

# Study Regarding the Use of *Salvia Officinalis* Essential Oil in Food Products with a High Fat Content (Mayonnaise)

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## Abstract

In the last years, through the emerging technologies for food processing, new ways are proposed for replacing the synthetic antioxidants with natural occurring compounds extracted from plants and which exert a high antioxidant activity. Therefore, the aim of the present study was to assess the addition of *Salvia officinalis* essential oil and its impact on the physicochemical characteristics of homemade mayonnaise. The product was monitored for four months in order to highlight the possible physicochemical changes, by determining the peroxide, the free fatty acids and the pH values. During storage, the pH of all investigated samples, except mayonnaise sample containing 2 µl/g of sage essential oil, slightly increased. The peroxid values for all samples increased during storage period and were higher than the one obtained for the control sample. Also, an increase in the free fatty acids content was noticed for all studied samples. Following the results obtained it can be stated that *Salvia officinalis* essential oil could be useful to control the development of rancidity and to maintain the quality and extend the shelf life of mayonnaise.

**Keywords:** *essential oil, mayonnaise, Salvia officinalis.*

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**Introduction.** Antioxidants introduced in foodstuffs can retard the reaction of oxygen reactive species (e.g. free radicals) with biomolecules and thus maintaining the nutritional values and physiological properties of the products. Nowadays there is an increasing trend in food industry to replace the synthetic antioxidants with natural ones (Rasmy *et al.*, 2012). *Salvia officinalis* is one of the most widespread herbal species, being a rich source of antioxidants that can be used in the food-processing industry (Jantova *et al.*, 2014).

**Aims.** Due to the increasing interest in finding natural alternatives for synthetic antioxidants, the aim of the present study was to assess the addition of *Salvia officinalis* essential oil on the

physicochemical characteristics of homemade mayonnaise during its storage.

**Materials and methods.** The sage leaves were collected in June 2015 from the green-house of Phytotechny Department of UASVM. The essential oil (EO) was extracted by hydro-distillation. Five experimental samples of mayonnaise were prepared, according to a formula suggested by Rasmy *et al.*, 2012. Salt (1.26 g), mustard (2.20 g) and white pepper (0.32 g) were mixed with fresh whole egg (22.17 g), vinegar (0.63 g) and lemon juice (2.20 g) using blender on low velocity for 5 sec (this mixture is the aqueous phase). The sunflower oil (70.0 g) was slowly added to the system during the first 30 sec. The EO of *Salvia*

**Tab.1.** Physicochemical characteristics of mayonnaise samples containing different concentrations of *Salvia officinalis* essential oil (EOs)

Physicochemical characteristics	Period of storage	EOs				
		Blank	Control (BHT)	2 $\mu$ L	4 $\mu$ L	8 $\mu$ L
<i>pH value</i>	0 month	4,69	4,69	4,69	4,69	4,69
	2 month	4,74	4,74	4,73	4,68	4,65
	3 month	4,76	4,66	4,67	4,64	4,66
	4 month	4,84	4,72	4,68	4,78	4,70
<i>Peroxid value (%)</i>	0 month	0,07	0,15	0,15	0,26	0,22
	1 month	0,24	0,19	0,13	0,21	0,30
	2 month	0,38	0,38	0,25	0,30	0,31
	3 month	0,57	0,38	0,35	0,52	0,47
	4 month	1,18	0,79	0,91	0,55	0,97
<i>Free fatty acids content (%)</i>	0 month	1,38	1,11	1,12	0,83	0,83
	1 month	1,39	1,11	1,11	1,40	1,11
	2 month	1,39	1,11	1,67	1,40	1,11
	3 month	1,68	1,95	1,67	1,39	1,11
	4 month	3,40	3,08	3,05	2,52	2,83

*officinalis* was added to the aqueous phase in different concentrations, 2  $\mu$ L, 4  $\mu$ L and 8  $\mu$ L per g of mayonnaise. For comparison, BHT (4.3  $\mu$ g) was added to a control sample. All samples were placed in sterile glass food containers and stored in a refrigerator until further analysis. The pH values of mayonnaise samples were measured using a laboratory pH meter. Briefly, ten grams of food sample was mixed with 100 mL of distilled water and homogenized. After that, the electrode was immersed in the sample and the pH was read. For the determination of peroxide value and the free fatty acids, the titrimetric method was used (Tofană and Mureșan, 2012).

**Results and Discussions.** Results of the physicochemical characteristic of mayonnaise samples during storage for four months are given in Table 1. The pH values for all investigated samples except mayonnaise sample containing 2  $\mu$ L/g of sage essential oil increased slightly. The peroxid value and the free fatty acids, for all samples, including the control samples increased as storage period increased. During storage period all of the quality parameters comply with the limits stipulated by

STAS. These results are also consistent with those of Rasmy *et al.*, 2012.

**Conclusion.** The study demonstrated that the mayonnaise samples in which the EO was added retained their integrity throughout the storage period. *Salvia officinalis* EO could be useful to control the development of rancidity and to maintain the quality and extend the shelf life of mayonnaise.

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