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PROSPECTS OF USING SAFFRON IN THE TREATMENT OF PARKINSON'S DISEASE IN FOLK MEDICINE

XALQ TABOBATIDA PARKINSON KASALLIGINI DAVOLASHDA ZA'FARONDAN FOYDALANISH ISTIQBOLLARI

ПЕРСПЕКТИВЫ ИСПОЛЬЗОВАНИЯ ШАФРАНА ПРИ ЛЕЧЕНИИ БОЛЕЗНИ ПАРКИНСОНА В НАРОДНОЙ МЕДИЦИНЕ

Asqarov Ibrohimjon Rahmonovich[1], UbaydullayevKomiljonTursunboyevich[2]

[1]Asqarov Ibrohimjon Rahmonovich − Kimyo fanlari doktori, professor, Andijon davlat universiteti.

[2]Ubaydullayev Komiljon Tursunboyevich − Erkin tadqiqotchi, Andijon davlat tibbiyot instituti.

Annotatsiya

Za'faron xalq tabobatida qadimdan ko'p kasalliklarni davolashda ishlatilib kelinayotgan qimmatbaho o'simlik. Za'faron tarkibida uglevodlar, oqsillar, suv, karatinoidlar, flavonoidlar, vitaminlar va anorganik moddalarni saqlaydi.

Ushbu tadqiqotimizda biz za'faron stigmalaridan tayyorlangan ekstrakt tarkibidagi flavonoidlarning ayrim vakillarining miqdorini yuqori samarali suyuqlik xromatografiyasi usulidan foydalangan holda aniqlashni amalga oshirdik.

Аннотация

Шафран – ценное растение, которое с древних времен использовалось в народной медицине для лечения многих заболеваний. Шафран содержит углеводы, белки, воду, каратиноиды, флавоноиды, витамины и неорганические вещества.

В данном исследовании мы определили количество некоторых представителей флавоноидов в экстракте, приготовленном из рылец шафрана, методом высокоэффективной жидкостной хроматографии.

Abstract

Saffron is a valuable plant that has been used in folk medicine for the treatment of many diseases since ancient times. Saffron contains carbohydrates, proteins, water, caratinoids, flavonoids, vitamins and inorganic substances.

In this study, we determined the amount of some representatives of flavonoids in the extract prepared from saffron stigmas using the method of high-performance liquid chromatography.

Kalit so'zlar.*Za'faron, flavonoidlar, Parkinson kasalligi, gall kislotasi, rutin, kversetin, apigenin,* kempferol.

Ключевые слова. *Шафран, флавоноиды, болезнь Паркинсона, галловая кислота, рутин, кверцетин, апигенин, кемпферол.*

Key words. *Saffron, flavonoids, Parkinson's disease, gallic acid, rutin, quercetin, apigenin, kaempferol.*

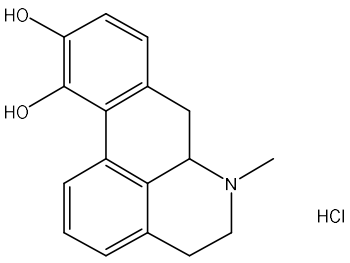
INTRODUCTION

Parkinson's disease is a chronic disease of the central nervous system. In a person suffering from this pain, the muscles become tense, the face remains immobile and simply put, the patient's movements are limited. Tremors are often observed in the paws, legs, jaw, tongue and eyelids. This disease is widespread mainly among men[1.p.749-750].

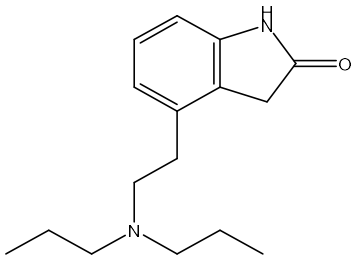
Parkinson's disease is a neurodegenerative disease. A combination of genetic and environmental factors is important in producing abnormal protein accumulation in selected groups of neurons, leading to cellular dysfunction and subsequent death. Currently, there are many tools, along with surgical interventions, for treating early and late complications of Parkinson's disease. Future developments in Parkinson's disease will likely focus on the concept of disease-modifying drugs that offer neuroprotection [2. p.125].

