

Article

Technology of Oil Extraction from Grape Seed and Its Application in the Food Industry

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Abstract: In this article, oil extraction from fruit seeds in our republic indicators and recommendations for efficient use of waste generated after extracting grape fruit juice. In addition, after extracting the juice of the grape fruit, effectively using the generated waste, redirecting it to processing to obtain a secondary raw material product, and obtaining grape oil from the grape seeds contained in this waste, and the chemical composition of the obtained oil is presented.

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Keywords: linoleic, linolenic and arachidonic acids (vitamin F), vitamin E, D, A, carotene (provitamin A), phosphatides, sterols, grape seed, grape seed waste, grape skin, i, grape stalks, lipids, protein.

1. Introduction

It is known that PQ-4118 of the President of the Republic of Uzbekistan dated January 16, 2019 "On additional measures for the further development of the oil industry and the introduction of market mechanisms in the management of the sector" "Uzyogmoysanoat" association was established by decision no. It is defined in the decision in connection with the execution of tasks, the strategy for the development of the oil industry in 2019-2025 and medium- and long-term programs were developed. [1-7].

Fats are of great importance in the national economy, because they are the main component of food along with carbohydrates and proteins. The nutritional power of fat is 2-2.5 times greater than that of carbohydrates and proteins. Fats contain linoleic, linolenic and arachidonic acids (vitamin F), vitamins E, D, A, carotene (provitamin A), phosphatides, sterols [8-12].

According to the characteristics of solubility in a number of organic solvents in the human, animal and plant organism, the presence of aliphatic or alicyclic high molecular acids and correspondingly alcohols and carbohydrates, and the properties of great effects on the body. there are many substances belonging to the group. Fatty

substances belonging to this group are called lipids. However, such a definition given to lipids cannot fully reveal their properties. Therefore, lipids are divided into two main groups - simple and complex lipids. Lipids belonging to each group are divided into several groups according to their chemical structure.[13-15].

The most common substances belonging to the group of lipids in nature are oils and fats. Despite the complexity of the structure of oils, the main part of it form triacylglycerides, which are esters of glycerol and high molecular fatty acids. Taste, smell and coloring substances, vitamins, enzymes and some chemical compounds are important in plant and animal physiology.

Recently, sterols, tocopherols, essential fatty acids are made from lipophilic substances in oils, and medicines are produced from them (gossypol, sterols, tocopherols, carotenoids, perfume cosmetics, shampoos). Rare phospholipid sterols in oil are of great interest.

Accumulation of fat in the body plays the role of a reserve when sick or malnourished. Since fats are high in calories compared to carbohydrates and proteins, they are stored in the body as a reserve (fats- $37,6 \cdot 10^6$ dj/kg, carbohydrates- $16,7 \cdot 10^6$ dj/kg, proteins $18,8 \cdot 10^6$ dj/kg). Vitamin F or essential acids (linoleic, linolenic, aranchid) included in triglycerides are physiologically active.

Also, in order to increase the volume of exports, projects are being implemented for the production of exportable medicinal oils from the seeds of fruit seeds and citrus fruits.

In this scientific research, we also planned to develop the technology of obtaining oil from local grape seeds by cold press method and using it in the food industry.

2. Methods

It was determined that 25% of grape seed, 50% grape skin, and 25% grape stalks were present in the waste produced after grape juice extraction. The waste produced after the fruit is pressed makes up 20-23% of the processed grapes. It is not possible to store this waste for a long time, during storage, the amount of oil in the seeds of grapes decreases, the process of fermentation begins in the waste itself, and it has a bad effect on the environment due to fermentation bacteria.

3. Results

Therefore, after extracting the juice of the grape fruit, it is necessary to use the resulting waste effectively and direct it to processing to obtain a secondary raw material product. Grape oil is obtained from grape seeds contained in this waste [1].

Table 1. Chemical composition of waste and seeds of grapes from which the fruit has been isolated.

Compounds in waste	Grape seed content,%	Grape seed oil is extracted waste composition,%
Lipids	15-20	5,5-9,0
Protein (Nx6.25)	10-14	7,5
Ash content	2-4	1,5
Water	25-45	15
Carbohydrates are fiber	34-36	7,0
Additives	5-7	–
Phenolic compounds	4-6	–
Nitrogen compounds	4-6,5	–
Fatty acids	1	–

The chemical composition of grapes can be seen from the table, that the juice from which the seed oil is extracted, as well as the amount of lipids, protein, carbohydrates and water contained in grape seeds, as well as additives, phenolic and nitrogenous compounds are only grape seeds. is observed to be in the composition. In the process of extracting the oil from the grape seeds, these compounds are removed together with the oil, in total 0.1-0.2% of the oil may remain. Also, from the results presented in the table, it can be seen that grape seed contains up to 30-4-5 cellulose, and after oil extraction, this indicator is 7-10%. In addition, secondary raw materials contain other organic substances, lignin, hemicellulose, pentoses, pectin substances, resins, and partly oil residues. Today, since the extracted seeds are discarded as waste, it is used as mineral fertilizer or pet food, as well as in the production of activated adsorbent [2].

