Ref. Ares(2025)7477681 - 09/09/2025

SPECIFICATION

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1. Name of the product

‘Milas Çekişke Zeytini’

2. Description of the agricultural product or foodstuff

‘Milas Çekişke Zeytini’ is a greenish-yellow, plump table olive obtained from olive trees of the Memecik variety in the Milas region. The ‘Milas Çekişke Zeytini’ can be served flavoured with Milas Zeytinyağı, lemon, and lemon juice. The products used for flavouring are specific to the geographical area. Some physicochemical parameters associated with ‘Milas Çekişke Zeytini’ are provided in Table 1 and Table 2.

It presents the chemical, phenolic and sensory characteristics of Milas Çekişke Zeytini as a comprehensive technical profile. Total antioxidants were measured in the range of 530.15–535.17 mg TE/100 g, and total phenolic compounds were determined to be 152.22–154.16 mg GAE/100 g; these values indicate a high phenolic/antioxidant value that supports oxidative stability. When examining the fatty acid composition, oleic acid is found at 65.13–66.25%, linoleic acid at 11.31–13.1%, and linolenic acid at 0.83–0.89%; this profile indicates that the high OA content is consistent with a mild fruity taste and good shelf life. Other fatty acid types, such as palmitoleic, arachidic, and behenic acids, are present in the ranges of 1.15–1.31%, 0.40–0.45%, and 0.11–0.15%, respectively. Fruit size is 200–250 per kilogram, ensuring consistent processing performance and efficiency. Volatile components are prominently highlighted in Table 2. 4-Ethylphenol shows a concentration of approximately 20%, while Phenylethyl alcohol is approximately 9.3% and 3-Hexen-1-ol is in the range of approximately 12.8–13.5%; these notes shape the fruity, floral and slightly spicy character of the olive.

Consequently, Milas Çekişke Zeytini, with its high antioxidant and phenolic content, supports oxidative stability, while its fatty acid balance and rich volatile profile make it a

strong product in terms of sensory characteristics. It provides a solid foundation for industrial applications targeting functional foods and shelf life optimisation.

Table 1. Some physicochemical parameters of ‘Milas Çekişke Zeytini’

Parameter	Value
Total Antioxidant	530.15 - 535.17 mg TE / 100 g
Total Phenolic Compounds	152.22 - 154.16 mg GAE / 100 g
Fruit Size (Per kg)	200 - 250 pieces / kg
Linoleic Acid (C18:2)	11.31 - 13.1 %
Oleic Acid (C18:1)	65.13 - 66.25 %
Palmitoleic Acid (C16:1)	1.15 - 1.31%
Linolenic Acid (C18:3)	0.83 - 0.89 %
Arachidic Acid (C20:0)	0.40 - 0.45%
Heptadecenoic Acid (C17:1)	0.9 - 0.12%
Behenic Acid (C22:0)	0.11 - 0.15 %

Table 2. Volatile compound profile of ‘Milas Çekişke Zeytini’

Parameter	Value (%)
Octane	6.23 - 6.51
2-Butanol	3.25 - 3.60
Acetic Acid, Hexyl Ester	2.89 - 3.18
3-Hexen-1-ol	12.83 - 13.50
1-Hexanol	7.00 - 7.37
4-Hexen-1-ol	5.67 - 5.90
3-Octanol	0.45 - 1.00
Acetic Acid	5.35 - 5.88
2-Hexanol, 3-Methyl	2.00 - 2.54
2-Hepten-1-ol	0.63 - 0.84
Benzaldehyde	0.73 - 0.92
4-Nitrophthalamide	1.16 - 1.46
Copane	1.57 - 1.78
1-Octanol	0.92 - 1.10
2,3-Butanediol	0.65 - 0.86
Benzene-Methyl	0.35 - 0.64
4-Undecene, 5-methyl-, (Z)	0.42 - 0.73
Hexanoic Acid	0.67 - 0.89
(1R, 2R)-1-Methanol-2-acetonitrile-4-cyclohexene	4.03 - 4.23
Phenol, 2-Methoxy	1.29 - 1.50
Pentanoic Acid	1.00 - 1.18
Benzenemethanol	3.78 - 3.99
Phenylethyl Alcohol	9.31 - 9.43

2-Methoxy-4-methylphenol	4.25 - 4.46
4-Ethylphenol	20.16 - 20.38
Nonanoic Acid	0.33 - 0.53
Hexadecanoic Acid	0.14 - 0.35

3. Definition of the geographical area

The protected area refers to all the villages and towns under the municipality of Milas in the province of Muğla, located in southern Aegean region.

4. Proof of origin

The use of Memecik type olives for Milas Çekişke Zeytini and the processes from production to labelling provide a step-by-step, measurable framework that can be implemented through control stages.

First, verification and target definition are carried out: geographical and genetic verification reports, regional registrations and necessary documents are examined to ensure that the product is produced from Memecik type olives and that this definition is accurately reflected on the labels.

Next, genetic/environmental suitability and raw material sourcing are evaluated; it is verified that only olives harvested from Memecik trees on slopes and mountainous areas are used; physical records and field checks document that no harvesting takes place in plains or flat areas.

During the collection area and methodology checks, it is ensured that the collection time is consistent with standard seasons, that collection batches are labelled with region-specific markings, and that independent counting and numbering are applied.

In the fertilisation and agricultural application standards section, only the use of synthetic fertilisers and the recording of related application protocols are required; types, quantities and times must be documented; appropriate measures are taken to prevent environmental impacts, and organic/conventional classification documents are audited for compliance.

The record-keeping and reliability step ensures that all processes are recorded digitally and physically and archived with version control. Periodic internal audits are conducted with internal auditing and third-party verification.

