Journal of Chemistry of Goods and Traditional Medicine

J Chem Good Trad Med, Volume 4, Issue 6, 2025 Traditional Medicine

ANTIRADICAL PROPERTIES OF THE PLANT-BASED ASTUR OINTMENT

Shoxrux O. Turaxonov
Andijan State University, Acting Associate Professor of the Department of Natural Compounds and Food Chemistry, Doctor of Philosophy (PhD) in Chemistry
https://orcid.org/0009-0004-6601-4074
E-mail: shoxruxturaxonov83@gmail.com

DOI: https://doi.org/10.55475/jcgtm/vol4.iss6.2025.573

Keywords: 2,2-diphenyl-1-picrylhydrazyl, polyphenols, ellagic acid and ellagotannins are oxidants, stress, flavonoids, gallotannins, antioxidants

Annotation

In this article, the antiradical activity of 2,2-diphenyl-1-picrylhydrazyl (DPPH) solution of ASTUR ointment, obtained from plants, was studied in vitro. The discoloration of the purple 2,2-diphenyl-1-picrylhydrazyl (DPPH) solution allowed us to determine the presence of some pure antioxidant compounds with hydrogen atom or electron donating properties. Stable DPPH is a reagent used in spectrophotometric analysis, and the measured light absorption and antiradical activities of the samples were compared.

How to Cite

Turaxonov, S. O. Antiradical properties of the plant-based ASTUR ointment. Journal of Chemistry of Goods and Traditional Medicine, 4(6). https://doi.org/10.55475/jcgtm/vol4.iss6.2025.573

Pomegranate peel has been used in traditional medicine since ancient times. It contains compounds with antiradical properties, i.e., substances capable of neutralizing free radicals and exhibiting antioxidant activity. These include polyphenols; ellagic acid (which reduces the accumulation of free radicals in vascular walls and lowers the risk of atherosclerosis); ellagic acid and ellagitannins (which slow the growth of cancer cells and protect DNA from oxidation); gallotannins (which exhibit anti-inflammatory and antiradical effects); flavonoids (which participate in maintaining cellular redox balance); vitamin C (which strengthens immunity and neutralizes free radicals), and others [1–8].

The discoloration of a purple solution of 2,2-diphenyl-1-picrylhydrazyl (DPPH) allows the detection of pure antioxidant compounds capable of donating a hydrogen atom or an electron. The stable radical DPPH• is a reagent commonly used in spectrophotometric analysis [9]. In the present study, the method proposed by Blois [10] for evaluating the inhibitory activity against DPPH• free radicals was used with minor modifications. A 0.812 mM DPPH• solution was prepared in ethanol in a 100 mL volumetric flask, wrapped in aluminum foil, and kept in the dark at room temperature for 30 minutes. A 4 mL quartz cuvette was filled with 3 mL of the DPPH solution and 200 µL of ethanol (blank sample), placed in a spectrophotometer, and the absorbance (D1) at a wavelength of 517 nm was measured every 5 minutes for 30 minutes using a K7000 spectrophotometer (YOKE, China).

To obtain the ethanolic extract of the sample, 1 g of the sample was placed in a 50 mL round-bottom flask equipped with a reflux condenser and extracted with 25 mL of 96% ethanol using an ultrasonic bath with a power of 100 W for 20 minutes. The extract was cooled, and the required volume for analysis was filtered through a syringe filter with a pore size of 0.45 µm. To evaluate the antiradical activity of the sample, 5, 10, 15, and 20 µL of the extract were mixed with 3 mL of the DPPH solution, and the absorbance at 517 nm (D2) was measured following the same procedure. Ethanol was added to adjust the total volume in the cuvette to 3.2 mL. The antiradical activity of the samples was calculated using the following formula:

$$ARA\% = \frac{D_1 - D_2}{D_1} \cdot 100\%$$

Table 1. Measured absorbance values and antiradical activities of the blank and test samples added to the DPPH solution.