According to reports from the World Health Organization, the incidence of Parkinson's disease has doubled in the last 25 years, and by 2019, the disease caused 5.8 million people to become disabled and 329,000 patients to die. [3.p.1].

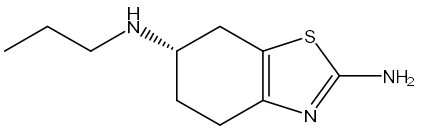
Medicines such as apomorphine(a), ropinirole(b), pramipexole(c), levodopa(d), entacapone(e), rasagiline(f) are used in medicine to treat this disease. However, the side effects of these drugs such as drowsiness, nausea, vomiting, dizziness, swelling of the legs, sweating, diarrhea, hallucination, dry mouth, and abdominal pain are also noted [4.p.801].



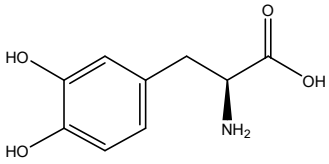
a)



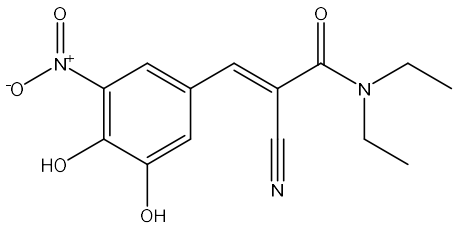
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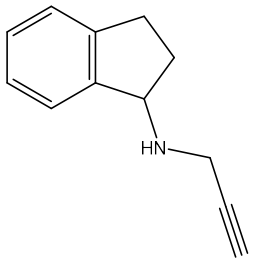
c)



d)



e)



f)

In addition to modern medical treatments, natural remedies can also be used. In particular, the regular consumption of natural, biologically active food additives such as **Shifoi bosim, Nishifo, Asdavo, Askalsiy, and Antivir 101**, has a good effect in the treatment of tremors and paralysis [1.p.750-751].

Another important tool in folk medicine is saffron stigmas. Below we will talk about its healing properties and the prospects of its use in Parkinson's disease.

Saffron has long been used in folk medicine for the treatment and prevention of several diseases such as headache, bronchitis, kidney stone disease, nasal disease, impotence, cirrhosis of the liver, impotence, bleeding gums, epilepsy, and heart disease. It is a plant that has been used and has not lost its importance and value even in today's modern medicine[5.p.379].

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Saffron stigmas have been found to have antioxidant activity, so saffron is a prospective natural product in this regard. It was found that saffron flower buds contain some representatives of flavonoids and contribute to the antioxidant activity of saffron [6.p.6253].

Flavonoids are ubiquitous in the plant kingdom. They appear as the main part of the daily diet, such as vegetables, fruits, nuts, seeds, stems, flowers, tea and wine [7.p.240].

In addition to the use of gallic acid and its ester derivatives in the food industry as flavouring agents and preservatives, these phytochemicals have biological and biological effects such as antioxidant, antimicrobial, anti-inflammatory, anti-cancer, cardioprotective, gastroprotective and neuroprotective effects. There are various scientific reports about its pharmacological activity [8.p.226].

Rutin is a flavonol that is abundant in plants such as buckwheat, tea, and apples and is an important food component. Chemically, it is a glycoside and demonstrates a number of

pharmacological activities, including antioxidant, cytoprotective, vasoprotective, anticarcinogenic, neuroprotective and cardioprotective activities [9.p.151].

Some researches have shown that quercetin has several beneficial biological activities, such as antioxidant, anti-inflammatory, anti-cancer and anti-viral properties [10.p.147].

Analysis of the literature shows that apigenin has several important pharmacological activities. These include diseases such as diabetes, cancer, and insomnia [11].

Several studies confirm the role of kaempferol in the prevention and/or treatment of other diseases such as neurodegenerative diseases, infectious diseases, diabetes, osteoporosis, allergies, inflammation and pain [12.p.326].

