

UDC 615.07:615.322  
AGRIS F60

<https://doi.org/10.33619/2414-2948/109/13>

## MEDICINAL PLANTS CONTAINING ANTHRACENE

©*Gasimov H.*, ORCID: 0009-0009-4075-3297, Ph.D., Nakhchivan State University, Nakhchivan, Azerbaijan, [hilalqasimov@ndu.edu.az](mailto:hilalqasimov@ndu.edu.az)

©*Seyidzade Z.*, ORCID: 0009-0009-2325-3266, Nakhchivan State University, Nakhchivan, Azerbaijan, [zulfiyyaseyidzada@gmail.com](mailto:zulfiyyaseyidzada@gmail.com)

## ЛЕКАРСТВЕННЫЕ РАСТЕНИЯ, СОДЕРЖАЩИЕ АНТРАЦЕН

©*Гасымов Г.*, ORCID: 0009-0009-4075-3297, канд. биол. наук, Нахичеванский государственный университет, г. Нахичевань, Азербайджан, [hilalqasimov@ndu.edu.az](mailto:hilalqasimov@ndu.edu.az)

©*Сейидзаде З.*, ORCID: 0009-0009-2325-3266, Нахичеванский государственный университет, г. Нахичевань, Азербайджан, [zulfiyyaseyidzada@gmail.com](mailto:zulfiyyaseyidzada@gmail.com)

*Abstract.* Various types of phytochemicals are present in plant parts such as bark, stem, roots, and other plant components. The distribution, chemical composition, and use of anthracene derivative-containing plants growing in Azerbaijan were investigated. Anthraquinones can be used as agents that have an active effect against malignant tumors and stimulate immunity against new malignant derivatives. Оxy- and oxymethylantraquinones of fennel have antispasmodic and diuretic effects, and the content of calcium and magnesium phosphates in them ensures the fragmentation and removal of urinary stones from the body. Methyloxanthraquinone derivatives are present in the bark, leaves, shoots, and fruits of *Rhamnus cathartica*. Freshly picked pods contain anthraglycoside frangulioriside, which oxidizes and turns into glucofrangulin when stored in pods for 1 year. Rhubarb root and its extracts have a laxative effect, increasing intestinal peristalsis. Aloe is used for skin care.

*Аннотация.* Различные типы фитохимических веществ присутствуют в частях растений, таких как кора, стебель, корни и другие компоненты растений. Исследованы распространение, химический состав и применение растений, содержащих производные антрацена и произрастающих в Азербайджане. Антрахиноны могут быть использованы как средства, оказывающие активное действие против злокачественных опухолей и стимулирующие иммунитет против новых злокачественных производных. Окси- и оксиметилантрахиноны фенхеля обыкновенного обладают спазмолитическим и мочегонным действием, а содержание в них фосфатов кальция и магния обеспечивает дробление и выведение мочевых камней из организма. Производные метилоксиантрахинона присутствуют в коре, листьях, побегах и плодах *Rhamnus cathartica*. Свежесобранные стручки содержат антрагликозид франгулиоризида, который при хранении в стручках в течение 1 года окисляется и превращается в глюкофрангулин. Корень ревеня и его экстракты оказывают слабительное действие, усиливая перистальтику кишечника. Алоэ используется для ухода за кожей.

*Keywords:* Azerbaijan, anthracene, anthraquinone, plant materials.

*Ключевые слова:* Азербайджан, антрацен, антрахинон, растительное сырье.

The study of biologically active substances contained in plants and the determination of their chemical and physical properties is considered necessary for obtaining new, more effective drugs from them. The main feature of herbal preparations obtained from medicinal plants, as well as other drugs, is that the various biologically active substances contained in them are in complex relationships with each other and with the patient's body. Thus, many anthraglycosides are able to enhance the peristalsis of the large intestine, due to which drugs based on them, as well as infusions and culinary products, tinctures, and extracts prepared from plant materials (senna, rhubarb, etc.), have a laxative effect. Anthraquinones have the ability to activate photooxidation and photoreduction reactions and are also biochemical electron carriers. Thus, various therapeutic effects of anthraquinones exist: antibacterial, antidepressant, antispasmodic, diuretic, antitumor, immunostimulating, etc. At present, their antitumor effect is being studied in a wide range. They are used not only in the medical industry but also their compounds with heavy metals—hydroxyanthraquinones are called "varnishes" and are used as dyes [1, 6, 7].

