

All Aspects of *Hypericum perforatum* (St. John's Wort)

Hatice Savran^a, Onur Koyuncu^{a,*} and Ö. Koray Yaylacı^b

^a Eskişehir Osmangazi University, Department of Biology, 26480, Eskişehir-Turkey

^b Anadolu University, Faculty of Pharmacy, Eskisehir

***Corresponding author: okoyuncu@ogu.edu.tr**

This paper was presented at 3th IPSAT Congress, Afyon, Turkey, 18-20 December 2019

ABSTRACT

The treatment of herbs as old as human history is still popular today. Humans consider plants to be safe because of their natural origin for therapeutic and protective purposes, and therefore prefer herbal products. *Hypericum perforatum* (St. John's Wort) is one of these traditionally used medicinal herbs. local as St. John's Wort in Turkey, *Hypericum* herb, blood grass, sword grass, wound Grass, Kuzukır and English known by St. John's Wort name *Hypericum perforatum*, including L. Hypericaceae families in Europe, Asia, many grown in North Africa and the USA perennial plants. There are up to 500 species in the world. Is an important center in terms of *Hypericum* species are endemic to our country in Turkey and 50% of the approximately 100 species. It grows naturally in Marmara, Black Sea, Aegean, Central Anatolia, Mediterranean and Southeastern Anatolia. The plant is perennial and has a fringe root system. The leaves are in full leaf form and are mutually arranged on the stem. There are transparent pores on the leaves that can be seen when exposed to light and make the leaf look full of holes. The name for perforatum at which means porous in Latin originates from these pores on the leaf. Plant content of naphthodianthrones (hyperisin, pseudohypericin, isohypericin), flavonoids (hyperocytin rutin, quercetin, quercetin, biflavonoid), essential oils (carophyllene, α -pinene, sesquiterpenes), protein, tannin, carotene, vitamin C, resin, including at least 11 different classes of secondary metabolites. Dried or fresh flowering branches of *Hypericum* species are used in various ways in conventional treatment and in the treatment of many diseases. Among the people, tea, tincture and oil are used. In this study of biological *Hypericum perforatum* plants, pharmaceutical, medical, ethnobotany and evaluation it was made in Turkey and the world scale of the economic dimension. With this research, it has been once again revealed that our floristic richness, which is one of the important values of our country, and therefore the use of traditional plants are among our valuable values. Accordingly, we tried to contribute to our economic and cultural values.

Keywords: Ethnobotany, *Hypericum perforatum*, St. John's Wort, Medicinal Plants, Turkey

INTRODUCTION

Plants, which have been used for various purposes since ancient times, play an important role in improving human health. The use of plants in treatment started with human history. People consider plants to be reliable because of their natural origin for therapeutic and protective purposes, and therefore prefer herbal products. *Hypericum perforatum* is one of these traditionally used medicinal herbs. This plant, which is widely used in order to accelerate the healing of burns and wounds among the people, has been shown to have positive effects on wound healing. Our country is home to many medicinal and aromatic plants with its rich flora (Fig. 1).



Fig.1. *Hypericum perforatum* flower and seed

With the development of modern sciences, combined with the disciplines such as biology, chemistry, pharmacology and toxicology, it can illuminate the natural compounds, phytochemical structures found in the structure of many plants used as folk medicine and determine the biological activities. Locally in our country, “Sarı Kantaron, Binbirdelik otu, Kan otu, Kılıç otu, Mayasıl otu, Yara otu, Kayakıran, Püren otu and St. John's Wort in English. *Hypericum perforatum* L., known as John's wort, is a perennial herb that grows in Europe, Asia, North Africa and the United States of the Hypericaceae family. 'St. *Hypericum perforatum* L., known as John's wort or goat weed, has been used as a medicinal plant for 2000 years. The English name of the plant is considered to be a saint in the Christian faith. John (Baptist) was born in June, which is thought to have been attributed to this saint because he opened his golden flowers (Fig. 2).



Fig. 2. *Hypericum perforatum* leaf

Hypericum, 'hubs' and 'eikon' and the word is formed from a Greek word meaning 'exceptional'. It is believed that this name was given to the plant in ancient times because it was believed to expel evil spirits because of its special smell.

The use of the plant due to its antidepressant effect has a very recent history and has emerged for the last 20 years. The plant was first used by Proscridus, a military doctor during the Roman times, for diarrhea and biliary disorders. At the same time, the Greek physician Dioscorides recommended a number of medicinal uses of the plant. 1000 years later, the famous German physician Paracelsus first mentioned the use of plant mental disorders. Even recommended the application of alcoholic tincture to be prepared from fresh petals and leaves and stated that it should be protected from daylight. 200 years later, German physician J. Kerner referred to the use of this herb in the treatment of mental disorders such as melancholy. Later, German physician K. Daniel, unfortunately, did not receive much attention in his article, which he published by observing the plant extract in 20 patients suffering from depression and published it before World War II.

