ECRONICON OPEN ACCESS

EC AGRICULTURE
Research Article

Study of Phytochemical Composition of Generative Organs of Standardized Drug Raw Material *Crocus sativus* L.

Makhmudov Azizbek Valijonovich*

Institute of Botany, Academy of Sciences of Uzbekistan, Uzbekistan

***Corresponding Author:** Makhmudov Azizbek Valijonovich, Institute of Botany, Academy of Sciences of Uzbekistan, Uzbekistan.

Received: September 10, 2018; **Published:** October 29, 2018

Abstract

The article is devoted to the study of the development of methods for standardization of medicinal plant raw materials for the preparation of conditions for the maximum production of biological active substances from seed saffron.

Keywords: *Crocus sativus; Hexane Extract; Benzene Extract; Chromatographic Mass Spectrophotometer*

Introduction

According to the Decree of the Cabinet of Ministers of the Republic of Uzbekistan from 2017 on August 21, EDO-03/1-421 "On measures to create saffron plantations, meet the needs of the pharmaceutical industry and cultivate exported medicinal plants", scientific works in applied research are conducted at the Uzbek Chemical-Pharmaceutical Research Institute on the topic "Studying as a plant raw material saffron seed *Crocus sativus* for obtaining medicines" for registration number PZ-20170919120.

The research was carried out at the Institute of Botany under the Academy of Sciences of the Republic of Uzbekistan.

Many scientists have studied taxonomy, morphology, and the cytology of existing such species of Saffron as *C. sativus*, *C. alatavicus* family of Iridaceae [1]. First of all, this is due to the valuable therapeutic and nutritional properties of saffron [2].

Abdullaev (2003) pointed out that saffron can be useful in cancer chemoprophylaxis in the near future [3].

Saffron was and still remains a very expensive spice (the cheapest Iranian saffron costs 460 - 470 US dollars per 1 kg, Greek saffron - 770 - 790 US dollars per 1 kg (Reuters) The most expensive Spanish saffron costs 900-950 dollars USA for 1 kg.), Since growing and obtaining it requires high costs (to get 1 kg of dry saffron, you need to sort out about 2000 flowers.) From 1 hectare plantation in the first year, you can collect only 6 kg of saffron, in the second year - up to 20 kg). In the Middle Ages, merchants made whole fortunes on this spice, investing in the cost of the goods the cost of its transportation. The use of saffron in food could only allow wealthy people. It is no accident that the flowers of saffron became a symbol and were used in the heraldry of bourbons. Lily is nothing but a symbolized saffron flower.

Purpose of the Study

The purpose of the research is to select and develop methods for standardizing medicinal plant raw materials in order to prepare the conditions for the maximum production of biological active substances from seed saffron.

Methodology and Results

The analysis of literature sources showed the effectiveness of the application of stigmas of the flowers of the tuberous saffron plant (*C. sativus*) [3,4].

Dried in the conditions of herbal drying, vegetable raw materials are randomly confused fragile non-adherent filaments, consisting of stigmas, single or sitting on short posts of three stigmas. Each stigma has the appearance of a differently curved tubule, widening gradually towards the apex and terminating in an irregularly irregular jagged margin [5].

To determine the authenticity, a sample of 100 grams of ground saffron was placed in a measuring glass flask with a capacity of 1000 cm^3 and poured into a third of the volume of purified water. Extraction of colorants was carried out for 20 minutes and then insisted for 12 hours. The volume in the flask was brought to a mark and with thorough mixing the aqueous phase was colored bright yellow.

The organoleptic analysis showed that the color of the stigma is dark orange with a transition in the lower part to yellow, the taste is spicy, specific for saffron (glycoside picrocrocin), the smell is spicy-bitterish, slightly tart (aldehyde-safranal).

Further according to ND [1] conducted studies to determine the mass shares of the following quality criteria: moisture; general ash; ash, insoluble in 10% hydrochloric acid; essential oil; stagnant and stumbling into hard-to-break lumps of stigmas; crushed stigmas passing through a sieve with holes of 2 mm; foreign impurities. Table 1 shows the results of the study of the above indices in serial samples of medicinal raw materials, the results comparatively compared with the permissible norms (Table 1).

