Modelling of extraction parameters of flax-seed oleoresins

Büşra ŞAHİN[1], Çankırı Karatekin University, Faculty of Engineering, Department of Food Engineering, Çankırı /Turkey
Seda ÖZGEN[1] , Çankırı Karatekin University, Faculty of Engineering, Department of Food Engineering, Çankırı /Turkey
*Corresponding Author: sozgen@karatekin.edu.tr

Abstract

In recent years, people have started to take into account of not only the ingredients of the food they consume but also its benefits to human health. Flaxseed which traces its origin back to Mesopotamia since 5000 BC, has been gaining popularity,due to the reports on its health benefits and disease preventive properties. Flaxseed is known contains a variety of constituents. Flaxseed is an important plant source containing beneficial compounds for health besides being rich in α-linolenic acid and good quality protein, flaxseed has potential as a natural source of phytochemicals such as flavonoids, lignans and phenolic acids. Flaxseed is the richest source of phenolic compounds.

Extraction time, temperature and sample/solvent ratio were tested and optimized as a parameter by using response surface methodology.

In this context, Response Surface Methodology (RSM) was used to optimize the extraction system and variable parameters were optimized. The optimization process was repeated in both drying methods. Extraction was carried out in a temperature controlled shaking water bath, and the solvents were removed in rotary evaporator. The design variable points were set at 30, 40 and 50 ° C for temperature, 10, 20 and 30 minute for time, 1: 10, 1:30 and 1:50 for plant material-solvent ratio. The effects of these variable parameters on extraction yield, total extractable carotenoid amount and antiradical activity were investigated. 40 ° C, 20 min., and 1:50 plant material-solvent ratio showed the best performance.The results were evaluated together with 3D graphics and the best extraction conditions were determined.

Thus, extraction conditions were found mathematically and It is provided that the parameters studied can be estimated by regression models depending on the changing factor level.

Keywords: Extraction, response surface methodology, Flax-seed

Image

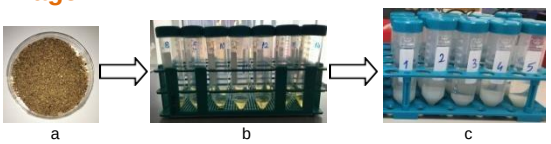


Figure 1: Flaxseed encapsulation steps
a: Lyophilized flaxseed
b: Flaxseed extracts
c: Flaxseed capsules

Recent Publications

1. Poonam R. Bajaj, Kanishka Bhunia, Leslie Kleiner, Helen S. Joyner (Melito), Denise Smith, Girish Ganjyal & Shyam S. Sablani (2017) Improving functional properties of pea protein isolate for microencapsulation of flaxseed oil . Volume 34:2, 218-230.

2. Ewa Domia, Anna Brynda-Kopytowska, Agata Marzec (2017) Functional Properties and Oxidative Stability of Flaxseed Oil Microencapsulated by Spray Drying Using Legume Proteins in Combination with Soluble Fiber or Trehalose. Volume 10:7, 1374–1386.

3. Ankit Goyal, Vivek Sharma, Manvesh Kumar Sihag, Ashish Kumar Singh, Sumit Arora, Latha Sabikhi (2017) Oxidative stability of alpha-linolenic acid (ω-3) in flaxseed oil microcapsules fortified market milk . Volume 70:2, 188-196.

4. Avramenko, N. A., Chang, C., Low, N. H., & Nickerson, M. T. (2016) Encapsulation of flaxseed oil within native and modified lentil protein-based microcapsules. Food Research International 81:17-24.

5. Goyal A, Sharma V, Sihag MK, Arora S, Singh AK, Sabikhi L. (2016) Effect of microencapsulation and spray drying on oxidative stability of flaxseed oil and its release behavior under simulated gastrointestinal conditions. Drying Technol 34:810–821.



Biography

Büşra Şahin, a graduate student and food engineer, was born in Tokat on 15 October 1994. After graduating high school, she studied food engineering in Konya where she studied composition of mother's milk.After finishing the university, she worked as a food engineer at the dormitory for 2 years whilst continuing her master's school. Then, she started her master's degree at Çankırı Karatekin university. continues to work on microencapsulation.

Email:busra1894@hotmail.com