Anthracene derivatives are a group of phenolic compounds containing various forms of the anthracene ring. The aglycones that comprise them are aromatic compounds. Anthracene derivatives are very common in nature. They are found in higher plants, fungi, mushrooms, and in the bodies of some insects and sea creatures. Most of the currently known anthracene derivatives are obtained from higher plants. Anthracene derivatives are found in plants in both free and glycoside forms. Glycosides of anthracene derivatives are called anthraglycosides, and their sugar moieties are glucose-rhamnose, xylose, arabinose, etc., including monosaccharides. Most anthraglycosides are O-glycosides, and the sugar residue is attached to them in the  $\alpha$ - or  $\beta$ -position. Common anthraglycosides in medicinal plants are ruberic acid, sennosides A and B, gluco-aloe-emodin, etc. An example can be given. Most natural derivatives of anthracene are anthraquinones with substituents  $-\text{CH}_3$ ,  $-\text{CH}_2\text{OH}$ ,  $-\text{CHO}$ ,  $-\text{COOH}$ ,  $-\text{OH}$ , and  $-\text{OCH}_3$ . Emodins are more common in plants—derivatives of oxymethylantraquinone, differing from each other in the position and number of functional groups. The names of oxymethylantraquinones are directly related to the names of the plants from which they are collected (frangula-emodin in brittle and laxative species, rheum-emodin in rhubarb and horsetail, aloe-emodin in azvai).

#### *Material and methodology of the study*

The various types of methods are applied for the treatment of humans through medicinal plants. From plants and prepared medicines are used for the treatment of various diseases. physical, chemical, and biological methods based on chemical components [3, 4].

In the course of the research, generally accepted floristic, geobotanical, bioecological, and other methods were used; phenological observations were used. H. Gasimov, S. Ibadullayeva, M. Seyidov, G. Shiraliyeva "Wild vegetable plants in the flora of Nakhchivan Autonomous Republic" [2].

#### *Discussion and conclusions of the study*

Anthracene derivatives are crystalline substances, the color of which varies from yellow to red. Aglycones are insoluble in water, poorly soluble in benzene, and soluble in chloroform and alcohol. Glycosides are insoluble in organic solvents but soluble in low-molecular alcohol and acetone (some are also soluble in water). A medicinal product containing anthracene derivatives undergoes sublimation when the plant material is heated to a temperature of more than  $210^\circ\text{C}$ . Many anthraquinones are able to increase peristalsis of the large intestine and, due to this, have a laxative effect. Anthraquinones have the ability to activate photooxidation and photoreduction reactions and are also biochemical electron carriers.

Oxy- and oxymethylanthraquinones of a common dye have an antispasmodic and diuretic effect, and the content of calcium and magnesium phosphates in them ensures the fragmentation and removal of urinary stones from the body. Anthraquinones can be used as agents that are active against malignant tumors and stimulate immunity against new malignant derivatives.

Due to their chemical structure, they are not absorbed in the large intestine. They affect the intestinal epithelium and change absorption and secretion. In doing so, they change intestinal peristalsis. However, if they are consumed in excess, pseudomelanosis fungi form in the intestinal mucosa. Sometimes this leads to cancer. According to studies, such exposure to anthracene derivatives leads to the formation of tumor cells. Although short-term use of these substances is generally safe, long-term use is not recommended [2, 5].

Since their first appearance by the Arabs in the 19th century, anthracenes have been widely used as lactic acid agents. Due to their natural origin, they are considered harmless and are therefore popular remedies. They can also be considered lactic acids of medicinal origin. Their effect was first used on animals and then tested on humans. Frangule bark - Cotex Frangula

Plant: *Frangula alnus* Mill.

Chapter: Rhamnaceae

A small tree or shrub of blackish color. Blooms in May-June. Common in Guba, Khachmaz, Shamkir, Goygol, and other regions of Azerbaijan. Bark 0.2-0.5 mm thick is used as a medicinal raw material. The upper part of the shell is concave-protruding; the lower surface is smooth. The presence of burrs on the surface of the shell is not allowed. The smell of the raw material is weak; the taste is bitter. It is recommended to use peeled peels after 1 year of storage. The bark raw material is collected in early spring.

Methoxyanthraquinone derivatives are present in the bark, leaves, shoots, and fruits of the brittle blackthorn. Freshly picked pods contain anthraglycoside frangulioside, which oxidizes and turns into glucofrangulin when stored in pods for 1 year. Glucofrangulin bioside is broken down by enzymes into frangulin monoside and glucose. In addition, the crust of the brittle impurity also contains chrysophanol and rot. For medicinal purposes, a decoction (1:10) and a transparent and solid extract of the decoction are used. Since freshly picked bark contains anthraglycoside frangulioside, side effects appear—vomiting, nausea. Therefore, it is used either after aging for 1 year or after heating at 100<sup>0</sup>C for 1 hour.

