ORIGINAL CONTRIBUTIONS

THE CHEMICAL COMPOSITION OF THE BITONTO TYPE OF ITALIAN OLIVE OIL

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An investigation of the composition of olive oil expressed from Mission olives grown in California has already been reported.[1] Since then the composition of the Bitonto type Italian olive oil has been determined in order to compare the compositions of two samples of oil expressed from different types of olives grown in two widely separated parts of the world.

Chemical and Physical Characteristics.—The more important chemical and physical characteristics of the Italian oil are recorded in Table 1. The results for the California oil are also given and a comparison shows that the differences are small. The most important differences are in the percentages of saturated and unsaturated acids. The Italian oil contains 2% more saturated acid and a correspondingly smaller percentage of unsaturated acid than the California oil.

Table 1

	Italian oil	California oil
Specific gravity 25/25°	0.9120	0.9119
Refractive index 20°	1.4690	1.4690
Acid value	1.8	1.5
Iodine number (Hanus)	84.4	85.1
Saponification value	190.8	190.6
Unsaponifiable matter (per cent)	1.1	1.0
Acetyl value	7.0	11.2
Saturated acids (determined) iodine no. 7.9 (per cent)	11.9	....
Unsaturated acids plus unsaponifiable matter (determined) (per cent)	83.4	....
Iodine number of unsaturated acids	94.2	....
Saturated acids (corrected) (per cent)	10.9	8.9
Unsaturated acids (corrected) (per cent)	83.3	85.2

Unsaturated Acids.—The iodine number of the unsaturated acids fraction was 94.2 which indicated that this fraction consisted of oleic acid (iodine number 90.1) and linolic acid (iodine number 181.4). Using these data the following percentages were calculated:

	%	In original oil %	Glycerides in original oil %
Oleic acid	95.51	79.56	83.1
Linolic acid	4.49	3.74	3.9
	100.00	83.30	87.0

[1] This Journal, **2**, 40 (1925).

Saturated Acids.—The methyl esters of the saturated acids were prepared and fractionally distilled under diminished pressure as described in the article on California olive oil. The fractions were analyzed and their compositions calculated from the analytical data as described in the previous article. The following percentages of saturated acids were found to be present:

	%	In original oil %	Glycerides in original oil %
Myristic acid	0.04	trace	trace
Palmitic acid	80.87	8.81	9.2
Stearic acid	17.28	1.88	2.0
Arachidic acid	1.81	0.20	0.2
	100.00	10.89	11.4

Arachidic, stearic and palmitic acids were isolated from various fractions by crystallization from alcohol and their identity established by the melting points and by observing whether or not these melting points were lowered when the substances were mixed with equal amounts of the respective acids which they were suspected of being and the purity of which had been established previously by elementary analysis. It was not possible to isolate pure myristic acid but a small crop of crystals was obtained which melted at 57–58°C. It is believed that this crop consisted of a mixture of myristic acid (m. p. 54°C.) and palmitic acid (m. p. 63°C.).

Summary

The chemical composition of Bitonto type of Italian olive oil has been determined and is given below. For comparison the composition of California olive oil expressed from Mission olives is also given:

		Italian olive oil Bitonto type	California olive oil from Mission olives
Glycerides of	Oleic	83.1	84.4
	Linolic	3.9	4.6
	Myristic	trace	trace
	Palmitic	9.2	6.9
	Stearic	2.0	2.3
	Arachidic	0.2	0.1
Unsaponifiable matter		1.1	1.0

It will be observed that the Italian oil contains 2.1% more of the saturated acid glycerides than the California oil. The widest difference is in the percentages of palmitic acid glycerides. The California oil contains 2% more of the unsaturated acid glycerides.

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