ANTIOXIDANT ACTIVITY OF HEXAHYDROQUINOLONES

A. Dankova, E. Tarun, A. Pyrko

Belarusian State University, ISEI BSU,
Minsk, Republic of Belarus
demure-m@ya.ru

Comparative characteristics of the antioxidant properties of five different structures held hexahydroquinolones conducted. The dependence of the fluorescence intensity of fluorescein from the logarithm of the concentration of hexahydroquinolones, of which graphically determined indicators IC_{50}.

Keywords: antioxidant activity, hexahydroquinolones, fluorescein.

The development of chemistry of non-aromatic nitrogen-containing heterocycles is essential to generate analogues of natural compounds with specific biological activity and play a unique role in living systems. Nitrogen-containing heterocycles are one of the main classes of compounds used for research and selection of new drugs with a wide range of physiological activity. Among the compounds of the hexahydroquinolones class, substances showing cardiovascular, hepatoprotective, antioxidant, antidiabetic, antiulcer, antituberculosis, antibacterial, antiviral activity have been found [1].

In the present work, a comparative characteristic of the antioxidant properties of 5 hexahydroquinolones of different structure was made: 2,7,7-trimethyl-4-propyl-3-carboethoxy-hexahydroquinolone-5 (HQ I), 2,7,7-trimethyl-4-benzyl-3-carboethoxy-hexahydroquinolone-5 (HQ II), 2,7,7-trimethyl-4-(2'-methoxyphenyl)-3-carboethoxy-hexahydroquinolone-5 (HQ III), 2,7,7-trimethyl-4-(3', 4'-dimethoxyphenyl)-3-carboethoxy-hexahydroquinolone-5 (HQ IV), 2-methyl-4-(2'-methoxyphenyl)-3,6-dicarboethoxy-7-(2'-thioethylpropyl)-hexahydroquinolone-5 (HQ V).

The method for determining the antioxidant activity (AOA) relative to the active forms of oxygen (AFO) is based on measuring the fluorescence intensity of oxidizable compounds and its decrease under the influence of the AFO. In the present work for the detection of free radicals used a fluorescein. The generation of free radicals was carried out using Fenton system, which produces hydroxyl radicals by the interaction of iron complex (Fe^{2+}) with ethylenediaminetetraacetic acid (EDTA) and hydrogen peroxide [2; 3].

The study of inhibition of reactions of the free radicals generated in the Fenton system the obtained dependences of the fluorescence intensity of fluorescein from the logarithm of concentration of all samples hexahydroquinoline. Studies were carried out in a wide range of concentrations of 10^{-12}–10^{-3} M. Depending on the structure, hexahydroquinolones began to show AOA in the concentration range of 10^{-12}–10^{-8} M. Subsequent increase in the concentration hexahydroquinoline an increase in the suppression of free radicals and the increase of fluorescence of fluorescein. The test samples restored the fluorescein fluorescence to 76–94 % (A_{max}) at the concentration of 10^{-4} M (Table 1). Graphically, IC_{50} values were determined - the concentration of hexahydroquinolones, at which 50 % of free radical inhibition is achieved. These indicators varied in the range 0,32–5,5·10^{-7} M (Table 1).

Table 1

Indicators of antioxidant activity of hexahydroquinolones.

Sample name	A_{max}, %	C_{max}, M	$IC_{50}\cdot10^{-7}$, M
HQ IV	94	10^{-4}	0,32
HQ V	82	10^{-4}	1,62
HQ III	76	10^{-4}	4,17
HQ I	92	10^{-4}	4,22
HQ II	93	10^{-4}	5,5

Evaluating indicators of A_{max} and IC_{50} can be concluded about hexahydroquinoline high inhibitory abilities against free radicals. A comparative study of the antioxidant activity of hexahydroquinolones of five different structures showed that AOA depends on the presence of ester groups, such as methoxy groups and carboethoxy groups, in the structure of these compounds, as well as their number and location relative to each other.

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