RESULTS AND DISCUSSION. The obtained results are presented in the following table:

Vaqt, sek	D_1	D_2 (5 mkl)	ARF%	D_2 (10 mkl)	ARF%	D_2 (15 mkl)	ARF%	D_2 (20 mkl)	ARF%
0	0,952	0,952	0,00	0,952	0,00	0,952	0,00	0,952	0,00
5	0,952	0,816	14,29	0,73	23,32	0,633	33,51	0,482	49,37
10	0,952	0,762	19,96	0,705	25,95	0,584	38,66	0,388	59,24
15	0,952	0,751	21,11	0,686	27,94	0,55	42,23	0,338	64,50
20	0,952	0,747	21,53	0,667	29,94	0,531	44,22	0,295	69,01
25	0,952	0,741	22,16	0,652	31,51	0,503	47,16	0,268	71,85
30	0,952	0,738	**22,48**	0,637	**33,09**	0,484	**49,16**	0,249	**73,84**

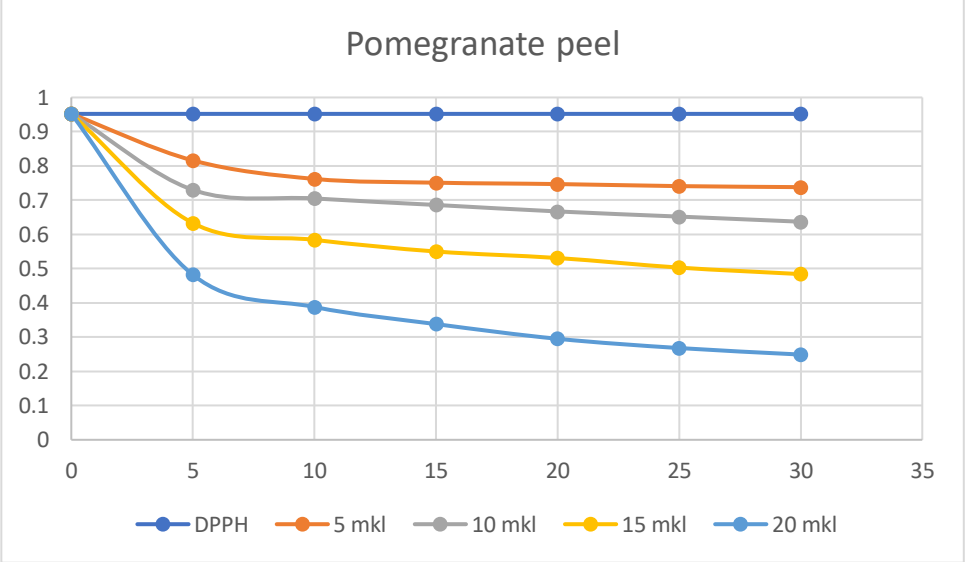


Figure 1. Graphical representation of the measured absorbance of the blank and test samples added to the DPPH solution.

To calculate the IC_{50} value of the sample—the concentration required to inhibit 50% of the DPPH solution—in each experiment a graph was constructed based on the absorbance at 5 minutes (D2) and the corresponding antiradical activity (ARF%). The IC_{50} value was then determined from the function of the fitted trend line.

