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Newsha Nourbehesht, Hajar Shekarchizadeh, Nafiseh Soltanizadeh

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Investigation of stability, consistency, and oil oxidation of emulsion filled gel prepared by inulin and rice bran oil using ultrasonic radiation

Newsha Nourbehesht, Hajar Shekarchizadeh[1], Nafiseh Soltanizadeh

Department of Food Science and Technology, College of Agriculture, Isfahan University of Technology, Isfahan, 84156–83111, Iran

Abstract

Inulin, rice bran oil and rosemary essential oil were used to produce high quality emulsion filled gel (EFG) using ultrasonic radiation. Response surface methodology was used to investigate the effects of oil content, inulin content and power of ultrasound on the stability and consistency of prepared EFG. The process conditions were optimized by conducting experiments at five different levels. Second order polynomial response surface equations were developed indicating the effect of variables on EFG stability and consistency. The oil content of 18 %; inulin content of 44.6 %; and power of ultrasound of 256 W were found to be the optimum conditions to achieve the best EFG stability and consistency. Microstructure and rheological properties of prepared EFG were investigated. Oil oxidation as a result of using ultrasonic radiation was also investigated. The increase of oxidation products and the decrease of total phenolic compounds as well as radical scavenging activity of antioxidant compounds showed the damaging effect of ultrasound on the oil quality of EFG.

Keywords: Emulsion filled gel; Inulin; Rice bran oil; Rosemary essential oil; Ultrasound

1. Introduction

Fats play important roles in the creation and enjoyment of many foods by imparting desirable texture and mouthfeel. However, the excessive consumption of fat has been caused health

[1] Corresponding author. Tel.: +98 31 33913369; Fax: +98 31 33913381; E–mail: Shekarchizadeh@cc.iut.ac.ir.