Thematic Section: Physicochemical Research. **Full Paper**
Subsection: Physical Chemistry. *Reference Object Identifier* – ROI: jbc-02/16-47-9-79
Publication is available for discussion in the framework of the on-line Internet conference "*Butlerov readings*".
http://butlerov.com/readings/
Submitted on November 30, 2016.

Thematic course: Influence of infrared radiation on antioxidant activity of plant raw material and structured water adsorbed inside. Part 3.

Features of structured water in alfalfa samples

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Keywords: total antioxidant activity, alfalfa leaves and stems, water extracts, adsorbed structured water in alfalfa samples.

Abstract

The total antioxidant activity (TAA) of water extracts of 10 samples, which are dried leaves and stems of perennial legume grass purple alfalfa (*Medicago sativa* L.), as well as of adsorbed structured water containing inside these samples has been investigated. All samples were cultivated under the same conditions in Republic of North Ossetia-Alania. Considering dried alfalfa leaves, maximal TAA was determined for 'Tyan-Shansky' variety (it is equal of 3.70 g rutin), and minimal one – for 'Osetinsky' variety, namely 2.71g rutin (per 100 g of absolute dry sample). TAA of dried alfalfa stems is by 35.41-29.24% (relative) less than one of leaves, it is 3.70g rutin per 100g for 'Osetinsky' variety, and minimal one is 1.21 g rutin for 'Pastbishhnaya' variety. TAA of water adsorbed during final drying of alfalfa leaves and stems, which were cut and dried by air and shade method, were calculated. The final drying and measuring were realized at the temperature of 105 °C using moisture detector MX-50 (Japan). Antioxidant properties, exceeding such properties of distilled water (control) in the range from 2147 times ('Pastbishhnaya' alfalfa) to 19299 times ('Tyan-Shansky' variety) for leaves and from 1446 times ('Pastbishhnaya' alfalfa) to 14516 times ('Manychskaya' alfalfa) for stems were revealed. Oxidative properties of water inside leaves, exceeding such level of distilled water by 2428 times were determined for 'Pastbishhnaya' alfalfa, and by 3319 times for 'Kizlyarskaya' alfalfa, for water inside stems – by 1592 times for 'Sparta' variety, and by 2443 times for 'Kizlyarskaya' alfalfa. TAA alterations at t 105 ºC can be used as indicative parameter of thermal stability of plant raw material, in this particular case – leaves and stems of different alfalfa varieties. The best TAA stability was detected for 'Kizlyarskaya' alfalfa variety both for leaves and for stems. Maximum TAA losses were determined for 'Osetinsky' variety, namely 36% for leaves, and for 'Manychskaya' variety – 45% for stems.