№	Indicators	Amount sample	Results	
			Norm	Actually
1	Mass fraction of moisture,%, not more than	15	12,0	10,7
2	Fraction of total mass of total ash,%, maximum	10	7,0	6,3
3	Mass fraction of ash insoluble in 10% hydrochloric acid,%, not less than	100	1,5	1.7
4	Fraction of total mass of essential oil,%, not less than	100	0,5	0,8
5	Mass fraction of stigmas impure and stuck in hard-to-separate lumps,%, not more than	100	5,0	3,2
6	Mass fraction of crushed stigmas passing through a sieve with holes of 2 mm,%, not more than	100	2,0	1,6
7	Mass fraction of foreign impurities,%, not more than	100	0,1	0,06

Table 1: *The results of a comparative study of C. sativus under the conditions of introduction.*

To determine the quantity in plant raw materials of value both in the therapeutic and nutritional plan of the basic substances, scientists recommend two methods: by distillation (Guenther E) and HPLC (Kun and Winterstein) [6,7].

Using the ground according to specifications, the raw materials obtained an extract based on hexane and benzene by the method of three-time maceration. Preliminary experiments to identify and determine the amount of constituents were carried out in an agilent 7890AGC gas chromatograph and an AGILENT 5975 C inet MSD chromatographic mass spectrophotometer. The obtained mass spectra were compared with the information of the electronic library W8N05ST.L and NIST08. The results are shown in tables 2, 3 and figures 1, 2.

№	Name of component	Retention time, sec. (R_t)	Content, %	Retention index, (RI)
1	1-Carboxaldehyde-5,5-dimethyl-2-methylene-3-cyclohexene	8.258	2.73	1110
2	α- Isophorone	8.498	7.02	1126
3	2,6,6- Vachmethyl -2-cyclohexene-1,4-dione	8.848	7.72	1149
4	2,2,6- Vachmethyl -1,4- cyclohexanedione	9.223	5.74	1173
5	2,6,6- Vachmethyl -1,3- cyclohexanedione -1- carbaldehyde	9.715	23.40	1205
6	2-Hydroxy-3,5,5-omethyl-2-cyclohexene-1,4-dione	10.250	1.55	1242
7	4-Hydroxy-3,5,5-osmethyl-2-cyclohexen-1-one	11.394	8.29	1322
8	2,4,4-Vachmethyl-3-carboxaldehyde-5-hydroxy-1-cyclohexanone-2,5-diene	12.433	8.20	1396

Table 2: *The chemical composition of the hexane extract of C. sativus.*

№	Name of component	Retention time, sec. (R_t)	Content, %	Retention index, (RI)
1	Heptanal	4.851	0.24	904
2	γ- Crotonolactone	5.177	1.92	923
3	н- Undekan	8.098	0.20	1100
4	Nonanal	8.196	0.82	1106
5	α- Isophorone	8.504	0.93	1126
6	4- Oxoisophorone	8.848	1.25	1149
7	2,2,6- Vachmethyl -1,4-cyclohexanedione	9.229	1.16	1174
8	Dihydro-4-hydroxy-2 (3H) -furanone	9.635	9.43	1200
9	3,4-Dihydroxybutane acid addition of γ-lactone	10.557	0.69	1264
10	н- Tridecane	11.074	0.97	1299
11	β- Methylnaphthalene	11.148	0.85	1304
12	4-Hydroxy-3,5,5-trimethyl-2-cyclohexen-1-one	11.406	2.77	1323
13	α- Tetradecan	12.347	0.58	1390
14	н- Tetradecan	12.445	4.78	1397
15	Octylcyclohexane	13.109	0.73	1445
16	2,6-Di-tert-butyl-p-benzoquinone	13.435	0.57	1468
17	Pentadecane	13.773	2.16	1492
18	α- Hexadecylen	14.984	0.56	1577
19	н- Cetane	15.083	1.26	1584
20	н- Heptadecane	16.479	2.02	1677
21	3,5-Di-t-butyl-4-hydroxybenzaldehyde	17.425	1.17	1736
22	*Z*-8- Hexadecene	17.893	3.02	1764
23	Methyl 3- (3,5-di-tert-butyl-4-hydroxyphenyl) propionate	20.850	3.28	1911
24	Dibutyl phthalate	21.619	10.56	1936

