ผลงานตีพิมพ์จากโครงการวิจัย

ส่วนหนึ่งของผลงานวิจัยในโครงการวิจัยนี้ได้นำไปเผยแพร่ในงาน The 25th Annual Meeting of the Thai Society for Biotechnology and International Conference ที่จัดขึ้นในวันที่ 16-19 ตุลาคม 2556 ณ. กรุงเทพมหานคร ประเทศไทย ในชื่อหัวข้อการนำเสนอ “Influence of Hydrothermal Pre-treatment on Dehulling Efficiency of Soybeans”

The 25th Annual Meeting of the Thai Society for Biotechnology and International Conference

O-04-013

Influence of Hydrothermal Pre-treatment on Dehulling Efficiency of Soybeans

Wanida Chareemuy, Chairath Tangduangdee* and Chotika Viriyarattanasak

ABSTRACT

This study investigated the effects of steaming and drying conditions on dehulling efficiency of soybean. Soybeans were exposed to steaming at 100ºC for four different time (0, 5, 10, and 15 minutes) prior to hot-air drying process at four different drying temperatures (60, 100, 130, and 160ºC) to obtain the final moisture content of approximately 6.38%, dry basis (db). Then, the samples were immediately dehulled by a dehuller (Mincer®). After dehulling, the whole soybeans were separated into four parts, i.e. cotyledon, hull, undehulled, and fines, and dehulling efficiency was evaluated in terms of their mass fractions. The result showed that the moisture content of no-steamed sample was 13.21±0.22% (db), while the moisture content of steamed samples was 17.83±0.60, 18.08±0.54, and 18.15±0.43% (db) for steaming of 5, 10, and 15 minutes, respectively. Increasing of the moisture contents after steaming had resulted in increasing in drying time at each drying temperature. The results of dehulling presented that steaming prior to drying process improved the dehulling efficiency of soybean from 59 to 87% and 85 to 89% when drying temperature was 60 and 100ºC, respectively. Nevertheless, there was no effect of steaming time on the dehulling efficiency (approximately 89%) for drying temperature of 130 and 160ºC.

Key words: Dehulling efficiency, dying, soybean, steaming

INTRODUCTION

Soybean (*Glycine max* L.) is a good resource of proteins (40%), fat (20%), carbohydrate (35%) (Idowu and Osho, 1998) and other nutrients such as isoflavones which are effective cancer-preventive agents (Friedman and Brandon, 2001). Recently, there are many utilizations of soybean in human diet such as soy flour, soy milk, and etc. Appropriate manufacturing of some soy products, especially soy flour, requires removal of soybean seed coat which contains trypsin inhibitor, which is an antinutritional substance, and insoluble fiber (Sessa and Wolf, 2001; Pisarikova and Zraly, 2010). Many studies have shown that removal of seed coat can improve appearance and quality of grain products; such as, rapeseed oil (Anjou, 1992), and dry bean flours (Deshpande *et al*., 1982). Raji and Famurewa (2008) reported that the dehulled soy flour retained higher nutritive compositions, except for ash and fiber, and gave a better acceptability when comparing with the undehulled samples.

In manufacturing of soy flour, dehulling is generally performed after heating and drying the soybeans to break the hull and separate it from the cotyledon. Nevertheless, pretreatments prior to drying such as moistening or steaming have been shown to loosen the hull and to provide the seed coat can easily be removed in the dehulling step (Ikebudu *et al*., 2000; Mapagalile *et al*., 2008). Mapagalile *et al*. (2008) reported that steaming time of 15 min followed by solar drying for 24 hr resulted in the cotyledon recovery of 85.40% compared to 74.75% for unsteamed Bossier soybeans. Tiwari *et al*. (2010) suggested that hydrothermal pretreatment followed by drying at 50ºC increased the dehulled fraction for pigeon pea. However, prolonged pretreatment times (>20 min) might increase percent fine fraction and

Department of Food Engineering, King Mongkut's University of Technology Thonburi, 126 Phacha U-tid Road, Bangmod, Tungkru, Bangkok 10140, Thailand

* Corresponding author; e-mail: chairath.tan@kmutt.ac.th