5. Description of the method of obtaining the agricultural product or foodstuff

The olives to be used to make ‘Milas Çekişke Zeytini’ are collected one by one by hand in the period between September and the first half of October, while the Memecik olives are still green and not fully ripe. Olive grains that are not of sufficient size and are deformed are removed from the collected olive grains. Then the olive grains are cracked with the help of a fist-sized stone or a hammer. Olive seeds should not be crushed during the cracking

process. The cracking process should be performed in a way that only fleshy parts of the olive grains are cracked. During the cracking process, care should be taken not to separate the fleshy parts of the olive grains from the seed.

The cracked olives are placed in glass, PET or PVC containers that comply with the Turkish Food Codex. Spring water or ordinary water that has been purified from chlorine by boiling is filled into the container in an amount to cover the olive grains, and the cap of the container is closed. After a week, the water in the container is poured out and spring water or dechlorinated water is added again. This water changing process is then performed every three days and continues for two weeks. In this way, the bitterness of the olive grains is removed (debittering). No chemical sweeteners or additives can be used in the debittering process of olive grains.

After the final water change, the water of the olives, which were subjected to debittering process, is not changed again. The olive grains in the water in which they were placed after final water changing can be stored in a suitable environment without losing their properties for three months.

Storage conditions and packaging:

The containers and olive jars containing debittered olives should be stored in cool environments that are not exposed direct sunlight, moisture-free and mold-free, and not exceed 18°C.

6. Link

‘Milas Çekişke Zeytini’ is a table olive produced from the unripe green-yellow olives of the Memecik variety, which are harvested from the Milas region, crushed, and then matured in brine. Milas is located in the northwestern part of Muğla province, in the Menteşe region, characterized by narrow and deep valleys between the Ilbıra Mountain to the west and the Akçay basin to the east, with limestone soils. The limited agricultural areas and the hilly terrain of the district provide a suitable environment for olive cultivation. Olive farming in Milas has naturally evolved into an agricultural activity due to the region's favorable natural conditions.

The district experiences typical Mediterranean climate characteristics. Olive trees require temperatures of 15-20°C during the flowering period, 15-20°C during fruit ripening, and at least 5°C from ripening to harvest. Additionally, a specific cold period is necessary for flower bud formation. Olive trees are very sensitive to low temperatures and can be damaged if daily minimum temperatures drop below -7°C. In Milas' olive groves, the average daily temperatures in December, January, and February are 9.9°C, 8.9°C, and 9.5°C, respectively, providing nearly optimal conditions for olive tree growth and allowing for high yields.

The ripeness levels of the Memecik variety olives used in the production of Milas Yağlı Zeytini and ‘Milas Çekişke Zeytini’ differ, resulting in different products concerning organoleptic factors such as aroma and taste developed during brining. Additionally, the crushing process contributes to reducing the bitterness of ‘Milas Çekişke Zeytini’ in brine

and helps with the formation of aromatic compounds. Because ‘Milas Çekişke Zeytini’ is made from unripe green-yellow olives, it has a high antioxidant content (531.17 mg TE / 100 g), which is positively influenced by the crushing process applied during production. This process also optimizes the phenolic content (153.22 mg GAE / 100 g) and fatty acid composition (oleic acid (C18:1): 66.13 % and linoleic acid (C18:2): 12.31 %) during the brining phase. The olives are hand-picked and crushed in a way not to damage the seeds to remove the bitterness with water that does not contain chlorine, and then prepared as brined olives rich in oleic acid and antioxidant content (66.13 % and 531.17 mg TE / 100 g, respectively). For many years, Milas Çekişke Zeytini has been an integral part of Milas, where the Memecik variety is harvested early while still green and processed using traditional methods, resulting in a unique product.

Milas has been a preferred living area throughout history. The rock paintings found along the shores of Bafa Lake, north of Milas, date back to the 6th millennium BC. Stone axes dating back to the 5th millennium BC have been discovered in Beçin, located 5 km south of the Milas town center. For thousands of years, the primary food sources for the people living in Milas have consistently been olives and olive oil. Archaeological excavations in the 26 ancient city ruins in the region have uncovered olive oil extraction tools, stone olive crushing stones, and presses, documenting a rich tradition of olive and olive oil culture in the area. The thousands of years of tradition and cultural accumulation in olive and olive oil production add unique value to Milas.

During the production process of crushing, the bitterness of ‘Milas Çekişke Zeytini’ is reduced, its flavour is enhanced due to its ability to easily absorb brine, and its texture softens. The cracking process of olive grains should be done within one day after collection, before the olive grains lose their vitality.

Today, the people of Milas continue to produce olives and olive oil with their millennia of experience and cultural heritage. ‘Milas Çekişke Zeytini’ is also a product of this rich cultural history. Before the new harvest season begins and as the olives from the previous year are still being consumed and stored, the first product presented on the table for those yearning for olives is ‘Milas Çekişke Zeytini’. For this reason, as soon as the olives begin to ripen, all olive producers in Milas eagerly and festively handpick the green olives. Subsequently, family members participate in the process of crushing the olives one by one. Sometimes neighbours also join in the olive crushing process within the family. Together, they prepare a sufficient quantity of olives to meet their needs and for sale in the market until the other varieties of olives mature. Families in Milas without olive trees purchase green olives from local traditional markets to prepare their own ‘Milas Çekişke Zeytini’. The preparation of ‘Milas Çekişke Zeytini’ is a product of communal effort and is conducted in a festive atmosphere.

7. Name and address of the authorities or bodies verifying compliance with the provision of the specification [Article 11/*R.510*]

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