Table 3: *The chemical composition of the benzene extract of C. sativus.*

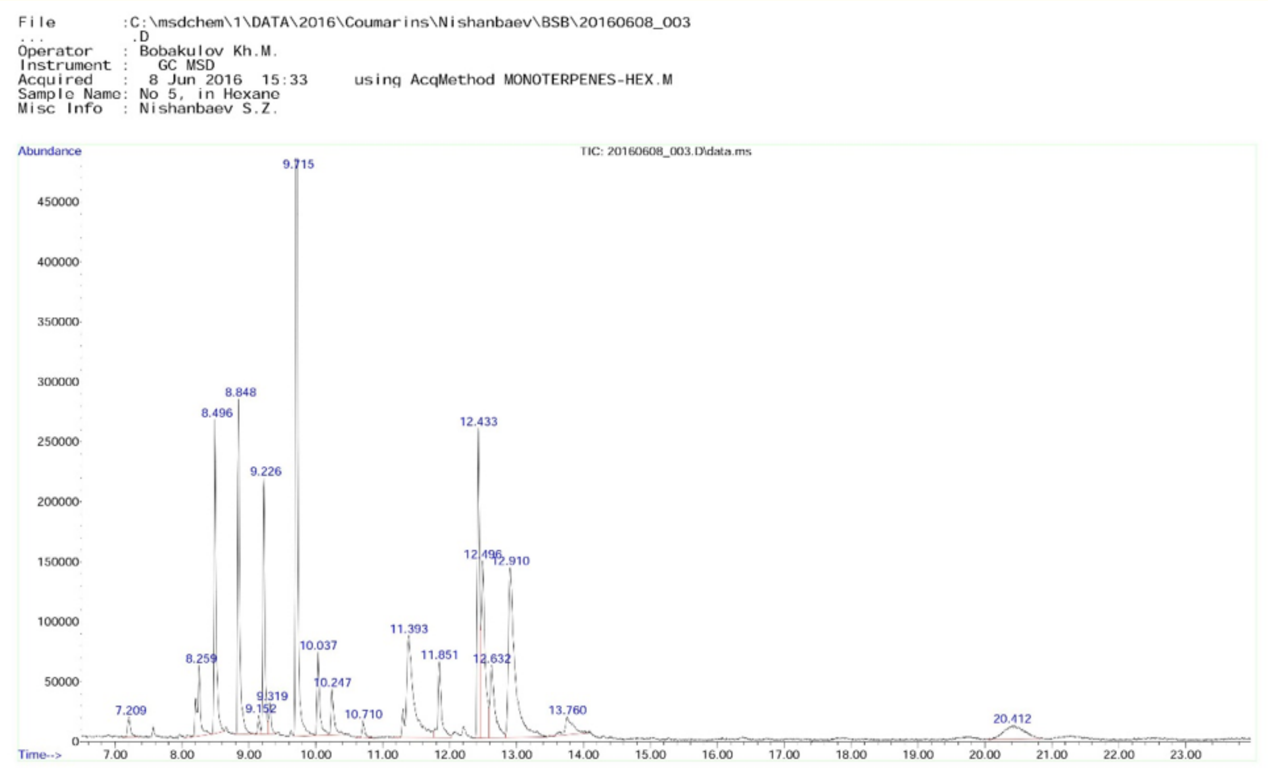

Figure 1: *Spectrum of C. sativus hexane extract.*

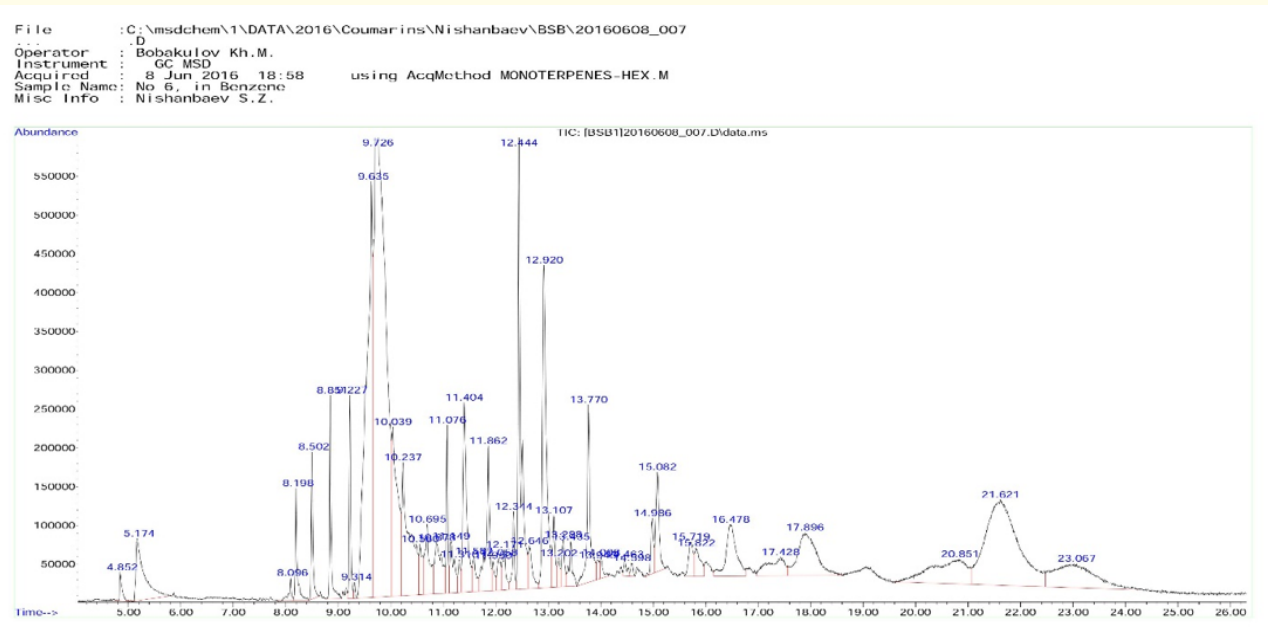

Figure 2: *Spectrum of C. sativus benzene extract.*

Discussion

Preliminary study of *C. sativus*, grown in local conditions and comparison of results with standards for plant raw materials, showed the compliance of the quality standard indicators in all parameters.

The standards given in the literature on the chemical composition of *C. sativus* methanol is 68.2%, ethanol 57.6% and α-tocopherol flavonoids is 95.6% [8]. Our studies showed that the hexane extract of the feedstock contains a large amount of 2,6,6-trimethyl-1,3-cyclohexadiene-1-carbaldehyde (23.40%), while the benzene extract contains 10.56% dibutylphthalate, which proves the chemical composition of saffron, grown on the territory of the republic with international standards [9].

Conclusion

According to the phytochemical composition of generative organs *C. sativus* in the hexane extract contains 8 species, in the benzene extract 26 types of substances that are subject to detailed study and development of methods for purification from ballast substances. Research in this direction continues.

Bibliography

