A Study of The Quality Assessment of Two Varieties of Pomace and Grape Oil of Local Origin

Azizov Miraziz Ravshanbekovich
Tashkent Institute of Chemical Technology, assistant
E-mail: azizovmirazizravsha@gmail.com

Akramova Rano Ramizitdinovna
Tashkent Institute of Chemical Technology,
PhD, professor

Annotation
This article presents research data on determining the amount of oil fatty acids and total lipids of two varieties of grape seeds and (red grapes - "Kabirne and white grapes Buvakiy") growing in the republic, as well as their qualitative chemical composition, in particular, lipid fatty acids. The obtained data were compared with the data of studies conducted on the study of lipids growing on the territory of Uzbekistan. The article presents the results of a quantitative and qualitative analysis of the limits of the use of grape seed oils of local origin.

Keywords: samples of two grapes, as well as the study of grape seed oil, total lipids, neutral lipid, fatty acids, moisture, extraction, thin layer chromatography methods, gas liquid chromatography method.

Introduction
Along with highly productive industrial plants, private and small enterprises are successfully developing. In the world production of oils and fats today, mainly soybean, palm, rapeseed, sunflower, peanut and other oils are used for food purposes. Together they provide about 85% of the production of vegetable oils.
The sown area for cotton has been significantly reduced due to the implementation of the state grain program. In the Republic of Uzbekistan, more than 30-50 thousand tons of various grape varieties are grown annually. Approximately 45 thousand tons of technical grape varieties are used to make wines and cognacs. The resulting grape pomace (approximately 25-30 thousand tons) is practically not used in the republic.
In particular, over the past decade, due to advances in breeding, the cultivation of grape seed oil has increased dramatically as the world's source of vegetable oils.
The problem that has arisen to eliminate the shortage of oilseed raw materials for processing can be solved by finding and subsequent use of non-traditional oilseed raw materials - grape seeds.
Grape seed oil has a fairly high demand on the world market in the food, cosmetic and pharmaceutical industries, as it has a wide range of biological activity.
However, we must not forget about the development trend towards organic cosmetics. Every year the demand for organic cosmetics grows. Many biologically active substances are used in cosmetics, and their number is growing with the speed of finding their application. These include: antioxidants, hydroxyl acids, vitamins, antibacterial, moisturizing agents, sunscreens, phytoestrogens, enzymes, peptides, growth factors, depigmenting agents.

Experimental
It is known that in the process of natural aging and under the influence of UV irradiation, reactive oxygen species are synthesized in human skin, including superoxide, peroxides, and singlet oxygen. Antioxidants prevent reactive oxygen species and free radicals from damaging skin cells and leading to accelerated aging. Sometimes antioxidants are also used to improve the stability of the formulation. Often, more than one antioxidant is introduced into the formulation, some of which provide a protective effect, while others increase the stability of the composition. Various biologically active compounds used in cosmetics: vitamins A, C, E, polyphenols.

In cosmetics, α-hydroxyl acids, β-hydroxyl acids and α-keto acids are commonly used.
Of the polybasic organic acids, grapes contain dicarboxylic acids - oxalic, succinic, fumaric. In addition, grapes contain hydroxy acids - glycolic, lactic, glyceric, gluconic. Among the polybasic hydroxy acids of grapes, tartaric and malic acids occupy the main place [10].
Grapes contain from 2.5 to 6% free and bound in the form of salts of organic acids: 60% malic acid, 40% - tartaric, gluconic, citric, succinic, oxalic. Free organic acids give the berries a sour taste, while bound ones do not affect it. In grape juice, the content of free organic acids of the acid is in the range from 0.2 to 0.6%.
In the course of optically established laboratory work, it was found in the composition of two grapes containing from 2.5 to 6% free and bound in the form of salts of organic acids, including 60% malic acid, 40% - tartaric, gluconic, citric, succinic, oxalic. Organic acids give the berries a sour taste, while related ones do not affect it. Grape juice contains free organic acids ranging from 0.2 to 0.6%.