The genus *Hypericum* belongs to Clusiaceae family and Hypericaceae subfamily and has about 500 species in the world. Turkey is an important center in terms of *Hypericum* species and about 100 endemic species present 50.

Hypericum perforatum, also known as St. John's Wort, is one of these species. It is a perennial, yellow flowering plant. Hairless, erect, usually has a woody structure at the base. The leaves are stemless, oval and linear, with transparent glandular spots. Flowering time from June to September. It grows naturally in mesophytic areas up to 2500 m above sea level. This plant is mostly used in temperate and tropical regions of the world; road edges, grassy riverside, rocky and stony places, forest edges, meadows, neglected fields, winter humid, dry arid areas. Grows best in slightly acidic-neutral soils. Naturally distributed in Western Europe, Asia and North Africa, the plant grows in Marmara, Black Sea, Aegean, Central and Eastern Anatolia, Mediterranean and Southeast Anatolia Regions in Turkey. The plant originated from the arid regions of Europe and North America. It probably occurred in very early times as a result of spontaneous hybridization between *H. maculatum* and *H. attenuatum* and subsequent chromosome folding (Fig. 3).



Fig. 3. *Hypericum perforatum* tea

This medicinal plant has antitumor, antiviral, antidepressant, antibacterial, antiinflammatory, analgesic and hepatoprotective effects. In Europe This plant, known as John Wort, was found to be the richest source of hypericin (Hy) and its derivatives (pseudohypericin). Hypericin is the most powerful natural photosensitizer known. In recent years, these compounds have gained importance in the treatment of tumor and viral disease, as well as in moderating moderate depression. St. John's wort contains anthracene species (hypericin and pseudohypericin), flavonoids, phenolic compounds (hyperforin), procyanidins, vitamin C, carotene, protein, resin and essential oil.



Fig. 4. *Hypericum perforatum* oil

RESULTS AND DISCUSSION

Hypericum perforatum is a plant belonging to the Hypericaceae family (table 1). Antitumor of *Hypericum perforatum* plant and its components, antiviral, antidepressant, antibacterial, antiinflammatory, analgesic wounds and It has been determined that the effects on the healing of burns (Fig. 5).



Fig. 6. General appearance *Hypericum perforatum*

Table 1. *Hypericum perforatum* of Systematic

Divisio	Spermatophyta
Subdivisio	Angiospermae
Classis	Dicotyledoneae
Subclassis	Magnolipsida
Ordo	Theales
Family	Hypericaceae (Cluciaceae=Guttiferae)
Genus	<i>Hypericum</i>
Species	<i>Hypericum perforatum</i>

Contains Bioactive Ingredients

Naphthodianthrones (hyperisin, pseudohypericin, isohypericin), flavons (hyperosidin, rutin, quercetin, quercetin, biflavonoid), essential oils, protein, tannin, carotene, vitamin C, resin, hyperforin and other water-soluble components in *H. perforatum* it contains a large number of secondary metabolites of different classes.

Antidepressant Effects

H. perforatum extracts have been used as antidepressants in herbal medicine for centuries, and since the 1990s the plant has bioactivity is being studied intensively. Today, Hypericum-derived drugs are widely used in Europe and are gaining popularity in the USA. It is thought that the antidepressant effect of hypericum extracts is mainly caused by hyperforin, hypericin and quercetin (Fig. 7).



Fig. 7. *Hypericum perforatum* oil

Antiviral Effects

Hypericum species have been used in traditional medicine for the treatment of viral diseases such as lymphatitis, mumps, hepatitis, intestinal tumors. Especially hypericin and pseudohypericin are highly effective against lipid-bound or non-lipidated DNA and RNA viruses. These substances have been reported to be highly effective in preventing the spread of a large number of virus infections and the spread of HIV.

Cancer Preventing Effects

Hypericin is the most powerful natural photosensitizer known. The anticancer effect of hypericin is also due to this photosensitizer. Photodynamic therapy (PDT) is one of the new and promising methods for the treatment of cancer.

Wound Healing and Anti-Inflammatory Effects

Lipophilic extracts of *Hypericum perforatum* are known to have a curative effect on regional applications in superficial wounds, abrasions, burns, and skin inflammation. Hyperforin shows lymphocyte effect on various epidermal cells and has an effect on the increase of T lymphocytes. Hyperforin has proven significant benefits in reducing regional skin inflammation in regional applications(Fig. 8)



Fig. 8. *Hypericum perforatum* oil

Antibacterial Effects

H. perforatum's aerial plant extracts prepared from above-ground parts have a strong antibacterial effect and bacterial. There are many studies reporting that it can be used in the treatment of wounds and infectious diseases. In all studies alcoholic extracts were more effective than aqueous extracts; It has been reported that the antibacterial effect of hypericum extracts is largely due to hyperforin and hypericin and is stronger than gram-negative bacteria against gram-positive bacteria.