1. Kapinos GE. "Biological patterns of development of bulbous and tuberous plants on Absheron". Baku (1965): 240.
2. Abdullaev FI. "Use of in vitro assays to assess the potential antigenotoxic and cytotoxic effects of saffron (Crocus sativus L.)". *Toxicology In Vitro* 17.5-6 (2003): 731-736.
3. Abdullaev FI. "Biomedical properties of saffron and its potential use in cancer therapy and chemoprevention trials". *Cancer Detection and Prevention* 28.6 (2004): 426-432.
4. Makhmudov AV. "Bioecological Features and anatomical Structure Crocus sativus L. to the Introduction in Uzbekistan". *Journal of Novel Applied Sciences* 5.1 (2016): 17-23.
5. State Pharmacopoeia XI-ed. 1 volume-Moscow (1987): g-328s.
6. Guenther E. "The essential oils/Van Nostrand Company". New York, Volume 6 (1952): 105.
7. Kuhn R and Winterstein A. "Uber the konstitution des pikro-crocins und seine Beziehung zu den Carotin-Farbstoffen des Safrans". *Berichte der Deutschen Chemischen Gesellschaft* 67.2 (1934): 344-357.
8. Karimi E., *et al*. "Evaluation of Crocus sativus L. stigma phenolic and flavonoid compounds and its antioxidant activity". *Journal of Molecules* 15.9 (2010): 6244-6256.
9. Dashtir MH., *et al*. "Saffron (Crocus sativus L.) extract prevents and improves d-galactose and NANO2 induced memory impairment in mice". *EXCLI Journal* 11 (2012): 328-337.

Volume 4 Issue 1 November 2018