Chemical composition of grape juice.
Table -1

Components	Mass fraction, %	
	red grapes «cabernet»	white grapes «buvakiy»
Protein	0,6	0,5
Fats	0,6	0,4
Carbohydrates	15,5	12,5
Ash	0,6	0,4
Water	80,4	87,3

Of the fat-soluble vitamins in grapes, there were such as provitamins A - carotene from 0.1 to 0.2 mg, tocopherols - from 0.02 to 0.05 per 100 g of berries.
The protein content in two grapes was no more than 0.4-0.6%. Essential amino acids (lysine, histidine, arginine, methionine, leucine) and nonessential amino acids (cystine, glycine), which are actively involved in metabolism, were found in grape protein.
Vitamin complex of grapes

Table –2

Vitamins	Content, mg	
	red grapes «cabernet»	white grapes «buvakiy»
Vitamin A (retinol)	0,2	0,1
Vitamin B1 (thiamine)	0,05	0,03
Vitamin B2 (riboflavin)	0,02	0,01
Niacin (vitamin B3 or PP)	0,3	0,3
Vitamin B5 (pantothenic acid)	0,18	0,14
Vitamin B6 (pyridoxine)	0,6	0,4
Folic acid (vitamin B9)	4,0	3,2
Vitamin C (ascorbic acid)	6,0	5,4
Biotin (Vitamin H)	4,0 mcg	3,2 mcg
Vitamin K (phylloquinone)	0,5-2,0 mcg	0,3-1,5 mcg
Vitamin P (flavonoids)	45,0 mg	32,0 mg

And also in the seeds of grapes found up to 20% fatty oil (grape oil), tannins, 0.8% lecithin, vanillin, flobafeny.
Grape oil is characterized by a high content of poly- and monounsaturated fatty acids, it also contains tocopherols (vitamin E), carotenoids (vitamin A provitamin), chlorophylls and phenolic compounds, which increase antioxidant, immunostimulating, anti-inflammatory, bactericidal, astringent and wound healing activity. These compounds cannot be synthesized by the human or animal body and can only be obtained from food.

Grapeseed oil is extracted from the seeds in two ways:
- cold pressing
- solvent extraction.

Grape seeds contain from 10 to 20% oil [8, 10], which consists mainly of triglycerides of fatty acids, and is also rich in macro- and microelements.

To determine the fatty acid composition of grape oil, the objects of our study were two types of grape seeds. This:
- red grapes - "Cabarnet" - sample (I);
- white grapes - "Buvaki" - sample (II).

Grape seeds of two types were dried and ground on a laboratory micromill F-306, specially designed for grinding samples of small volumes. Small volume grinding chamber, specially shaped knives, minimal gaps between the blades and the chamber - everything in the F-306 laboratory mill is optimized for high-quality fine grinding of small volume samples, while in larger mills, the grinding efficiency of small portions can be significantly lower due to scattering the sample on the walls of the chamber. Especially effective is the use of the F-306 laboratory mill for grinding samples of agricultural products: wheat, barley, sunflower seeds, in accordance with the requirements of GOST R 53600-2009.

Grape oil, obtained from local grape varieties, has almost identical properties, and in its fatty acid composition is close to sunflower oil.

The cold pressing method is rarely used in practice due to the relatively low yield of the final product, less than 8%, although this method allows it to retain all the necessary biologically active substances (BAS) that determine its useful properties.

For the complete extraction of lipids organic solvents: gasoline, hexane, petroleum ether, acetone, chloroform and other extraction method to obtain grape oil can significantly increase its yield.

The samples of oils obtained by extraction from technical varieties of grape seeds (for example, red and white grapes) processed at the factories of the Republic of Uzbekistan were studied. The highest yield of the lyophilic fraction was achieved with extraction up to 13.1%, and the smallest - with cold pressing up to 6.3%.

Lipids (oil) were isolated from air-dry crushed seeds in a Soxhlet apparatus using extraction gasoline (bp 72-800C). The acid number was determined, and according to this indicator, the content of fatty acids (FA) in them was calculated, as described [Guide to research methods, techno-chemical control and accounting for production in the oil and fat industry, 1, Leningrad, 1967, ss.888, 815].