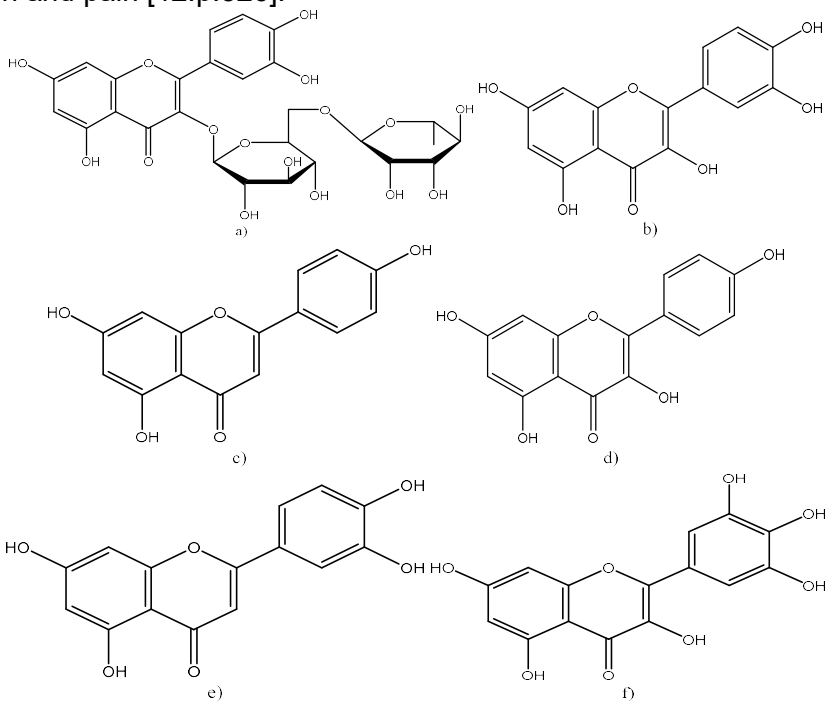


Figure 1. Structural formulas of some representatives of flavonoids: a) rutin, b) quercetin, c) apigenin, d) kaempferol, e) luteolin, f) myricetin.

Experimental part. The following method was used to qualitatively and quantitatively determine flavonoids in saffron stigmas.

We used 96% ethyl alcohol as a solvent to extract the substances to be determined from the saffron sample. For this purpose, 0.5 grams of saffron sample was taken, mixed with 20 ml of alcohol and extracted using a magnetic stirrer at a temperature of 30°C for 75 minutes. As a stationary phase, the amount of rutin, gallic acid and quercetin in the samples was determined using an Agilent Zorbax 4,6 mm ID x 12,5 mm cartridge and a Perkin Elmer C18 250x4,6 mm 5 µm C_{18} (USA) column. For this, a 0.5% solution of acetic acid in a ratio of 35:65 and standard solutions in acetonitrile with different concentrations: 0.025 mg/ml and 0.05 mg/ml were prepared, the flow rate was 1 ml/min, the temperature of the thermostat was 40°C, the injection sample volume was 10 µl. a calibration curve was generated. Based on the standard samples, the following chromatogram was obtained on the HPLC device (LC 2030 C3D Plus Shimadzu Japan) in 2.5 min of gallic acid, 3.6 min of rutin and 16 min of quercetin.

