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COMPARATIVE ANALYSIS OF CONTENT AND RADICAL SCAVENGING CAPACITY OF PHENOLIC COMPOUNDS FROM BLACK AND WHITE PEPPER, *PIPER NIGRUM* L. AND PIMENT PEPPER, *PIMENTA DIOICA* L.

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Phenolic compounds are product of secondary metabolism of plants. There are the increasing interests for phenolic compounds in food today as they have free radical scavenging abilities, antimutagenic and anticancerogenic activities. In this paper the content and radical scavenging capacity of phenolic compounds from black (*Piper nigrum* L., mature, non-decorticated fruit), white (*Piper nigrum* L., mature, decorticated fruit) and piment (*Pimenta dioica* L., crude, non-decorticated fruit) pepper were examined. The samples were bought in local store in Leskovac, Serbia, originally from Vietnam. Plant extracts were prepared by using 80% (v/v) ethanol and total phenolic content was determined by spectrometric method on a standard curve prepared by chlorogenic acid solution concentration ranged from 50-500 $\mu\text{mol}/\text{dm}^3$ ($\text{PC} = (A_{280} - 0.1083)/4.89 \times 10^{-4}$). The free radical scavenging abilities was determined by DPPH radical method measuring the Ab value at 518 nm on a VARIAN UV-Vis Cary-100 spectrophotometer. The extract yield was 17.3, 13.9 and 39.17% and the phenolic content was 64.3%, 70.6% and 46.56 mg chlorogenic acid per g of investigated samples, respectively. The highest maximal achieved scavenging capacity had piment (94.5%) and the lowest white pepper (84.5%), while for black pepper this value was 85.5%. The EC_{50} values which represent concentrations of investigated extracts that causes a decrease in the initial DPPH concentration by 50%, were 0.36, 0.23 and 0.62 mg of chlorogenic acid per ml of extract, for black, white and piment pepper, respectively. As lower EC_{50} value indicates higher antioxidant capacity, the obtained EC_{50} values for investigated samples show the best antioxidant activity had piment pepper, which had the highest extract yield, too.

Keywords: phenolic compounds, content, antioxidative activity, pepper.

**CHEMICAL COMPOSITION OF ESSENTIAL OIL FROM SAGE, *SALVIA OFFICINALIS* L.,
OBTAINED BY DIFFERENT DISTILLATION TECHNIQUES**

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Chemical composition of the essential oils of sage (*Salvia officinalis* L.) has been investigated by GC-MS technique. Three ways of distillation by Clevenger were used for their obtaining, such as: I - classical hydrodistillation (CD), II - the 800W microwave hydrodistillation (MWD) and III - solvent free microwave distillation at 800W (SFMWD). The oils were distilled from dried (for CD and MWD) and fresh (for SFMWD) herb (10.7 and 69.5% moisture, respectively). The duration of conventional distillation amounted to 150 min. (I), while using the microwave the time was shortened to 75 min. (II) and 64 min. (III).

The number of registered components in essential oils was 44, 39 and 33, identified as 38, 37 and 31 components (CD, MWD and SFMWD, respectively). As a characteristic component of the essential oil of sage, α -thujone is mostly present in CD oil (19.1%). Slightly lower content (18.8%) was found in the oil SFMWD, while the lowest content (18.0%) was observed in the sample MWD. As for β -thujone, the most of it has been found in the sample MWD (2.4%), and then in CD (2.3%) and SFMWD (2.1%). Depending on the technique of distillation, camphor content also varies from 2.9% (MWD), to 2.5% (CD), ie. 2.4% (SFMWD). Within the sample MWD the content of the α -pinene, camphene, β -pinene, 1,8-cineole, linalool, β -thujone, and camphor prevailed. The oil SFMWD is characterized by a high content of limonene, borneol, α -humulene, (*E*)-caryophyllene, γ -muurolene, δ -cadinene, caryophyllene oxide, viridiflorol.

The highest content of monoterpenic hydrocarbons was identified in the oil MWD (17.3%), followed by oils CD (17.2%) and SFMWD (13.8%). It is similar with oxidized monoterpenes as well (56.3%, 48.3% and 41.1%, respectively). Sesquiterpenic hydrocarbons dominate in oil SFMWD (29.9%), followed by CD (20,5%) and MWD (17.9%). Similarly, the content of oxidized sesquiterpenes is the largest in the sample SFMWD (10.5%), followed by the CD (8.4%) and MWD (6.1%). The content of diterpenes (only manool) is the largest in the sample CD (4.2%), followed by SFMWD (4.2%) and MWD (1.6%).

The above results indicate that the content of certain compounds in the essential oil of sage depends on the chosen technique of distillation.

Keywords: *Salvia officinalis*, microwave, distillation, chemical composition.