Grape seeds. Grape seeds are contained in grape pomace, which is a waste product of wine and juice factories. Grape (viiyis) is a perennial plant fruit.

Grape fruit content (%): pod-6.5-10.5; meat part- 87-91; seed-2-5. Tuppa consists of 25% seeds, 50% pods and 25% stalks. Tuppa makes up 20-23% of processed grapes.

Tuppah is poorly stored, the oiliness of the seeds decreases during storage. Therefore, the tuppah should be processed immediately after it is taken. Grape seed oil is extracted from the stem and seeds. The chemical composition of fine seeds is presented in Table 1.

Table 1. Chemical composition of grape tumpas and seeds.

A group of compounds	To the room	Seed
Lipids	5,5-9,0	15-20
Protein (Nx6.25)	7,5	10-14
Cellulose	7,0	35-45
Hills	1,5	1,0-3,5
Additives	–	5-7
Water	up to 50	9-20

The oil obtained from the tuppa is distinguished by high acidity, unsaponifiable lipids and a very dark color. It is used for technical purposes only. High-quality oil, suitable for food purposes, is obtained during the processing of grape seeds separated from the stem in wineries. To do this, tuooa is cleaned of extractive substances, dried to 11-12% moisture and the seeds are separated.

Grape seeds are distinguished by the following characteristics as an oily raw material stands for: high acidity of oils, contamination with mineral impurities. The size of the seed coat (70-75%). Seeds are 4.5-7.0 mm long and 3.0-5.0 mm wide mm, thickness 2.0-3.5mm. the absolute mass of the seeds is 20-21 g, the density of the pile is 500-250 kg/m³.

Defatted seeds are used in the production of activated carbon as a mineral fertilizer.

Fatty acid content of grape seed triacylglycerols (%): C14:01.6-1.7, C16:05.0-13.1; C18:03.8-10.0; C18:1-12,3-24,3; C18:2-55,5-70,6; C18:3-0.6-0.8.

Density of grape oil at 15°C is 909-956 kg/m³, refractive index at 20°C is 1,470-1,480, solidification temperature is -10...-20°C.

The composition of grape seeds is as follows: water-25-45%, carbohydrates-fiber 34-36%, fats 13-20%, phenolic compounds 4-6%, nitrogenous compounds 4-6.5%, ash 2-4 %, fatty acids up to 1%.

The amount of aromatic aldehydes in each 100 g of seeds is as follows: vanillin-1.32 mg, pyrocatechin aldehyde-1.32 mg, cinnamon aldehyde 0.02 mg.

Composition of grape seed:

Grape seeds are slightly firm and easy to chew. They have a clean and slightly bitter taste. The chemical composition of the seeds is diverse, so they are mainly used for medical purposes. Grape seeds are good for health has an effect. Contains a series of connectors:

1. Fatty acids

Linoleic acid is one of the essential fatty acids important for the human body. Human cells use this acid for their physiological functions. Grape seeds have a high concentration of unsaturated fatty acids. With their help, hair loss is prevented and strengthened. Strengthens the dermis layer of the human skin, evens out the skin color and develops. Prevents the development of diseases of the cardiovascular system.

2. *Kletchatka*

Insoluble plant matter coats the core and makes it hard. In the process of digestion, they remove food residues from the intestinal walls and clean them. In order not to damage the mucous membrane, it is advisable to consume grape seed extract.

3. *Organic acids.*

They activate the process of metabolism, i.e. metabolism, improve the formation of bile. They control the secretion of gastric juice and has an antibacterial effect.

4. *Amino acids*

They participate in all processes and types of metabolism. Substances necessary for the body to renew cells and form organ tissues are considered.

5. *Chlorophylls.*

It is a natural antiseptic and has anti-inflammatory and antioxidant properties. Quickly heals microtraumas and cuts on the skin. Restores and renews tissues, improves the external condition of hair and nails.

The chemical composition of grape seed is given in the table below. Substances marked with ** in the table indicate that these components are leading among all berries.