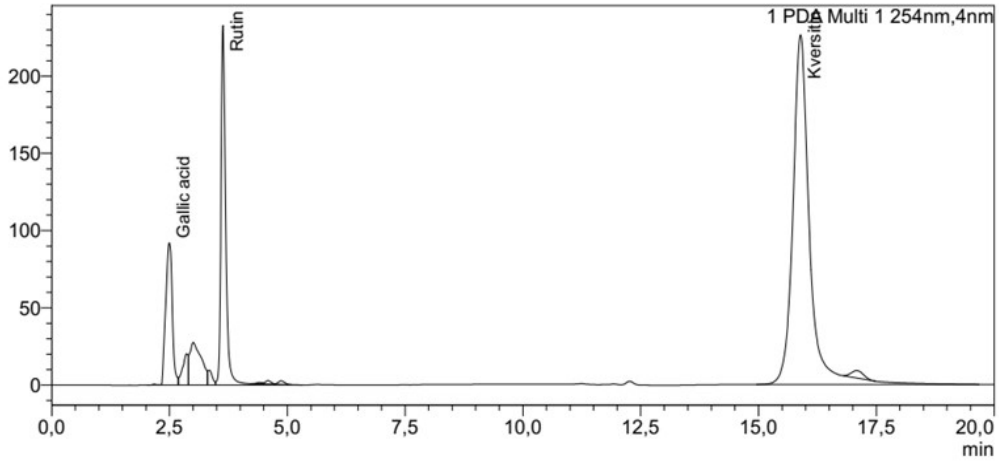


Figure 2. Chromatogram of standard solutions.

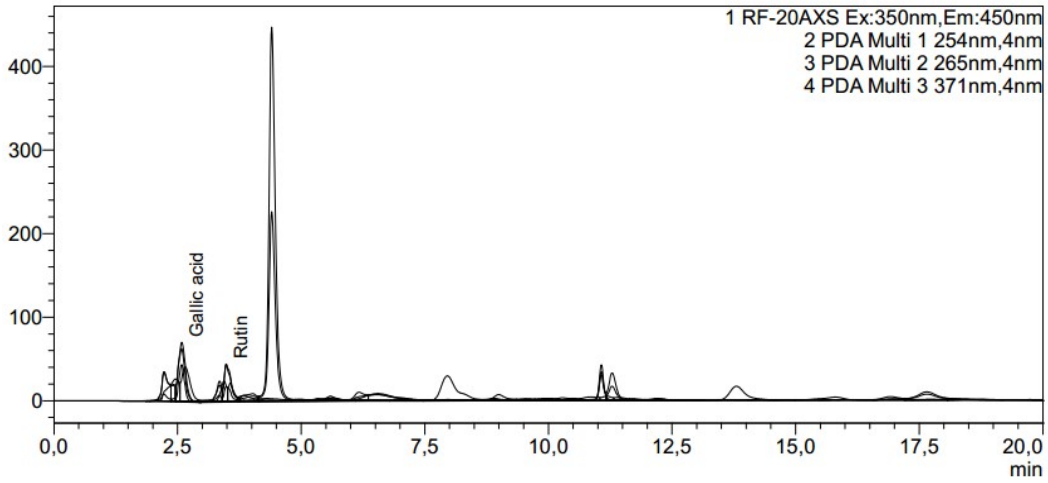


Figure 3. Chromatogram of saffron extract.

When performing the analysis of apigenin and kaempferol, based on the parameters of the above device, a chromatogram was obtained in the following gradient mode in 12 min at a flow rate of 0.75 ml/min.

