

**RESEARCH OF PHENOLIC COMPOUNDS OF DRY EXTRACT  
MADE FROM WASTES OF SALVIA OFFICINALIS LEAVES  
OBTAINED AFTER INITIAL ETHYL ACETATE EXTRACTION**

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Nowadays a wide range of different herbal medicines is represented on the pharmaceutical market. The greatest part of their production requires a large quantity of medicinal plants. In addition manufacturing technology of these medicines doesn't include the allocation of the maximum number of biologically active compounds (BAC), so the inefficient use of medicinal herbs becomes evident. That's why complex processing of medicinal plants is considered as the main direction to solve this relevant problem.

There are 38 medicines that contain biologically active compounds extracted from *Salvia officinalis* species at the Ukrainian pharmaceutical market. They include the essential oil and the tincture.

For example, our pharmaceutical industry has previously produced medicine «Salvin». «Salvin» was notable due to its important anti-inflammatory and antimicrobial properties. But acetone was needed for its production technology. And nowadays acetone belongs to the precursors.

According to the previous researches ethyl acetate can substitute acetone in order to obtain new medicine from the leaves of *Salvia officinalis* similar to «Salvin». But there is still the significant number of phenolic BAC in wastes that remains after the ethyl acetate extraction. That's why further studying of its chemical composition is reasonable in order to create new medicines by using the complex processing method.

To obtain the dry extract wastes of *Salvia officinalis* leaves, which remain after previous ethyl acetate extraction, were poured with purified water (1:5 ratio). The mixture was heated in a water heater and then infused during one day. The extraction was performed twice. At the next stage the extract was purified by settling, and then it was filtered and evaporated in the vacuum spray machine. In such way 12-15% yield was achieved.

To establish the qualitative composition of the obtained dry extract qualitative reactions, paper (HRP) and thin-layer chromatography (TLC) were used as generally accepted research methods.

In order to determine hydroxycinnamic acids the ethyl acetate fraction of the investigated extract was used. It was chromatographed on paper with standard hydroxycinnamic acids samples in the following systems: I – n-butanol-acetic acid-water (4:1:2) and II – 15% acetic acid. The resulted chromatogram was then treated with ammonia vapor and diazoreagent.

Flavonoid compounds was discovered by HRP and TLC methods with standard flavonoid samples in the following organic solvents: n-butanol-acetic acid-water (4:1:2); chloroform-acetic acid-water (13:6:2); chloroform-methanol (9: 1). The presence of this compounds group was determined by their fluorescence in UV light before and after next chromatogram treatment: ammonia vapor, 1% aluminum chloride alcoholic solution.

Therefore amino acids, sugars, hydroxycinnamic acids, flavonoids and tannins were discovered in the resulted extract. Caffeic, ferulic and chlorogenic acids were identified among hydroxycinnamic acids. And apigenin as well as luteolin 7-O-glucoside were found out among flavonoids.

Quantitative determination of hydroxycinnamic acid derivatives, flavonoids, polyphenolic compounds was performed using spectrophotometric method. Optical density was measured in cuvette with a 10 mm layer thickness at spectrophotometer Specol 1500 (Switzerland) at the appropriate wavelength. The amount of hydroxycinnamic acids derivatives was determined at 327 nm (calculated as chlorogenic acid). The flavonoids amount (calculated as routine) was confirmed at a 417 nm wavelength after a complex with aluminum chloride formation. Also the amount of phenolic compounds (calculated as gallic acid) was found out at 270 nm wavelength.

All experiments were repeated at least five times for statistical significance.

As a result, it was discovered that the dry extract from the *Salvia officinalis* leaves obtained by the complex processing contains such amounts of BAC: hydroxycinnamic acids – 5.5%, flavonoids – 6.61%, phenolic compounds – 32.49%.

Thus, our research demonstrated significant prospects of the complex processing of *Salvia officinalis* leaves in order to obtain new anti-inflammatory and antimicrobial herbal medicines similar to «Salvin». Such complex processing not only helps to solve the problem of medicinal herbs misuse, but also considerably improves the production technology of the herbal medicines.

The experimentally discovered data will be the basement for further standardization of *Salvia officinalis* dry extract obtained using the complex processing.