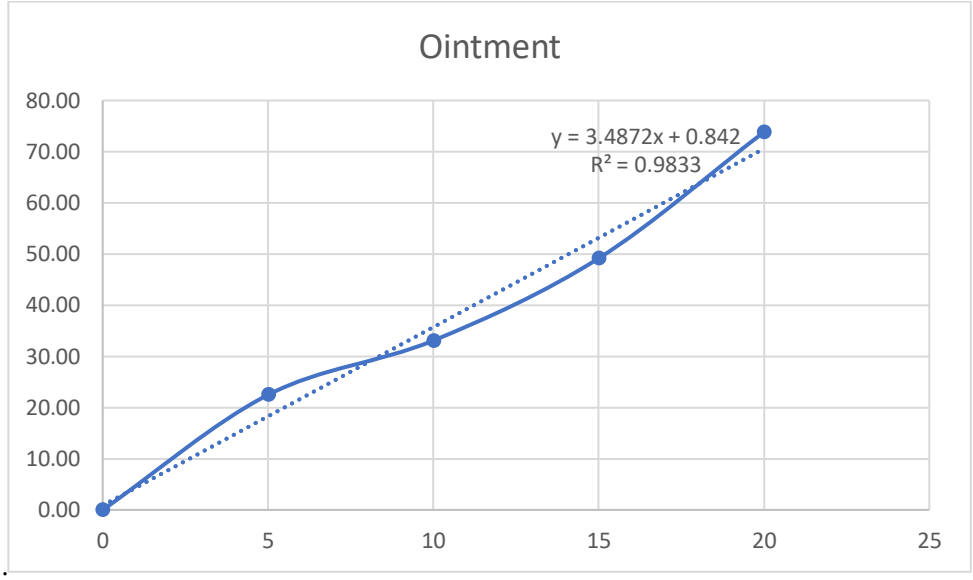


Figure 2. Graph showing the relationship between the ARF% values determined at 10 minutes and the volumes of the samples.

From the trend line function plotted on the graph, expressed by the equation y = mx + b, the volume corresponding to 50% ARF (IC_{50}) was calculated using the formula x = (y − b) / m.

$$IC_{50} = \frac{(50 - 0.842)}{3{,}4872} = 14{,}097\ mkl$$

Conclusion. As a result of the conducted studies, the antiradical activity of the ointment obtained on the basis of pomegranate peel was investigated at volumes of 5, 10, 15, and 20 µL. It was determined that the extract at 20 µL mixed with 3 mL of DPPH solution exhibited the highest antiradical activity. In conclusion, it can be stated that the sample demonstrates high antiradical activity; in particular, its IC_{50} value was determined to be 14.097 µL.

References

1. I.R. Askarov, H. Isakov, Sh.O. Torakhanov, M. Komilov "The importance of pomegranate, the king of fruits, in finding a cure for human ailments." "Folk medicine plus" scientific, practical, social, medical, educational journal No. 3(4) 2020, pp. 32-35.

2. Kh. Isakov, Sh. O. Torakhonov "The healing effect of polyphenols in pomegranate peel on the human body", "Folk Medicine Plus" scientific, practical, social, medical, educational journal No. 1(6) 2021, p. 46-47 .

3. I.R.Askarov, H.Isakov, Sh.O.Torakhanov "Obtaining medicinal products based on pomegranate peel", "Folk medicine plus" scientific, practical, social, medical, educational magazine #3(8) 2021. 5-7 p.

4. Kh. Isakov, I.R. Askarov, Sh.O. Turakhonov "Antioxidant activity of pomegranate peel extract" Ko'kan DPI Scientific reports March 2022 pp. 184-187.

5. И.Р.Асқаров, Х.Исақов, Ш.О.Тураконов О.Ш.Абдуллоев, “Obtaining monomethylol urea gallate ethers” Fardu. Ilmiy xabarlar. 2022 йил pp.88-92.

6. I.R. Askarov, H. Isakov, Sh. O. Turakhonov, O. Sh. Abdulloev "Methods of extracting gallic acid from pomegranate peel" Fardu. Scientific news. 25-30 p. of 2021

7. I.R.Askarov, Kh. Isakov, M.Kh. Mamarakhmanov, S. Usmanov, R. Sh. O. Turakhonov, U. Makhmudov “Quantum-chemical studies of the reaction of thiourea with formaldehyde” UNIVERSIUM: TECHNICAL SCIENCES Scientific journal Moscow Issue: 3 (84) March 2021. pp.16- 20

8. I.R. Askarov, Kh. Isakov, M.Kh. Mamarakhmonov, Sh.O. Turakhonov, N.Kh. Abdurakhimova, R.U. Makhmudov, N.N. Eserkeeva, S. Usmonov “Quantum chemical studies of the electronic structure of

trimethylolthiourea" UNIVERSIUM: TECHNICAL SCIENCEScientific journal Moscow Issue: March 2021. pp.25-27

9. Gulcin, I.; Beydemir, S.; Sat, I.G.; Kufrevioglu, O.I. Evaluation of antioxidant activity of cornelian cherry (Cornus mas L.). Acta Aliment. Hung. 2005, 34, 193–202..

10. Blois, M.S. Antioxidant determinations by the use of a stable free radical. Nature 1958, 181, 1199–1200.