Fig. 9. *Hypericum perforatum* oil

Hypericum species, especially *H. perforatum*, have been extensively studied in the pharmacological and chemical sense for the last 30 years and a new one is added to the scientific studies on the medicinal properties and importance of these plants. With this research, it has been once again revealed that our floristic richness, which is one of the important values of our country, and therefore the use of traditional plants are among our valuable values. Accordingly, we tried to contribute to our economic and cultural values. *Hypericum perforatum* is a gift of nature as one of humanity's source of healing.

REFERENCES

- Anonymous (2019). *Hypericum perforatum* L.-Additional Information on, URL: <http://res2.agr.gc.ca/london/pmrc/english/stjohnswort.html>
- Baykal, T., (1977), Doğal Kaynaklı Bileşiklerin Biyolojik Aktivite Yönünden Değerlendirilmesi ve Tedavideki Yeri, GE, 46: 21-22.
- Baytop T (1999). Türkiye’de Bitkiler ile Tedavi Geçmişte ve Bugün. Nobel Tıp Kitabevi, ilaveli ikinci Baskı, İstanbul.
- Baytop, T., (1999), Türkiye’de Bitkiler ile Tedavi (Geçmişte ve Bugün), Nobel Tıp Kitabevleri, (480):166.
- Bohn, T.; Fabritius, E.; Kauth, S.; Plötz, S.; Hesemann, C-U; 1996; First Result of Comparative Investigation About Callus of Seven *Hypericum* species, International Symposium Breeding Research on Medicinal and Aromatic Plants, June 30- July 4, 1996, Quedlinburg, Germany, 286.
- Bronz I, Greibrokk T, Groth PA, Aasen J. (1982). The relative stereochemistry of hyperforin - an antibiotic from *Hypericum perforatum* L. *Tetrahedron Letters*.23:1299-300.
- Bystrov NS, Dobrynin VN, Kolosov MN, Chernov BK, Chervin, II. (1975). [Structure of the chromophoric part of hyperforin]. *Dokl Akad Nauk SSSR*.225:1327-8.
- Çirak, C., (2006). Hypericin in *Hypericum lydiu*m Boiss. Growing in Turkey. *Biochemical Systematics and Ecology* 34, 897-899.
- Çirak, C., A. Ayan, K. Kevseroğlu. (2004). The effects of light and some presoaking treatments on germination rate of St. John’s wort (*Hypericum perforatum* L.) seeds. *Pakistan Journal of Biological Sciences* 7:182-186.
- Couldwell WT, Gopala Krishan R, Hinton DR, He S, Weiss MH, Law RE & Apuzzo MLJ (1994). Hypericin apotential anti glioma therapy. *Neurosurgery* 35: 705-710.
- De Smet PA & Mohen WA (1996). St. John’s Wort as an antidepressant. *British Medicinal Journal* 313:241-242.
- Deltito, J., Bayer, D., (1998). The scientific, quasi-scientific and popular literature on the use of St. John’s wort in the treatment of depression. *J. Affect. Disord.* 51:345-351.