Effects: Babatsilin, formed around the anus, is a natural medicine that reduces the risk of constipation, regulates digestion, promotes the renewal of liver cells, and at the same time helps to remove harmful toxins. Mordarchi bark has a diuretic effect, removes salts from the kidneys and urinary tract, and protects intestinal health, preventing the formation of parasites. also eliminates gases and bloating; these peels, having an antispasmodic effect, relieve spasms that occur in the muscles; is an effective cure for poisoning and also has an emetic effect; balancing blood circulation, reduces the risk of vascular occlusion and heart disease; maintains the smooth functioning of the spleen, helps bile to cleanse and flow; has a good effect on headaches, nausea, and insomnia.

Plant: *Rhamnus cathartica* L.

Working mud is a bush or tree with black bark. In the wild, it grows in different regions of Azerbaijan, from Ojumla to the Nakhchivan Autonomous Republic. There are spherical, berry-shaped, juicy pome fruits (Figure).

It is not allowed to mix ripe and dried pome fruits with fruits of fragile foam since they cause vomiting. They are distinguished by the presence of a beak-shaped protrusion on the seeds. Ripe fruits contain frangulin (rhamnoxanthin), frangulemodin and zosterin. The amount of

oxymethyltrichanone in the fruits is 1%. Brewing and cooking are used as a laxative for atonic and chronic constipation, when intestinal activity is weakened.



Figure. Fructus *Rhamnus cathartica* L.

Rhubarb root — *Rheum palmatum* L.

Plant: Tangut rhubarb — *Rheum palmatum* L. var *tanguticum* Regel.

Chapter: Polygonaceae.

This is an upright plant with a highly developed rhizome.

It has roots that are yellow on the inside, which are covered with a thin gray-brown cork on the outside. The roots have a bitter taste and a unique smell.

Contains anthracylines and vaccines. More than 5% of rheochrysin, glucoalo-emodin (glycoside of aloe-emodin), etc., are present. The plant accumulates aglycones and their original forms—anthranols. In summer and autumn, the plant accumulates more oxidized anthraquinones and reduced anthranols. Increasing intestinal peristalsis, it has a laxative effect. Vaccines have a strengthening and anti-inflammatory effect. The astringent effect of vaccines, as well as the laxative effect of anthraglycosides in large doses, is manifested when taken orally in small doses. doses.

A tree-like plant — *Aloe arborescens* Mill.

Chapter: Asphodelaceae.

This is an evergreen, juicy, tree-like, South African plant. Freshly squeezed juice, dried juice (sabar), biogenic stimulant preparations, as well as fresh leaves. This is a solid product obtained by drying the juice of Sabur-azvai leaves. Consists of black-brown pieces. It has a bitter taste and a faint unpleasant odor. Aloe—emodin (up to 2%), etc. Includes anthracylines. Other types include aloin (barbolin), isobarbolin, nataloin, etc., which refer to anthracene.

Aloin, when hydrolyzed, forms aloe-emodin and arabinose. Freshly squeezed juice is used as an appetite suppressant. Taken orally 2-3 times a day. Facilitates digestion, having a positive effect on the digestive system. Cleanses bile and relieves constipation. It is useful for stomach problems such as gastric ulcers. Reduces pain from burns. Very useful for skin inflammations and sunburn. Azvai, which is also used for skin care, moisturizes and renews worn-out skin. In addition to strengthening the immune system, it helps eliminate diseases such as goiter and tumors. It helps protect the body from infections.

### Results

1. Based on literature data, we have determined that one of the most common biologically active substances in plants is anthraquinones.
2. In medical practice, it is mainly used as a laxative, antibacterial, antidepressant, antispasmodic, diuretic, antitumor, and immunostimulating agent.
3. The distribution, chemical composition, and use of brittle impurities, laxative impurities, rhubarb root, and azvai, which are part of anthracene derivatives, were studied.