Physico-chemical parameters are presented in table.1.

Table 3.

Organoleptic and physico-chemical indicators
grape seed oil extraction from local varieties

Name of indicators	Characteristics of oils	
	red grapes «cabernet»	white grapes «buvakiy»
Appearance	transparent, oily liquid purple shade	transparent, oily liquid greenish shade
Smell	Weak fragrance	Weak fragrance
Solubility	Soluble in -chloroform, benzene, acetone, diethyl and petroleum ether;	Soluble in - chloroform, benzene, acetone, diethyl and petroleum ether; - slightly soluble in alcohol 95%;

	- slightly soluble in alcohol 95%; - practically insoluble in water.	- practically insoluble in water.
Density, g/cm^3	0,9218	0,8789
Refractive index	1,4660	1,1256
Acid number, mg KOH/g	2,4	3,01
Iodine number, g I2/100 g	126	126
Essential number, mgKOH/g	181	175
Saponification number, mgKOH/g	178	165
Technological yield, %	13,5	10,8

From the data of Table 1 it can be seen that the physicochemical indication of two samples, where you can see the obtained non-traditional oil from technical grape seeds, corresponds to GOST 21314-75. Also obtained samples of lipids I - II are transparent oily liquids with a slight specific odor.

To determine the composition of fatty acids (FA), the studied samples were hydrolyzed with an alcoholic solution of alkali, and the isolated fatty acids were methylated with freshly prepared diazomethane. FAs in the form of methyl esters were analyzed by GC on an Agilent 6890 N instrument with a flame ionization detector, using a capillary column 30 m x 0.32 mm with a stationary phase HP - 5, carrier gas - helium, programming temperature 150 - 270°C.

The results of the analysis are presented by thin layer chromatography (TLC) of two samples of grape seed oil.

Table 2.

The content of the fatty acid composition of oils of two samples

(wt%)

Name	Name Sample-I	Name Sample-II
Linoleic	74,03	62,01
Oleic	16,63	14,2
Linolenic	5,1	2,1
palmitic	7,49	6,54
Stearic	4,27	4,1
fat (%)		
Saturated fats	12%	9%
Monounsaturated fats	16%	14%
Polyunsaturated fats	70%	63%

If we talk about the chemical composition of grape pomace, it attracts with its rich elements such as antioxidants, carbohydrates, organic acids, phenolic compounds, nitrogenous, mineral and other substances.

The composition of grape pomace includes carbohydrates monosaccharides and polysaccharides. Everyone knows the main representatives of grape monosaccharides - L-arabinose, D-xylose, D-glucose, D fructose. Grape polysaccharides are represented by homo- and heteropolyoses, different in their structure and properties. The composition of soluble polysaccharides includes individual fractions of hemicelluloses, hexosans, polyuronides (arabinogalactan, glucomannan, mannan, glucan). Water-soluble polysaccharides contain pectin substances. Grape berries contain from 0.2 to 1.5% pectin. When grapes ripen, the total amount of polysaccharides, especially hemicelluloses, decreases and the content of the water-soluble fraction in the juice slightly increases.

Conclusion. From the above data, it can be noted that today the current direction in the production of cosmetic creams is their enrichment with biologically active additives of antioxidant action. Including the use of grape oil for food purposes, as well as the widespread use of grape pomace for cosmetic products. The use of grape oil and grape skin extract makes it possible to enrich the cosmetic cream with polyunsaturated fatty acids (linoleic), natural phenolic antioxidants (anthocyanins), vitamin E and fruit

acids. As well as our research, it was possible to establish the composition of lipids and fatty acids. Extraction oil obtained from a local variety of two samples of technical grade grape seeds is characterized by a high content of essential unsaturated fatty acids, tocopherols (vitamin E), carotenoids (vitamin A) and chlorophylls. The results show the promise of use as a food raw material and in the cosmetic industry.

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