- Duke JA (1985). Handbook of Medicinal Herbs. CRC, Boca Raton, Florida, p. 242.
- Güner, A., Özhatay, N., Ekim T. ve Başer, K. H. C., (2000). Flora of Turkey and the East Aegean Islands (Supplement 2). Edinburgh University Press. (11), 71-72.
- Güner, A., S. Aslan, T. Ekim, M. Vural, M. T. Babaç. (2012). Türkiye Bitkileri Listesi (Damarlı Bitkiler). Nezahat Gökyiğit Botanik Bahçesi ve Flora Araştırmaları Derneği Yayını. İstanbul.
- Güner, A., S. Aslan, T. Ekim, M. Vural, M. T. Babaç. 2012. Türkiye Bitkileri Listesi (Damarlı Bitkiler). Nezahat Gökyiğit Botanik Bahçesi ve Flora Araştırmaları Derneği Yayını. İstanbul.
- Hışıl, Y., F. Şahin., S.B., Omay, (2005). Kantaronun (*Hypericum perforatum* L.) bileşimi ve tıbbi önemi. Uluslararası Hematoloji-Onkoloji Dergisi Cilt: 15 sayı: 4, 212-218.
- Hışıl, Y., F. Şahin., S.B., Omay, (2005). Kantaronun (*Hypericum perforatum* L.) bileşimi ve tıbbi önemi, Uluslararası Hematoloji-Onkoloji Dergisi Cilt: 15 sayı: 4, 212-218.
- Hobbs, Ch., (1996). St. John's wort, herbalgram (35):18-32.
- Khoska, R.L. and N. Bhatia, (1982). Antifungal effects of *Hypericum perforatum* L., j. sci. Res. plants. Med. 3:49-50.
- Koyuncu, F.T., Koyuncu, O. (2018a). Economic Dimension of Ecological Agriculture in Turkey, International Journal of Environmental Research and Technology, 1(2): 48-51.
- Koyuncu, F.T., Koyuncu, O. Emiroğlu, Ö., Sezer, O. (2018b). A New Hope For Turkish Agriculture Sector: Lavender, International Journal of Environmental Research and Technology, 1(2): 46-47.
- Mukherjee, P.K., B. Sresh, and R. Verpoote, (2001). Cns active potentials of some *Hypericum* species of India phytomedicine, Vol. 8 (5), pp.337.
- Nakipoğlu, M., Otan, H., (1992). Tıbbi Bitkilerin Flavonoitleri, J.AARI, 4(1): 70-93.
- Ollivier B et al., (1985). Separation et identification des acides phenols par chromatographie liquide haute performance et spectroscopie ultra-violette. Application à la pariétaire (*Parietaria officinalis* L.) et au millepertuis (*Hypericum perforatum* L.). J. Pharm Belg. (40), 173-177.
- Özçelikay G (1997). 1989-1995 yılları arasında sağlık bakanlığı tarafından bitkisel ilaçlar için verilen ithal ve üretim ruhsatları üzerine bir çalışma. XI. Bitkisel İlaç Hammaddeleri Toplantısı Bildiri Kitabı, Üniversitesi Eczacılık Fakültesi Yayınları No: 75, Ankara.
- Ozturk N, Korkmaz S, Ozturk Y. (2007). Wound-healing activity of St. John's Wort (*Hypericum perforatum* L.) on chicken embryonic fibroblasts. J Ethnopharmacol. 111:33-9.
- Özyurt MS (1992). Ekonomik Botanik. Erciyes Üniversitesi Yayınları, No:47, Kayseri.

- Plescher A & Fröbus I (1995). Leitlinie Für Den Effizienten und Umweltvertraeglichen Anbau von Johanniskraut in Thüringen. Jahresbericht 1-15.
- Robson, N. K. B. (1981). Studies in the genus *Hypericum* L.(Guttiferae) 2. Characters of the genus. Bulletin of the British Museum (Natural History) Botany Series, 8, 55-226.
- Robson, N.K.B., (2010). About this volüme= the monograph of *Hypericum* by Norman Robson Phytotaxa, Editorial 4, 1-4.
- Saddiqe Z, Naeem I, Maimoona A. (2010). A review of the antibacterial activity of *Hypericum perforatum* L. J Ethnopharmacol.131:511-21.
- Schempp, C.M., Hezel, S., Simon, C., (2003). Topical treatment of atopic dermatitis with *Hypericum* cream: a randomised, placebocontrolled, doubleblind half-side comparison study, *Hautarzt* 54, 248-253.
- Suntar IP, Akkol EK, Yilmazer D, Baykal T, Kirmizibekmez H, Alper M et al. (2010). Investigations on the in vivo wound healing potential of *Hypericum perforatum* L. J Ethnopharmacol.;127:468-77.
- Tadeg, H., Mohammed, E., Asres, K., Mariam, T.G., (2005). Antimicrobial Activities of Some Selected Traditional Ethiopian Medicinal Plants Used in The Treatment of Skin Disorders, J. Of Ethnopharmacol., 100(1):168-175.
- Tadeg, H., Mohammed, E., Asres, K., Mariam, T.G., (2005). Antimicrobial Activities of Some Selected Traditional Ethiopian Medicinal Plants Used in The Treatment of Skin Disorders, J. Of Ethnopharmacol., 100(1):168-175.
- Tolkunova NN, Cheuva EN, Bidyuk A. (2002). Effect of medicinal plant extracts on microorganism development. *Pishchevaya Promyshlennost.* 8:70-1.
- Tukel, T. ve Hatipoğlu, R., (2001), Çayır-meralarda zehirli bitkiler ve hayvanlar üzerinde etkileri, *Tarım Köy Dergisi*, 139.
- Tümen G & Sekendiz OA (1989). Balıkesir ve merkez köylerinde halk ilacı olarak kullanılan bitkiler. Uludağ Üniversitesi Balıkesir Necatibey Eğitim Fakültesi Yayınları, Balıkesir.
- Uzun, F. (2009). Ontogenic changes in hypericin content of some *Hypericum* species in natural pastureland of Turkey. *Bangladesh J. Bot.* 38: 13-18.
- Yetkin G. (2008). Türkiye’de satılan ticari kantaron yağı üzerinde fitoterapötik yönden araştırmalar (Yüksek lisans tezi). Ankara, Gazi Üniversitesi.