### References:

1. Adhikari, B., Marasini, B. P., Rayamajhee, B., Bhattarai, B. R., Lamichhane, G., Khadayat, K., ... & Parajuli, N. (2021). Potential roles of medicinal plants for the treatment of viral diseases focusing on COVID-19: A review. *Phytotherapy Research*, 35(3), 1298-1312. <https://doi.org/10.1002/ptr.6893>
2. Ayangla, N. W., Singh, N., & Kumar, A. (2016). Phytochemical analysis of plant species of genus *Zanthoxylum*. *International Journal of Medicine and Pharmaceutical Science*, 6(1), 1-8.
3. Wubetu, M., Abula, T., & Dejenu, G. (2017). Ethnopharmacologic survey of medicinal plants used to treat human diseases by traditional medical practitioners in Dega Damot district, Amhara, Northwestern Ethiopia. *BMC research notes*, 10, 1-13. <https://doi.org/10.1186/s13104-017-2482-3>
4. Maroyi, A. (2013). Traditional use of medicinal plants in south-central Zimbabwe: review and perspectives. *Journal of ethnobiology and ethnomedicine*, 9, 1-18. <https://doi.org/10.1186/1746-4269-9-31>
5. Mustafaeva, I. R., Ibadullaeva, S. Ch., Alekperov, R. A., Ismailov, A. Kh., Gasymova, Kh. Z., & Gasymova, Sh. Sh. (2015). Farmakognoziya (s osnovami botaniki). Nakhchyvan. (in Azerbaijani).
6. Rasool, A., Bhat, K. M., Sheikh, A. A., Jan, A., & Hassan, S. (2020). Medicinal plants: Role, distribution and future. *Journal of Pharmacognosy and Phytochemistry*, 9(2), 2111-2114.
7. Wubetu, M., Abula, T., & Dejenu, G. (2017). Ethnopharmacologic survey of medicinal plants used to treat human diseases by traditional medical practitioners in Dega Damot district, Amhara, Northwestern Ethiopia. *BMC research notes*, 10, 1-13. <https://doi.org/10.1186/s13104-017-2482-3>

### Список литературы:

1. Adhikari B., Marasini B. P., Rayamajhee B., Bhattarai B. R., Lamichhane G., Khadayat K., Parajuli N. Potential roles of medicinal plants for the treatment of viral diseases focusing on COVID-19: A review // *Phytotherapy Research*. 2021. V. 35. №3. P. 1298-1312. <https://doi.org/10.1002/ptr.6893>
2. Ayangla N. W., Singh N., Kumar A. Phytochemical analysis of plant species of genus *Zanthoxylum* // *International Journal of Medicine and Pharmaceutical Science*. 2016. V. 6. №1. P. 1-8.
3. Wubetu M., Abula T., Dejenu G. Ethnopharmacologic survey of medicinal plants used to treat human diseases by traditional medical practitioners in Dega Damot district, Amhara, Northwestern Ethiopia // *BMC research notes*. 2017. V. 10. P. 1-13. <https://doi.org/10.1186/s13104-017-2482-3>
4. Maroyi A. Traditional use of medicinal plants in south-central Zimbabwe: review and perspectives // *Journal of ethnobiology and ethnomedicine*. 2013. V. 9. P. 1-18. <https://doi.org/10.1186/1746-4269-9-31>

5. Mustafayeva İ. R., İbadullayeva S. Ç., Ələkbərov R. A., İsmayilov A. X., Qasimova X. Z., Qasimova Ş. Ş. Farmakoqnoziya (s osnovami botaniki). Naxçıvan, 2015. 668 с.
6. Rasool A., Bhat K. M., Sheikh A. A., Jan A., Hassan S. Medicinal plants: Role, distribution and future // Journal of Pharmacognosy and Phytochemistry. 2020. V. 9. №2. P. 2111-2114.
7. Wubetu M., Abula T., Dejenu G. Ethnopharmacologic survey of medicinal plants used to treat human diseases by traditional medical practitioners in Dega Damot district, Amhara, Northwestern Ethiopia // BMC research notes. 2017. V. 10. P. 1-13. <https://doi.org/10.1186/s13104-017-2482-3>

*Работа поступила  
в редакцию 05.11.2024 г.*

*Принята к публикации  
10.11.2024 г.*

---

*Ссылка для цитирования:*

Gasimov H., Seyidzade Z. Medicinal Plants Containing Anthracene // Бюллетень науки и практики. 2024. Т. 10. №12. С. 104-109. <https://doi.org/10.33619/2414-2948/109/13>

*Cite as (APA):*

Gasimov, H. & Seyidzade, Z. (2024). Medicinal Plants Containing Anthracene. *Bulletin of Science and Practice*, 10(12), 104-109. <https://doi.org/10.33619/2414-2948/109/13>