

## EFEK GELOMBANG ULTRASONIK TERHADAP SUHU SISTEM PERENDAMAN BIJI DAN KINETIKA PENGERINGAN TEPUNG PATI SORGUM

### INTISARI

Oleh:

**MARISA ULFA VERA**

**19/446806/TP/12609**

Sorgum merupakan salah satu bahan pangan yang dapat menjadi bahan baku tepung *gluten free* sebagai substitusi tepung gandum yang telah banyak dikonsumsi. Penggunaan ultrasonik telah banyak dipelajari untuk diaplikasikan pada beberapa proses pengolahan pangan. Penggunaan ultrasonik mampu memperbaiki kualitas tepung sorgum yang dihasilkan. Oleh karena itu, penelitian ini bertujuan untuk mengkaji respon suhu sistem serta kinetika perubahan sifat fisik yang terjadi pada proses pengolahan biji sorgum yang diberi perlakuan *pretreatment* ultrasonik menjadi tepung. Biji sorgum direndam di dalam larutan asam sitrat 3% lalu di-*treatment* ultrasonik selama 20 menit pada *ultrasound mixer* dengan 4 level amplitudo daya ultrasonik (0%-80%). Kenaikan suhu diamati dan dilihat perubahannya. Perubahan yang terjadi menunjukkan bahwa daya yang semakin tinggi menunjukkan kenaikan suhu yang lebih cepat dan suhu akhir lebih tinggi. Setelah *pretreatment*, biji sorgum didiamkan selama 24 jam pada suhu ruang sebelum kemudian di-*wet mill* dan dikeringkan pada suhu 50°C. Kinetika perubahan kadar air yang terjadi pada tepung sorgum meliputi kinetika laju konstan dan kinetika laju menurun. Konstanta laju pengeringan paling tinggi diperoleh amplitudo daya 65% pada laju pengeringan konstan dan daya 80% pada laju pengeringan menurun. Pada produk tepung sorgum, *pretreatment* daya ultrasonik secara nyata mempengaruhi *whiteness* (64,08-65,39), kadar air (3,70-5,25), dan *hue angle* (79,28-259,60) sedangkan *bulk density*, *tapped density*, dan *chroma* tidak dipengaruhi secara nyata. Perlakuan *pretreatment* terbaik dengan gelombang ultrasonik diperoleh amplitudo daya 65%.

Kata kunci: karakteristik fisik, *ultrasonic mixer*, bebas gluten, penggilingan basah, *whiteness*, laju konstan, laju menurun

## THE EFFECT OF ULTRASONIC WAVES ON SEED IMMERSION SYSTEM TEMPERATURE AND THE DRYING KINETICS OF SORGHUM STARCH FLOUR

### ABSTRACT

By:

**MARISA ULFA VERA**

**19/446806/TP/12609**

*Sorghum is one of the food ingredients that can be used as a raw material for gluten-free flour as a substitute for wheat flour, which has been widely consumed. The use of ultrasonics has been extensively studied for application in various food processing processes. The use of ultrasonics can improve the quality of sorghum flour produced. Therefore, this study aims to assess the temperature response of the system and the kinetics of physical property changes that occur during the processing of sorghum seeds treated with ultrasonic pretreatment to become flour. Sorghum seeds were steeped in a 3% citric acid solution and then subjected to ultrasonic treatment for 20 minutes using an ultrasound mixer with 4 levels of ultrasonic power amplitude (0%-80%). The temperature increase was observed. The results showed that higher power levels resulted in a faster temperature increase and higher final temperatures. After pretreatment, the sorghum seeds were allowed to stand for 24 hours at room temperature before being wet-milled and dried at 50°C. The kinetics of changes in moisture content in sorghum flour consist constant rate and falling rate kinetics. The highest drying rate constant was obtained at a 65% power amplitude for constant drying rate and at a 80% power amplitude for fall drying rate. In the sorghum flour product, ultrasonic pretreatment significantly affected whiteness (64.08-65.39), moisture content (3.70-5.25), and hue angle (79.28-259.60), while bulk density, tapped density, and chroma were not significantly affected. The best pretreatment with ultrasonic waves was achieved at a 65% power amplitude.*

*Keyword: physical properties, ultrasonic mixer, gluten-free, wet mill, whiteness, constan rate, falling rate*