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THE EVALUATION OF HEALTHFUL PROPERTIES OF PUMPKIN FRUIT EXTRACT THROUGH THE ANTIOXIDANTIC INDICATOR

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ABSTRACT

The present article provides information on the importance of antioxidants in the human body, a number of natural and synthetic antioxidants widely used in the food and chemical industries. There is also information on the evaluation of the antioxidant properties of Cucurbita pepo L - variety pumpkin fruit extracts grown in Andijan region by comparing them with standard antioxidants quercetin and glyclasides.

KEYWORDS: *oxygen oxygenase, oxidative stress, free radicals, antioxidants, ferment and vitamins, glyclazide, quercetin, pumpkin fruit extract.*

INTRODUCTION

The exchange of oxygen in the human body is constantly monitored by physicians and biochemists. This is because oxidative stress in the human body occurs when the balance between the biochemical mechanisms of oxygen oxygenase utilization is disturbed. Reducing oxidative stress is accomplished using biologically active substances (BAS), particularly antioxidants. Antioxidants inhibit rapidly growing oxidative processes, forming inactive radicals and expelling them from the body [1,2].

Because free radical molecules lack one or more electrons, they attack healthy molecules aggressively and cause chain reactions. Free radicals usually accumulate in cell membranes and begin to break down them, resulting in the cells of our body gradually disintegrating and dying [3,4,5].

Antioxidants act as specific donors for free radicals, stopping the formation of free radicals by sacrificing their electrons and not turning them into free radicals. As a result, the oxidation of cells in the body is slowed down or even completely stopped [3,4,5]. Enzymes are the primary

antioxidant protection that destroys active oxygen species. They convert reactive oxygen species into hydrogen peroxide and less aggressive radicals, which are then converted to water and simple useful oxygen [6]. Vitamins and substances of vitamin nature, as secondary anti-oxidant protection, destroy aggressive radicals and prevent the development of a chain reaction that leads to the formation of new radicals that eliminate excess energy. These vitamins or vitamin-rich substances include water-soluble vitamins - C, R-vitamins (bioflavonoids - rutin, cercetin, citrine, hesperidin, ascorbutin), fat-soluble vitamins - vitamin A, beta-carotene, E, K, amino acids containing sulfur (gluta-thione, cysteine, methionine), C-cytochrome, chelates, microelements such as alcohol, selenium and zinc in micro doses [6].

Antioxidants are substances that prevent food from oxidizing under the influence of atmospheric oxygen. In this process, the antioxidants are expended in the oxidation process i.e. they are decomposed under the influence of oxygen in the air. Therefore, the more antioxidants a product contains, the longer its shelf life. However, the addition of large amounts of antioxidants can adversely affect food intake [7,8,9].

Today, there are a number of natural and synthetic antioxidants that are widely used in the food and chemical industries. These include ascorbic acid (E 300), sodium salt of ascorbic acid (E 301), butyloxyanisole (E 320), butyloxytoluene (E 321), sodium lactate (E 325), orthophosphate acid (E 339), citric acid and its salts (E 330 - 333) and other antioxidants can be added. Although these types of antioxidants increase the shelf life of food, they can also exhibit harmful properties [7,8,9].

EXPERIMENTAL PART

Aqueous extracts of localized Cucurbita pepo L variety pumpkin fruits were obtained for the experiment in Andijan region.

Using bidistillate water from the initial concentrated solution to be tested, ie 10% (900 ml of bidistillate water per 100 mg / ml test solution), 25% (750 ml of bidistillate water to 250 mg / ml test solution), 50% (500 mg / ml test solution to 500 ml). bidistillate water), 75% (250 ml of bidistillate water to 750 mg / ml test solution) and 100% (1000 mg / ml test solution) of 5 different concentrations.

The solubility and analysis conditions of the samples to be tested are given in Table 1.

TABLE 1. SAMPLES BEING TESTED

№	Samples	Solvent	Concentrations of solutions **in vitro** conditions mg / ml
1	Cucurbita pepo L	water	100/250/500/750/1000
2	Quercetin	30% alcohol	100/250/500/750/1000
3	Glyclazide	water	100/250/500/750/1000

The amount of the extract under study (concentration 1 mg in 1 ml) was used as standard. 0.2 M 2.0 ml buffer, 0.18% 56 mg / ml (5.46 mM) adrenaline was used as a control sample.

