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USE OF SAFFRON IN FOLK MEDICINE

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Annotation

Saffron has many healing properties due to its rich chemical composition and has been widely used in folk medicine for the treatment of various diseases since ancient times. Even today, researches are being conducted on its effectiveness against vitiligo, colds, asthma, eye and heart diseases, and cancer. Considering that the healing properties of saffron are related to its antioxidant characteristics, our article aims to present the results of our research conducted to determine the antioxidant activity of saffron cultivated within our country.

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INTRODUCTION. Saffron (Crocus sativus L.) is a perennial herbaceous plant belonging to the Iridaceae family. It blooms in February and bears fruit from April to August. Wild species grow in the hills and mountains of Tashkent and the Fergana Valley. Its long, crimson inflorescences are highly prized for their aroma and golden-yellow color [1, 2, 3, 4].

Saffron has been found to contain more than 150 volatile and non-volatile chemical compounds. The four main biologically active compounds in saffron are crocin, crocetin, picrocrocin, and safranal. Studies have shown that the chemical composition of saffron is approximately as follows: 8-15% water, 12-15% carbohydrates, 10% tannins, 8% pentosans, 6% pectins, 6% starch, 2% crocins, 1% other carotenoids, 12% proteins and amino acids, 6% minerals, 6% non-volatile fats, 1% volatile oils, and 5% miscellaneous substances [5, 6].

Saffron, as a medicinal plant, is traditionally used as an antidepressant, a remedy for respiratory ailments, an antispasmodic, and a sedative. In folk medicine, it is used to treat smallpox, colds, asthma, eye and heart diseases, and cancer. Fifty milligrams of saffron, dissolved in 100 ml of milk and taken twice daily, significantly reduce the oxidative susceptibility of lipoproteins in patients with cardiovascular disease, demonstrating saffron's antioxidant potential [7, 8, 9].

Behavioral and electrophysiological studies have shown that saffron extract affects learning and memory in experimental animals. Saffron extract or its active components, crocetin and crocin, may be useful in the treatment of neurodegenerative diseases associated with memory impairment [10].

