

Malinee Rungsee 2015: Baking of Bread by a Continuous Microwave-Infrared Hybrid Oven. Master of Science (Food Engineering), Major Field: Food Engineering, Department of Food Science and Technology. Thesis Advisor: Mr. Sirichai Songsermpong, Ph.D. 152 pages.

The problems of bread baking in conventional ovens are non-uniformity in color, long warming time, long baking time, high energy consumption and increased hardness during storage. The objective of this research was to use a continuous microwave-infrared system for improving the uniformity in color, reducing baking time and low energy consumption. The microwave and infrared heating was done simultaneously, in which various levels of microwave power (400, 600, 800 W) infrared temperature (140, 160, 180°C) and baking time (3, 4, 5 min) were studied. The effects of microwave-infrared combination baking on quality of breads were studied and compared with conventional baking. The quality parameters such as % weight loss, crust thickness, hardness, color and moisture content were measured. The optimum condition of baking bread from sensory evaluation was 600 watt of microwave power, 160°C infrared temperature, 5 min baking time and internal temperature of bread was more than 80°C. Bread had 7.24 %weight loss , 0.69 mm crust thickness, 9.96 N hardness, 30.11 % moisture content and L\* a\* b\* value were 77.07, 7.59, 31.61 respectively . In conclusion, this new microwave-infrared oven can replace the conventional oven with more uniformity in color, 6.8% shorter baking time and 53.79% lower energy consumption with good quality of bread.

---

Student's signature

---

Thesis Advisor's signature

\_\_\_/\_\_\_/\_\_\_