

# INVESTIGATION OF THE EFFECT OF SURFACTANTS ON THE FLAVONOIDS EXTRACTION

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**Introduction.** Medicinal plants are a popular source of raw materials for pharmaceuticals. Our attention was attracted by *Vitis vinifera* as the source of flavonoids. Grape (lat *Vitis Vinifera*.) - the kind of perennial bush vines of the Grapes genus of the Grape family. *Vitis vinifera* grows in temperate and subtropical regions, it is widely cultivated in many countries all over the world. Grapes grow on a trellis normally. The fruit is juicy berries with different colors and shapes. Berries are gathered in clusters, ripen in late August – September. Wine takes foremost among the grapes products. The consumption of ripe berries increases metabolism and tones the body. Folk medicine advises to use decoction of dried grapes with a small amount of impurities onions to treat cough and hoarse singers and lecturers. Grape leaves are used to treat hypertension. Powder of dried leaves is good to stop bleeding. Prom in boiling water, winepress fresh grape leaves is applied to purulent wounds, venous ulcers and bedsores. With grape marc are also taken grape seed oil, which has proved to be an effective antioxidant due to its high content of vitamin E.

Grape leaves are used less, but contain a lot of biologically active substances. *Vitis vinifera* leaves are a rich source of vitamins A, B<sub>6</sub> and C, manganese, magnesium, iron, calcium, fiber, niacin, riboflavin, flavonoids and other substances.

To get the flavonoids from the grape leaves the extraction methods must be applied. Maceration and percolation are often used methods as the most simple. They do not require complex technological equipment. Maceration can be used in small pharmaceutical enterprises or pharmacies. For extraction of flavonoids alcohol at a concentration of 40-70% is used as extractant.

To intensify the process of extraction different methods are used. Advanced equipment, grinding materials, new extractants, the effect of pulsation, vibration, hydrodynamic conditions, the addition of surfactant are used. Among these methods the addition of surfactants is interesting because this method does not require replacement of existing equipment and technology. Surfactants increase the solubility of substances and reduce the surface tension and thus accelerate the process of extraction. Widely known surfactants is sodium lauryl sulfate, Tween-20, Tween-80. Sodium lauryl sulfate is an anionic surfactant, Tween-20, Tween-80 are a non-ionic surfactant.

**Aim.** The aim of this study is to investigate the effect of surfactants on the flavonoids extraction from *vitis vinifera* leaves.

**Materials and methods.** The first step was to prepare a sample extract from the vitis vinifera leaves. Sample of 10 g of crushed grape leaves was extracted with 100 ml of 40% ethanol by appropriate method (maceration). For other samples 40% ethanol with the addition of surfactants were used as extractant. We used 0.1% of sodium lauryl sulfate, 0.01% sodium lauryl sulfate, 0.1% Tween-20, 0.01% Tween-20, 0.1% Tween-80%, 0.01% Tween-80. Ready extract was poured into measuring flask 100 ml and the volume was adjusted to the mark. That was the solution A.

1 ml of solution A, 1 ml of aluminum chloride were transferred in measuring flask 25 ml. Amount of solution was adjusted to mark by 5% solution of acetic acid in 95% alcohol. After 30 minutes, the optical density of the solution in a spectrophotometer at a wavelength from of 390 to 430 nm in the cell with a layer thickness of 10 mm was measured . As the reference solution using a solution consisting of 1 ml of extract, 5% solution of acetic acid in 95% alcohol brought to the mark in a volumetric flask 25 ml.

Parallel optical density of state standard sample routine was measured, which was prepared as follows. In the volumetric flask 25 ml 0.25 ml of state standard sample routine solution was transferred. Amount of solution was adjusted to mark by 5% solution of acetic acid in 95% alcohol. As the reference solution using a solution consisting of 0.25 ml of extract, 5% solution of acetic acid in 95% alcohol brought to the mark in a volumetric flask 25 ml.

The content of the amount of flavonoids in terms of routine and absolutely dry raw material as a percentage calculated by the general formula.

**Results and discussion.** Solution extract using 40% ethanol has a maximum absorption at a wavelength of 404-405 nm. Solutions extract using 40% ethanol and surfactants have a maximum absorption at a wavelength of 406-408 nm. So spectrometric method can be used to quantify flavonoids in alcohol extracts and alcohol extracts containing surfactants.

The results determine the quantitative content of flavonoids in extracts show that using surfactants solution amount of flavonoids in extracts increased. The solution of 0.1% sodium lauryl sulfate and 0.1% Tween-20 showed the best results. The number of flavonoids increased in 1.68 times. The use of other samples increases amounts of flavonoids in 1.41-1.48 times.

**Conclusions.** Thus found that the use of surfactants does not prevent spectrophotometric determination of flavonoids. So spectrometric method can be used to quantify flavonoids in alcohol extracts and alcohol extracts containing surfactants. By using vitis vinifera leaves as example it was shown that surfactants increased amounts of flavonoids extracted from medicinal plants. 0.1% sodium lauryl sulfate and 0.1% Tween-20 in 40% ethanol can be used as extractants to increase yield of flavonoids.