

NEW ASPECTS OF QUALITY EVALUATION OF VEGETATIVE FOODSTUFFS

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Antioxidant activity is a new aspect of quality of vegetative foodstuffs and food raw materials. Unbalanced feed evoke economic consequences – decline of labor productivity, increase in expenses of national public health services. It is known, that about 30% of expenses of national public health services in Europe cause by the illnesses connected with worthless diet. Free radicals add much to the progress of various diseases: ischemia, glaucoma, defeats of lungs, blood diseases, arising of tumours, as so as malignant. Antioxidants are capable to reduce amount of free radicals and to protect macromolecules in living cells. The mane sources of antioxidants for human organism are vegetables, fruit and other foodstuffs made of vegetative raw materials. Organization of proper antioxidant diet allows protecting human being from free radicals.

Keywords: quality control, foodstuffs, antioxidant activity, vine, beer, fruit, vegetables, express methods.

To provide the mankind with foodstuffs according to physiological standards is still an actual problem. A feed from infancy till last days affects human organism. Food substances convert in human body and define its health, health of its posterity, and influence on the age of life. For this reasons the quality of food is one of the major factors, which define human health.

Scientific opinions on a role of food substances in metabolism have been formed in the middle of XIX century. Considerable amount of information about the significance of biological macromolecules, vitamins and inorganic ions for functioning of organism has been saved up at that time. A little bit later, in the beginning of XX century, the theory of the balanced feed was formed.

The diet of the modern person is based on knowledge about physiological norms for energy, for basic nutrients, for macro- and microelements. An unbalanced feed, both insufficient, and abundant, can cause illnesses. It is known, that excessive diet is one of the reasons of obesity and cardiovascular diseases. Lack of iodine causes not only dysfunction of a thyroid gland, but also delay of mental development, which could be avoided. Iron-deficient anemia slows down intellectual development of children and raises risk of diseases and death of pregnant women.

Unbalanced feed evoke economic consequences – decline of labor productivity, increase in expenses of national public health

services. It is considered, that about 30% of expenses of national public health services in Europe cause by the illnesses connected with worthless diet [1].

Now it is known, that free radicals add much to the progress of various diseases: ischemia, glaucoma, defeats of lungs, blood diseases, arising of tumours, as so as malignant [2]. Abundance of free radicals in human organism formed due to various reasons. There are adverse ecology, xenobiotics, taken with food, smoking, and even psychological stress.

The substances, capable to reduce amount of free radicals and to protect macromolecules in cells, named antioxidants (AO). The mane source of antioxidants for human organism are vegetables, fruit and other foodstuff made of vegetative raw materials or specially created biologically active additives. The urgency of the above-listed reasons has led to high necessity of an evaluation of integrated antioxidant properties of these products. It's clear, that organization of proper antioxidant diet demand the elaboration of simple and cheap methods for the analysis of integrated antioxidant properties of products.

In Ural state university of economics the new method of research integrated antioxidant activity has been developed [3]. With the use of this method the broad audience of vegetative foodstuffs has been analyzed [4]. Results of this research leded to conclusion, that the parameter of antioxidant activity

(AOA) can be used for quality evaluation of food.

Fruit and vegetables contain a considerable amount of substances, which provide

AOA. In figure 1 results of AOA measurement of industrial and fresh juices of vegetables and fruit are presented.

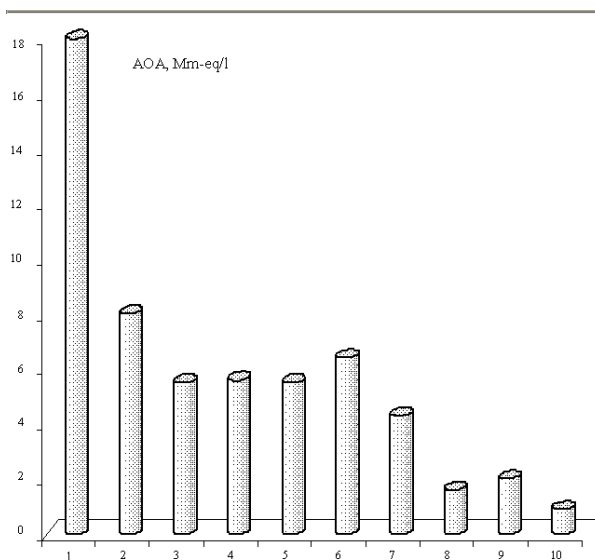


Fig. 1. AOA of fruit and vegetable juices*

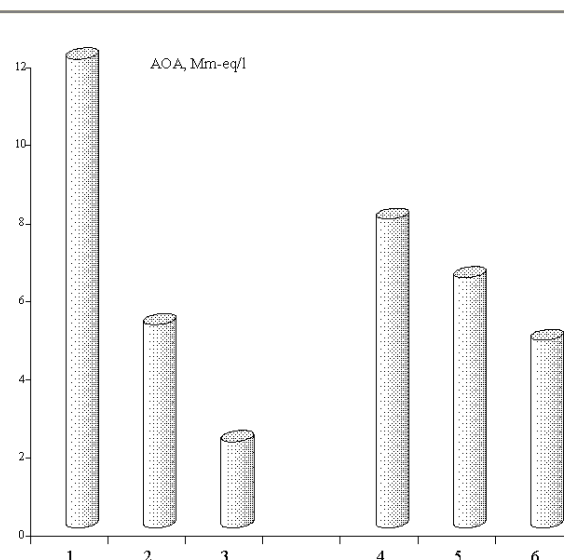


Fig. 2. AOA of tea**

* Fresh juices: 1 – black currant, 3 – Nefhelum lappaceum, 4 – kohlrabi, 5 – sweet pepper, 6 – oranges. Juices of industrial manufacturing: 2 – black currant; 7, 8 – orange; 9, 10 – tomato.

