Sevil Cikrikci et al., J Food Process Technol 2015, 6:8
http://dx.doi.org/10.4172/2157-7110.S1.023

OMICS International
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4th International Conference and Exhibition on
Food Processing & Technology
August 10-12, 2015 London, UK

Investigating oil migration in two layer chocolate systems with different hazelnut paste and cream formulations over chocolate layer by using magnetic resonance imaging (MRI) technique

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Oil migration is a common problem in chocolate confectionery products leading to quality defects particularly fat bloom. Although there are so many methods to monitor and quantify migration, Magnetic Resonance Imaging (MRI) is among the most novel technique as being a non-destructive method. The main objective of this study was to quantify oil migration from two different hazelnut pastes (oil percentage as 44% and 38.4%) and one hazelnut cream (oil percentage as 30%) products into one type of dark chocolate layer system stored at 30°C. For this purpose, signal intensity (SI) values of chocolate layers containing migrated oil through hazelnut layers were obtained by using MRI. 2D MR images of samples were acquired in the study. MRI measurement was performed using a turbo spin echo sequence (TSE) with a TR of 800 ms and TE of 13 ms with a 3T system (SIEMENS MAGNETOM Trio, Germany). A single layer of each hazelnut formulation and a single layer of dark chocolate were prepared and analyzed. SI values were obtained as 102.94, 92.96 and 101.9 for two layer systems of hazelnut paste with high oil content (HO), low oil content (LO) and hazelnut cream (HC) samples respectively. The highest SI value among single layer samples was found in single layer of HO sample as 366.27 and the lowest SI result was obtained in single chocolate layer as 57.61. It was shown that MRI has the potential to differentiate different confectionary fillings/coatings based on their migration rates in chocolate systems.

Biography

Sevil Cikrikci has completed her both BS and MS Degree at Middle East Technical University Food Engineering Department. Currently, she has been studying PhD at METU and she is also a Research Assistant.

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