsin inhibitors was essentially lower under microwave heating, so 20 minutes was enough for about 92 % inactivation of urease and 100 % activity lost of trypsin inhibitors. In the same time it is known that additional heating treatment of soybean cake is necessary for urease inactivation according to traditional procedure.

We also have a previous data about decrease of solvent oil extraction time after microwave pretreatment of soybeans and that such treatment prevents increasing of insoluble protein in soy flour.