Table 3. The chemical composition of grape seed

<i>Vitamins and vitamin-like substances</i>	100 g product
Vitamin C (ascorbic acid)	6,5 mg
B2 vitamini (riboflavin)**	1,5 mg
Vitamin B9 (folate)	2 mkg
A vitamins	3 mkg
Betta-carotene	39 mkg
Alpha-carotene	1 mkg
Betta-cryptoxanthin	1 mkg
Lycopene	0 mkg
Lyuteint+zeaxanthin	64 mkg
<i>Minerals</i>	100 g product
Ca (calcium)	37 mg
Fe (iron)	0,26 mg
Mg (magnesium)	14 mg

P (phosphorus)	24 mg
K (kaliy)	203 mg
Na (sodium)	1 mg
Zn (sinkum)	0,11 mg
Cu (kuprum)	0,119 mg
Mn (marganes)**	1,973 mg
<i>Basic ingredients</i>	100 g product
Water	84,29 gr
Protein	0,81 gr
Oils	0,47 mg
Ash content	0,5 gr
Carbohydrates	13,93 gr
Common dietary fiber	3,9 gr
Sucrose	0,57 gr
Glucose (dextrose)	3,67 gr
Fructose**	3,92 gr
Lactose	0 gr
Maltose	0 gr

The energy value of 100 g of grapes is as follows:

Total-57 Kkal.

It contains 0.8 g of protein, 0.5 g of fat, 13.9 g of carbohydrates, 84.3 g of water and 0.5 g of ash. Grape seed oil has a very high calorie content. Therefore, if you cook food in this oil, you should not eat them in the afternoon. A small amount of this oil is beneficial.

Grape seed oil in the food industry application:

In cooking. Unrefined green oil of pale yellow color has a pleasant taste and a noticeable nutty smell. Softly delivering the taste and aroma of various dishes (meat, fish, fried or baked vegetables, spaghetti dishes), this oil is used in mayonnaise, sauces, oil extracts from garlic and greens, fondue, as well as , widely used in home canning and marinades for meat, fish or poultry. A few drops of fine grape oil can add a unique aroma

to baked goods and add an unusual taste to the taste of everyday dishes, for example, for porridge and cereals, for mashed potatoes [1].

Grape seed oil is often used in cooking and as a substitute for sunflower or peanut oil. Due to the presence of oleic acid, the oil is resistant to heat ("flash point" is considered to be 216 degrees), so it is excellent for frying or frying meat, vegetables and fish (fries fried in this oil are appetizing) Antioxidative grape oil and also to other vegetable oils (olive, sunflower, flax) is added to [2].

What foods go well with grape seed oil?

The taste of this product is very light, the aroma is delicate, with subtle nutty notes.

Unrefined grape seed oil has a brighter aroma, while refined grape seed oil is suitable for those who do not like the oily taste in salads and frying. The flash point is average, about 216°C, the calorie content of the product is 900 kcal/100 g.

The light and clean taste of grapeseed oil is perfect for the following vegetable and fruit salads.

An ideal flavoring sauce is:

- 1) Arugula, soft cheese, tomato or ripe pear:
- 2) Fresh vegetables and shrimps:
- 3) Bean Vinaigrette.

This oil is delicious together with garlic and fragrant greens, basil, rosemary, and mint. This special sauce can be stored in the refrigerator for one to two weeks and used as an addition to dishes.

Grape seed oil goes well with fish and seafood - it is used for marinating and frying. Marinade for meat or poultry is also a great option. And if you are a householder, the following is also simple and interesting at home you can prepare wonderful dishes from the recipes:

- 1) *Fried rice papi (Chinese cuisine)*. Dry rice should be lightly fried with onions in grape oil, then add mirin or dry wine, wait until it evaporates, add water and simmer over low heat until cooked. Rice is salted and peppered, mixed with grated cheese and butter, cooled, then pomegranate seeds are added and small balls are made. They are dipped in batter and fried in a lot of oil or baked in the oven.
- 2) *Zucchini snack with fragrant greens and cheese*. Zucchini wings are fried in butter with garlic, fragrant greens are sprinkled, and at the end, a slice of cheese is placed on each zucchini wing, the pan is closed with a lid and the cheese is left to melt.
- 3) *Steamed cabbage with kelp (dried seaweed or shredded nori leaves can be used)*. Cabbage with grapeseed oil and butter fried in a mixture, after the cabbage softens, garlic, rosemary, sea herbs and a little rice vinegar are added.

Another field of use of grape seed oil in cooking is baking. Cakes, cakes, waffles and pancakes will be tastier if grape oil is used in cooking. By sprinkling a few drops on the grapes, we preserve their aroma.

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