World Academy of Science, Engineering and Technology
International Journal of Agricultural and Biosystems Engineering
Vol:12, No:02, 2018

Effect of Ultrasonic Assisted High Pressure Soaking of Soybean on Soymilk Properties

Authors : Rahul Kumar, Pavuluri Srinivasa Rao

Abstract : This study investigates the effect of ultrasound-assisted high pressure (HP) treatment on the soaking characteristic of soybeans and extracted soy milk quality. The soybean (variety) was subjected to sonication (US) at ambient temperature for 15 and 30 min followed by HP treatment in the range of 200-400 MPa for dwell times 5-10 min. The bean samples were also compared with HPP samples (200-400 MPa; 5-10 mins), overnight soaked samples(12-15 h) and thermal treated samples (100°C/30 min) followed by overnight soaking for 12-15 h soaking. Rapid soaking within 40 min was achieved by the combined US-HPP treatment, and it reduced the soaking time by about 25 times in comparison to overnight soaking or thermal treatment followed by soaking. Reducing the soaking time of soybeans is expected to suppress the development of undesirable beany flavor of soy milk developed during normal soaking milk extraction. The optimum moisture uptake by the sonicated-pressure treated soybeans was 60-62% (w.b) similar to that obtained after overnight soaking for 12-15 h or thermal treatment followed by overnight soaking. pH of soy milk was not much affected by the different US-HPP treatments and overnight soaking which centered around the range of 6.6-6.7 much like the normal cow milk. For milk extracted from thermally treated soy samples, pH reduced to 6.2. Total soluble solids were found to be maximum for the normal overnight soaked soy samples, and it was in the range of 10.3-10.6. For the HPP treated soy milk, the TSS reduced to 7.4 while sonication further reduced it to 6.2. TSS was found to be getting reduced with increasing time of ultrasonication. Further reduction in TSS to 2.3 was observed in soy milk produced from thermally treated samples following overnight soaking. Our results conclude that thermally treated beans' milk is less stable and more acidic, soaking is very rapid compared to overnight soaking hence milk productivity can be enhanced with less development of undesirable beany flavor.

Keywords : beany flavor, high pressure processing, high pressure, soybean, soaking, milk, ultrasound, wet basis
Conference Title : ICAFE 2018 : International Conference on Agricultural and Food Engineering
Conference Location : Paris, France
Conference Dates : February 19-20, 2018