ANTIOXIDANT ACTIVITY OF VARIOUS SPECIES OF LILAC (SYRINGA) BARK EXTRACTS

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A comparative study of the antioxidant activity of extracts of lilac bark of various species was carried out. The dependences of the fluorescence fluorescein intensity on the logarithm of the concentration of lilac bark extracts were obtained, from which IC50 values were graphically determined. Samples of lilac bark extracts showed high antioxidant activity. They restored the fluorescence of fluorescein to 88–100 % at a low concentration of samples of 0,1–1 %, which corresponds to a dilution of the original extract in 100-1000 times. The highest antioxidant activity (Amax = 100 %) was shown by the Beijing lilac and broadleaf. The minimum IC50 was found in Zvegintsov's lilacs.

Keywords: antioxidant activity, bark extracts of various types of lilac.

Excessive concentration of free radicals in the body is a central risk factor for cardiovascular, oncological diseases and other pathologies [1]. Flavonoids have strong antioxidant properties and can be used to prevent various diseases. The biologically active substances that make up the lilac bark determine their pharmacological properties, which allows them to be used as a raw material source for the pharmacological industry. Extracts of lilac bark contain sirengin and other phenolic and glycosidic compounds, in particular, phenylpropanoid compounds such as acteoside and echinacoside [2].

A comparative study of antioxidant activity (AOA) of 7 different types of lilac bark was carried out. The method for determining AOA with respect to activated oxygen species (ROS) is based on measuring the fluorescence intensity of the oxidizable compound and its decrease under the influence of ROS. In the present work, fluorescein with a high extinction coefficient and close to 1 quantum yield of fluorescence was used to detect free radicals [3]. Free radicals were generated using the Fenton system, in which hydroxyl radicals are formed during the interaction of the iron complex (Fe^{2+}) with ethylenediaminetetraacetic acid (EDTA) and hydrogen peroxide [4]. When fluorescein interacts with free radicals, its fluorescence is quenched, which can be restored by adding substances exhibiting antioxidant properties to the system.

The highest AOA (Amax = 100 %) was shown by Peking lilac and broadleaf. The minimum IC50 was found in Zvegintsov's lilac – $0.001 \cdot 10^{-4}$. The IC50 values obtained for extracts of the Himalayan lilac bark ($0{,}214 \cdot 10^{-4}$ %) and Amur ($1{,}29 \cdot 10^{-4}$%) are 214 and 1290 times higher than the corresponding index of the Zvegintsov lilac bark extract. A sample of lilac fluffy extract showed the lowest AOA, restoring fluorescence of fluorescein to 88% at a concentration of 0,1 %. Its IC50 has a maximum value ($3{,}39 \cdot 10^{-4}$ %), which indicates the lowest antioxidant activity.

Broadleaf lilac contains the maximum amount of phenylpropanoid compounds such as syringin, olivyl glucoside, oleuropein and ligstroside, and Himalayan lilac contains hydroxy tyrosyl hexoside, pinoresinol glucoside, olivyl glucoside and oleuropein. Samples of extracts of these types of lilacs showed high AOA. However, a clear relationship between AOA and the quantitative content of phenylpropanoid compounds was not obtained.

BIBLIOGRAPHY

1. *Wang, J. L.* Chemical constituents from seed crust of Syringa oblate / J. L. Wang [et al.] // Chin. Tradit. Herbal. Drugs. – 2010. – Vol. 41. – P. 598–601.
2. *Kurkin, V. A.* Phenylpropanoids from medicinal plants: distribution, classification, structural analysis, and biological activity / V. A. Kurkin // Chem. Nat. Compd. – 2003. – Vol. 39. – P. 123–53.
3. *Deng, R. X.* Chemical constituents from Syringa pubescens Turcz / R. X. Deng [et al.] // Biochem. Syst. Ecol. – 2010. – Vol. 38. – P. 813–5.
4. *Machida, K.* Two new phenolic glycosides from Syringa reticulate / K. Machida [et al.] // J. Nat. Med. – 2009. – Vol. 63. – P. 192–194.