

## CHARACTERISTICS AND FATTY ACID COMPOSITIONS OF *Rhus coriaria* CULTIVARS FROM SOUTHEAST TURKEY

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*Rhus coriaria* L., commonly known as sumac (also spelled sumach), grows wild in the region extending from the Canary Island over the Mediterranean coastline to Iran and Afghanistan. It is native to the Mediterranean and southeast Anatolian region of Turkey [1, 2]. The name is derived from "sumaga", meaning red in Syriac [3]. The name sumac is given also to the commercial preparation of the dried and ground leaves of the Sicilian or tanners sumac (*Rhus coriaria*) of Southern Europe, long used in making leather [4]. The spice, produced by grinding the dried fruit with salt, is used as a condiment and sprinkled over kebabs and grilled meat as well as over the salad often accompanying these dishes [5–8]. There were different studies conducted on various sumac such as mineral content and antimicrobial and antioxidant effects [9–16], but a study on the oil of sumac has not been previously reported. Sumac oil might be a good product for the food industry to use in salad and meals, especially when it is mixed with olive oil, and also seeds of sumac might be used in the different oil industries in the world.

The objective of this study was the preliminary investigation of fatty acid composition and proximate composition of different sumac cultivars grown in the region of southeast Turkey.

Four different cultivars of sumac samples were obtained from native producers in southeast Anatolia (Birecik, Darende, Kahramanmaraş, Sanliurfa). The oil was extracted from the samples using cold ether extraction. For chemical analysis, each group of sumac was homogenized and then analyzed to determine moisture, oil, and protein using standard methods [17]. Fatty acid (FA) compositions of the oils were determined by preparing methyl esters of the FA [18]. The gas chromatography equipment used was a Shimadzu GC 40 A (Shimadzu, Kyoto, Japan) fitted with a 2.1 m spiral steel (SS) column of inner diameter 3.2 mm.

The total oil, protein, moisture, and ash contents of the sumac ranged from 10.00 to 15.00 %, 3.36 to 3.74 %, 6.35 to 8.32 %, and 2.82 to 3.32 %, respectively (Table 1). The protein content of *Rhus copallina* was 6.3 % in the literature [19]. As seen from Table 1, the oleic acid contents of the oils ranged from 34.00 to 40.35 % while the linoleic and linolenic acid contents ranged from 33.31 to 35.83 % and 1.53 to 2.99 %, respectively. However, the palmitic acid content changed between 20.75 % and 25.60 %. In this study, it was seen that the major fatty acids in the sumac were oleic ( $C_{18:1}$ ), linoleic ( $C_{18:2}$ ), and palmitic ( $C_{16:0}$ ) acids. The polyunsaturated fatty acid contents (18:2 + 18:3) of the total fatty acids ranged from 34.84 to 37.36 %. Storage capabilities were also dependent on the polyunsaturated fatty acid level because polyunsaturated fatty acids are more susceptible to oxidative degradation [20–22]. As sumac oil contains a lower polyunsaturated fatty acid content, it can probably be stored over a long time and contribute to the shelf life of the olive oil. McNeil et al. [23] pointed out that the consumer taste preference for certain cultivars varied from year to year. Especially, a mixture of sumac and olive oil may be a new product for different salad formulations and fast foods.

Finally, the results indicate that some of the cultivars of sumac grown at southeast Anatolia are different from each other in terms of individual fatty acids. Since research on sumac oil is very limited in the literature, we suggest that further research should be conducted on it and its chemical properties.

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TABLE 1. Proximate Composition and Fatty Acid Composition of the Sumac from Southeast Turkey, %

Varieties of sumac	Oil	Protein	Moisture	Ash	14:0	16:0	18:0	18:1	18:2	18:3
Birecik	10.00	3.36	8.32	2.82	0.30	25.60	2.54	34.00	35.83	1.53
Darende	12.00	3.58	7.73	3.32	0.20	20.75	4.04	40.15	33.70	1.14
K. Maras	15.00	3.74	6.35	2.95	0.25	24.59	2.80	35.73	33.31	2.99
S. Urfa	13.00	3.44	7.78	3.13	Tr.	21.60	3.13	40.35	34.91	-*

Values represent means of duplicate values [dry weight].

\*Not detected.

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