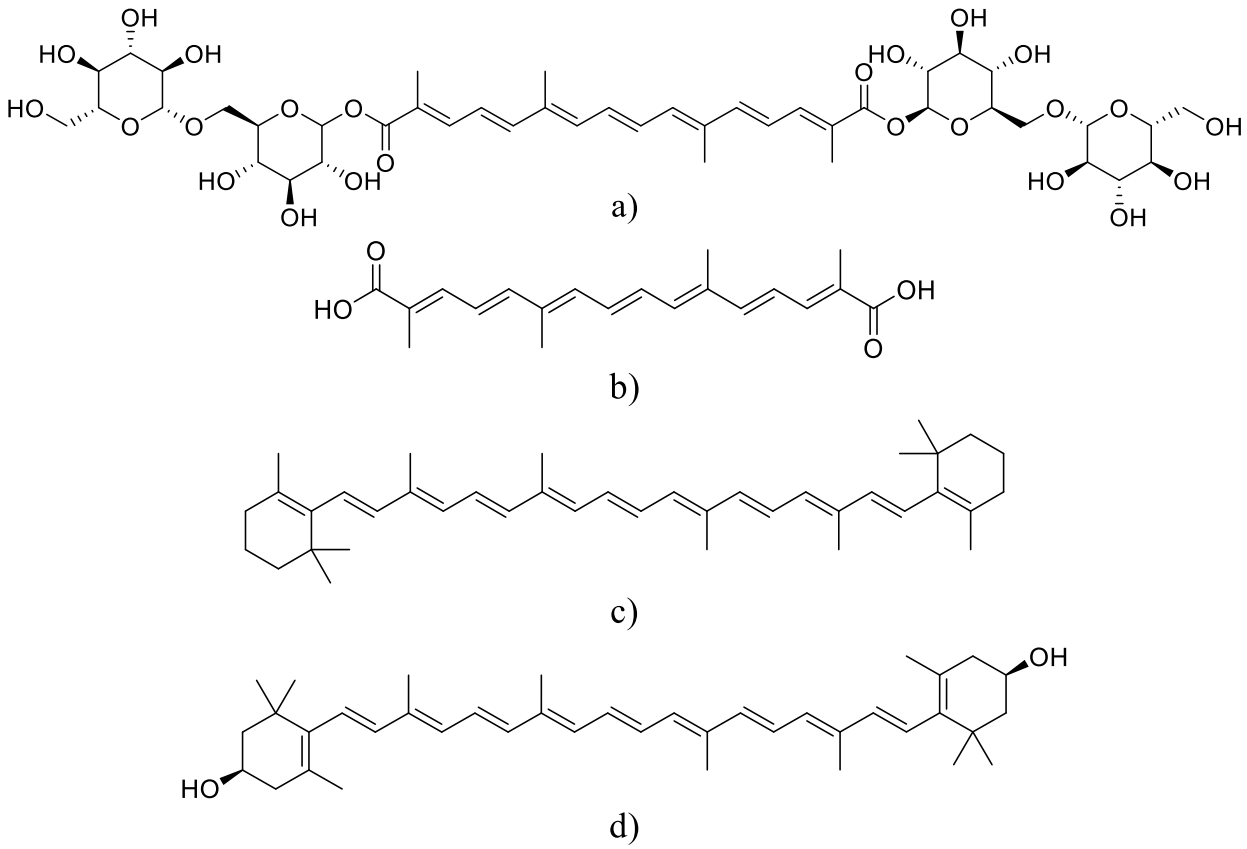


Figure 1. Important bioactive compounds found in saffron: a) crocin; b) crocetin; c) β-carotene; d) zeaxanthin.

EXPERIMENTAL PART. The antioxidant activity of the studied compounds is determined by phytochemical tests and assessed using several methods.

The antioxidant activity of the compounds is determined by inhibiting the adrenaline autoxidation reaction in vitro and the formation of free oxygen radicals. The method is based on the inhibition of the adrenaline autoxidation reaction, expressed as a percentage (%), based on the formation and autoxidation of adrenaline over time in vitro.

The antioxidant activity of saffron was determined using the in vitro adrenaline autoxidation method.

For the study, 2.0 ml of 0.2 M sodium carbonate buffer solution (Na_2CO_3-$NaHCO_3$) with pH = 10.65, 56 µl of 0.18% adrenaline hydrochloride (epinephrine) solution were taken, 30 µl of the antioxidant sample were added and, with rapid mixing, the analysis was carried out in a 10 mm cuvette at a wavelength of 347 nm for 30 seconds - 10 minutes on a Cary 60 UV-Vis spectrophotometer Agilet Technologies. The studied amount was used as a standard (the concentration of the extract in 1 ml is 1 mg). 2.0 ml of 0.2 M buffer solution, 56 µl of 0.18% (5.46 mM) adrenaline were used as a control sample.

Antioxidant activity is expressed as a percentage of inhibition of adrenaline autooxidation and is calculated using the following formula.

$$AA\% = \frac{D_1 - D_2 x 100}{D_1} \quad (1).$$

Here:

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

D_2 – the optical density of the test extract and adrenaline hydrochloride added to the buffer [11].

DISCUSSION OF OBTAINED RESULTS. Antioxidants are substances such as vitamins, minerals, carotenoids, and polyphenols that play a vital role in the body's defense system against reactive oxygen species. The primary function of antioxidants is to prevent oxidation in various situations, and research has shown that they provide the best protection against the development of diseases caused by

oxidative stress, such as cancer, cardiovascular disease, obesity, type 2 diabetes, hypertension, and cataracts [12].

In this study, we determined the antioxidant activity of saffron crocuses. Saffron flowers were harvested early in the morning, and the crocuses were separated from the flowers in a dark place. Freshly harvested crocuses were stored under appropriate conditions, at low temperatures and moderate air circulation. To preserve the color, morphological properties, and biologically active components of saffron and prevent biochemical and enzymatic changes during the drying process, it was dried using the traditional method, that is, at an average temperature of 35-45°C.

Table 1. Antioxidant activity of saffron stigmas

№	Saffron stigmas	Optical density of control solution, D	Optical density of the experimental solution, D	Antioxidant capacity, %
1	100 mkg/ml	0,2017	0.1761	12,69
2	250 mkg/ml	0,3442	0.2870	16,60
3	500 mkg/ml	0,3604	0.2969	19,44
4	750 mkg/ml	0,3484	0.2836	18,57
5	1000 mkg/ml	0,4811	0.3750	22,05
	Gliklazid			10,0%
	Kversetin			37,4%

The antioxidant activity of saffron crocus was determined by inhibiting the adrenaline autoxidation reaction in vitro and preventing the formation of free oxygen radicals. Saffron crocus was compared with the standard antioxidants quercetin and gliclazide, and the results indicate its antioxidant properties.

The tables above clearly demonstrate that saffron crocuses possess antioxidant activity.

CONCLUSION. The antioxidant activity of saffron stigmas was determined using an in vitro adrenaline autoxidation inhibition assay. The presence of biologically active compounds such as crocin, crocetin, β-carotene, and zeaxanthin in saffron provides it with high antioxidant activity. This allows saffron to be effectively used in folk medicine as an antidepressant, antispasmodic, and sedative, as well as for the treatment of smallpox, colds, asthma, eye diseases, heart disease, cancer, diabetes, and respiratory illnesses.

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