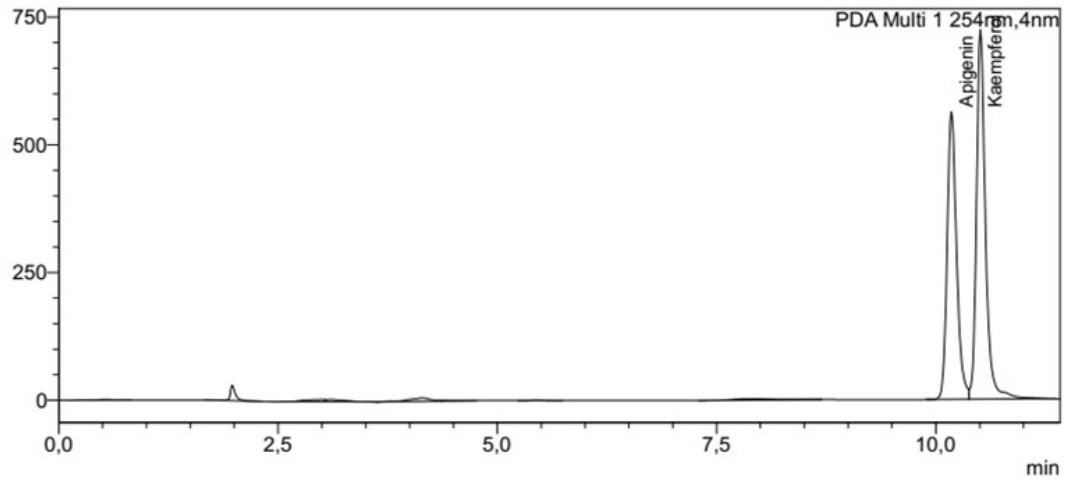


Figure 4. Chromatogram of standard solutions.

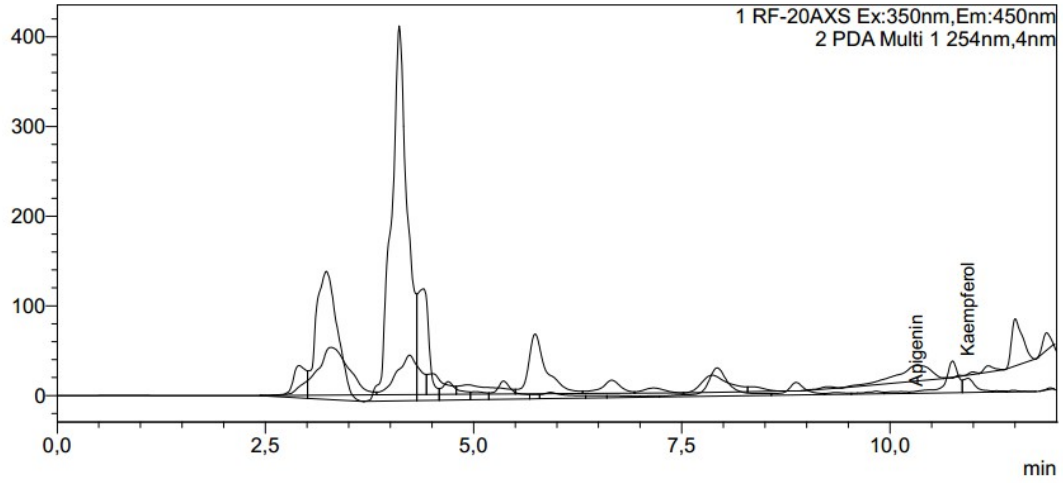


Figure 5. Chromatogram of saffron extract.

The amount of flavonoids in the extracted saffron sample is given below (Table 1).

Table 1

Results of determination of some flavonoids in saffron extract by high-performance liquid chromatography method

Gallic acid (mg/g)	Rutin (mg/g)	Quercitin (mg/g)	Apigenin (mg/g)	Kaempferol (mg/g)
1.56	0.56	0	0.04	0.4

Figures 3, 5 and Table 1 show that the content of gallic acid, rutin, and kaempferol in the extract of saffron buds is much higher than that of apigenin, and quercetin is not detected.

CONCLUSION

Due to the presence of many biologically active substances in saffron, it has been used in folk medicine for centuries to treat many diseases. Flavonoids also contribute to its valuable properties.

As a result of our research, the presence of important representatives of flavonoids, gallic acid, rutin, quercetin and kaempferol in the extract prepared from flower buds of saffron grown in Surkhandarya region of Uzbekistan was determined by high-performance liquid chromatography.

Based on this, we suggest the use of extracts, ointments and food additives based on this plant in folk medicine for the prevention and treatment of various diseases such as inflammation, cancer, cardiovascular diseases, diabetes and insomnia.

We emphasize that it is possible to obtain natural healing antioxidant food supplements based on this plant, especially due to its flavonoid content.

The presence of neuroprotective activity in most representatives of flavonoids found in saffron makes it possible to use medicinal food additives based on saffron in folk medicine for the treatment of Parkinson's disease, which is caused by a disorder of the central nervous system.

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