** Black tea – 1, 2, 3. Green tea – 4, 5, 6. Tea bags – 3, 6.

The highest values AOA have been found in fresh juices of a black currant, Nefhelum lappaceum, oranges, kohlrabi and pepper sweet. AOA of fresh juices was a little bit higher, than of industrial ones. AOA of industrial juices of different manufacturers could differ twice. That fact is possible due to different quality of initial raw material.

In figure 2 AOA of various kinds of tea are presented. In some samples of black tea this parameter was nearly twice higher, than in green tea. Higher level of AOA can be caused by high quality of raw material, proper processing that allow to preserve tea antioxidants. It is necessary to note, that AOA of black tea bags was significantly less, than those of leaves tea and green tea bags.

In table 1 the results of wine and beer investigation are shown. AOA of those beverages connected with technology of their manufacture. AOA of wine and beer corre-

lated with quantity and quality of the vegetative raw materials used for its manufacturing.

Nonalcoholic beer has a least AOA. The highest AOA was found in dark beer with 15-16% extractive substances in a mash. It is necessary to note, that AOA in the same kinds of beer from different manufacturers could differ nearly twice.

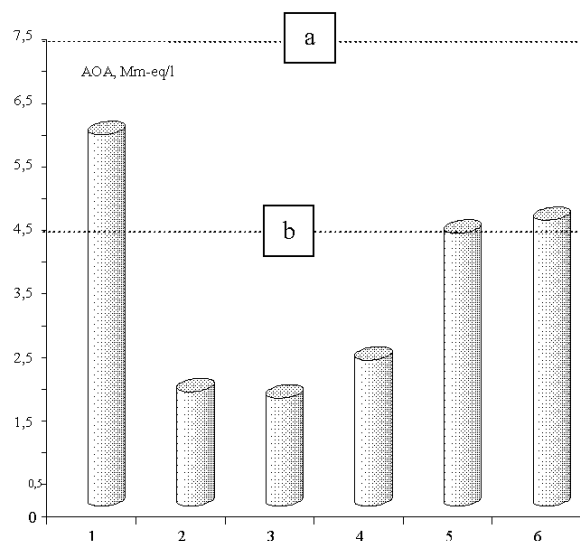
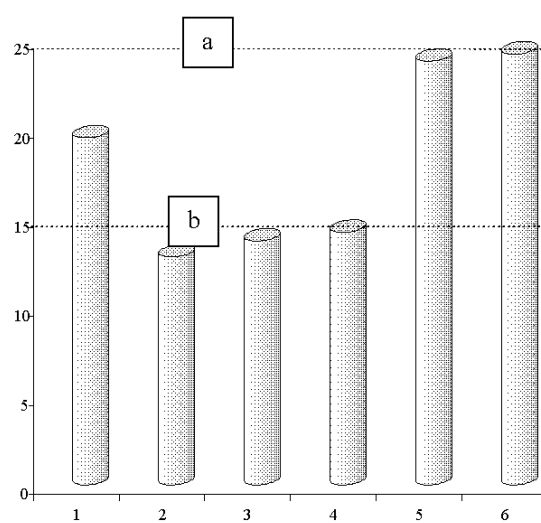
The general level of polyphenols in wine depends on a sort of grapes and a way of drink manufacturing. Skins of grape berry contain 9-10 % of polyphenols, pulp – 85-90 %, and seeds – 2-6 % of weight of a berry. This fact is very important because white and red wine has different contact time of skins and seeds with juice. Different ways of winemaking lead to a different value of AOA in red and white wine.

Wine is falsified often. In figures 2 and 3 AOA of 60 samples of white and red grape wine are presented.

Table 1. AOA of beer and wine

Group of beverages		AOA, Mm-eq/l
Beer	nonalcoholic	0, 4
	12% extractive substances in a mash	1, 4 – 0, 8
	15-16% extractive substances in a mash	2, 0 – 2, 2
Wine*	Red	17, 4
	Pink	11, 0
	Port wine	9, 6
	Wight	5, 4

*Average AOA for group (not less than 10 samples).

**Fig. 3.** AOA of wight wine***Fig. 4.** AOA of red wine*

*1 – average level fore group, a – higher level, b – lower level; 2, 3, 4 – diluted samples; 5, 6 – proper wine.

At the same time these samples have been investigated by the method of capillary electrophoresis (CE), for identification natural and forged wine. AOA of samples of the wine identified by CE as diluted, was much lower, then AOA of natural wine.

Thus, the information about AOA of vegetative foodstuff has a significant importance. Antioxidant activity is a new sign of quality of vegetative foodstuffs and food raw materials.

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