To check the optical densities of the test samples, 2.0 ml of 0.2 M sodium carbonate (Na2CO3-NaHCO3) buffer with pH = 10.65, 56 mg / ml of 0.18% solution of adrenaline (epinephrine) hydrochloride and 30 mg / ml were added. the mixture was prepared by adding an antioxidant

sample and the optical densities of the solutions were checked on a Cary 60 UV-Vis Agilet Technologies spectrophotometer in a 10 mm cuvette with a wavelength of 347 nm for 30 seconds to 10 minutes by rapid stirring.

For comparative analysis, in addition to the samples examined, the optical densities of glyclazide and quercetin were also determined. Based on the values of the determined optical densities, the AA (%) activity of the samples was calculated based on the following formula:

$$AA = \frac{(D_1 - D_2) \cdot 100}{D_1}, \%.$$

D_1-optical density of adrenaline hydrochloride solution added to the buffer;

D_2-the optical density of the extract under study and adrenaline hydrochloride added to the buffer.

The statistics were verified with the t-student criterion and the Original 6.1 U.S. program.

The antioxidant activity of the samples obtained for the study was carried out by inhibiting the autooxidation reaction of adrenaline under “in vitro” conditions, as well as by inhibiting the formation of the free form of oxygen. The method is based on the inhibition of the autoxidation reaction of adrenaline, in which the formation of adrenaline over time in "in vitro" conditions is expressed as a percentage of the formation of KFSh (active form of oxygen) and autooxidation (%).

RESULTS AND THEIR DISCUSSION

Optical density of 5 different concentrations of adrenaline hydrochloride solution added to a buffer solution of 0.2 M sodium carbonate (Na_2CO_3-$NaHCO_3$) pH = 10.65 as a control of the solutions of the tested samples, as well as the optical densities of the extract under study and adrenaline hydrochloride mixture were measured on a Cary 60 UV-Vis Agilet Technologies spectrophotometer in a 10 mm cuvette at a wavelength of 347 nm. The results of spectrophotometric analyzes are given in Table 2.

TABLE 2. INDICATORS OF SPECTROPHOTOMETRIC AND ANTIOXIDANT ACTIVENESS (AA%) OF PUMPKIN EXTRACT

№	Solutions to be analyzed	Control (D_1)	Experiment (D_2)	$AA_{\%}$
1	Cucurbita pepo L - (10%) 100 mg/ml	0,23611	0,1970	16,56
2	Cucurbita pepo L - (25%) 250 mg/ml	0,27326	0,2247	17,77
3	Cucurbita pepo L - (50%) 500 mg/ml	0,29455	0,2384	19,06
4	Cucurbita pepo L - (75%) 750 mg/ml	0,36258	0,2918	19,52
5	Cucurbita pepo L - (100%) 1000 mg/ml	0,36806	0,2927	20,47
6	Glyclazide - (10%) 100 mg/ml	0,02782	0,0235	2,0
7	Glyclazide - (25%) 250 mg/ml	0,03895	0,0329	2,8
8	Glyclazide - (50%) 500 mg/ml	0,06955	0,0587	5,0

9	**Glyclazide - (75%) 750 mg/ml**	**0,11823**	**0,0998**	**8,5**
10	**Glyclazide - (100%) 1000 mg/ml**	**0,13909**	**0,1174**	**10,0**
11	**Quercetin - (10%) 100 mg/ml**	**0,11128**	**0,0940**	**8,0**
12	**Quercetin - (25%) 250 mg/ml**	**0,18778**	**0,1586**	**13,5**
13	**Quercetin - (50%) 500 mg/ml**	**0,27819**	**0,2396**	**20,0**
14	**Quercetin - (75%) 750 mg/ml**	**0,38251**	**0,3294**	**27,5**
15	**Quercetin - (100%) 1000 mg/ml**	**0,67247**	**0,5348**	**34,7**

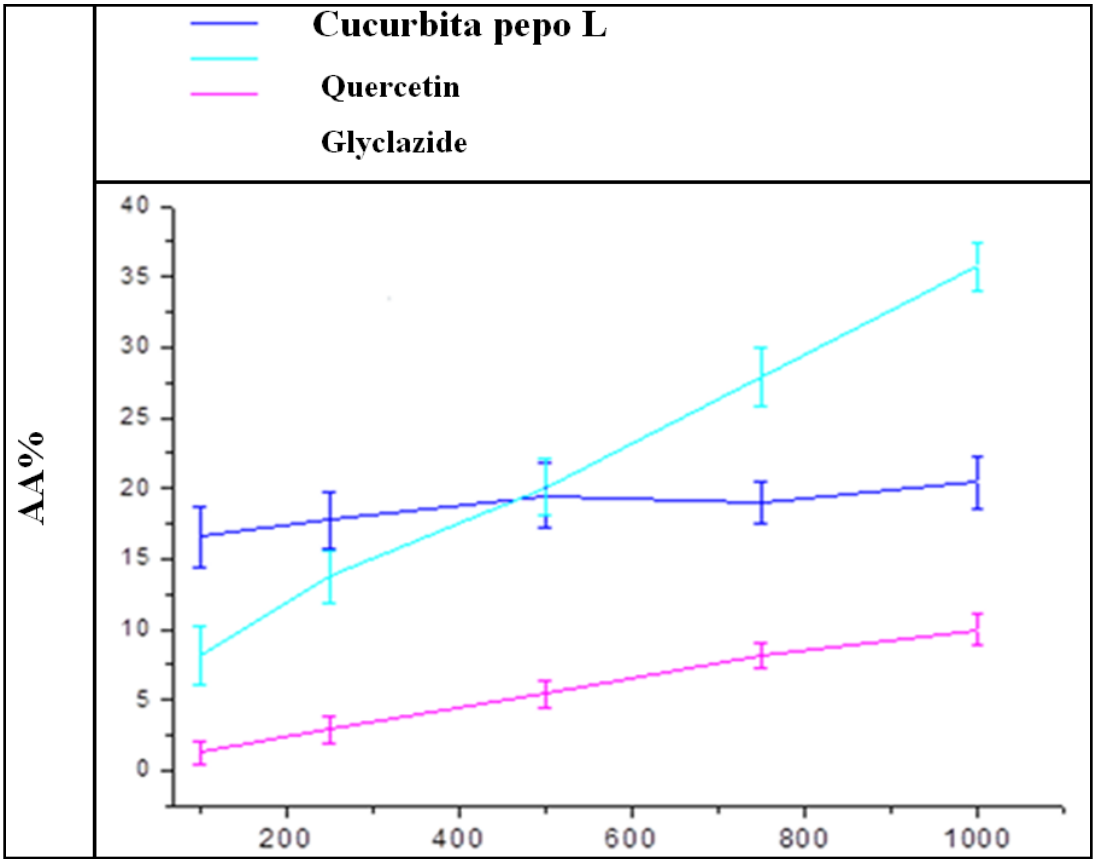

Figure 2.4. Dependence of the antioxidant properties of Cucurbita pepo L sample on concentration

The antioxidant activity of the test samples was calculated based on the values of their optical densities by preparing samples of 5 different concentrations from the test solution with bidistillate water:

$$AA = \frac{(D_1 - D_2) * 100}{D_1} = \frac{(0{,}23611 - 0{,}1970) * 100}{0{,}23611} = \mathbf{16{,}56\ \%}$$

The results of the identified calculations are given in Table 2.

For a comparative analysis of the antioxidant activity of the samples tested, the optical densities of glyclazide used in pharmaceuticals and medicine, as well as quercetin substances used as BFQ in the food industry, and antioxidant activity based on these values were also determined.

A graph of the concentration dependence of the AA activity of 5 different concentrated solutions of the Cucurbita pepo L-pumpkin fruit sample examined is shown in Figure 2.4.

CONCLUSIONS

1. The AA activity of the test samples was explained by the inhibition of the autooxidation reaction of adrenaline in vitro and the formation of a free form of oxygen.

2. The antioxidant properties of Cucurbita pepo L pumpkin fruit extract samples were evaluated by comparison with quercetin and glyclazide antioxidants as standard antioxidants.

3. It was found that the AA activity of low-concentration solutions of all tested samples was higher than that of glyclazide, and the AA activity of high-concentration solutions was closer to that of quercetin.

4. Local Cucurbita pepo L pumpkin fruit extracts were found to have high antioxidant properties and were recommended for use in the food industry as a natural antioxidant.

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