

NEWSLETTER

Knowledge of herbs –*Arnebia euchroma*

Arnebia euchroma, commonly known as 'Ratanjot' of Boraginaceae family grows in wild at an altitude of 4000 to 4200 m a.m.s.l. in the Himalayan region. Its roots are a good source of red naphthoquinone pigments. These metabolites have commercial importance as natural colorants in food, cosmetics, textiles and exhibit various medicinal and pharmaceutical properties.

Taxonomy Hierarchy

Familia: [Boraginaceae](#)
Subfamilia: [Boraginoideae](#)
Genus: [Arnebia](#)
Species: ***Arnebia***
subfamilia: [Boraginoideae](#)
Genus: [Arnebia](#)
Species: ***Arnebia euchroma***



Other common names

Afghan: yarlang, **chin.:** pinyin, zicao, **Japan:** nanshikon, **ladh.:** aam, **trade:** Ratanjot, **unani:** shanjar

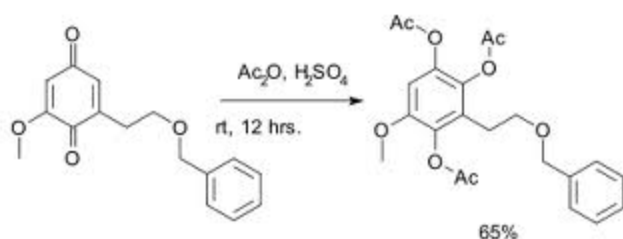
Description

Perennial growing to 0.3m it is hardy to zone 0. It is in flower from June to August, and the seeds ripen from July to September. The flowers are hermaphrodite (have both male and female organs) and are pollinated by Insects. The plant prefers light (sandy) soils, requires well-drained soil and can grow in nutritionally poor soil. The plant prefers acid, neutral and basic (alkaline) soils. It cannot grow in the shade. It requires dry or moist soil.

Biologically active constituents

Two quinonic compounds, arnebinone and arnebifuranone, were isolated from the roots of *Arnebia euchroma* and their structures were elucidated on the basis of spectral evidence. Arnebinone is a monoterpenyl-benzoquinone in which the monoterpene moiety forms a

fused ring to the benzoquinone. Arnebifuranone is another monoterpenylbenzoquinone with a furan ring containing side chain which is bonded to the benzoquinone at the head carbon of C10 moiety originating from the geranyl moiety of geranyhydroquinone.



Medicinal uses

The root is antipyretic, cancer, contraceptive, emollient and vulnerary [176]. It is used in the treatment of measles, mild constipation, burns, frostbite, eczema, dermatitis etc [176, 218]. Experimentally it has shown contraceptive action on rats, inhibiting oestrus, the fertility rate and the release of pituitary gonadotrophin hormone and chorion gonadotrophin hormone [176]. It inhibits the growth of cancer cells on the chorion membrane [176]. The root contains shikonin, an antitumour and bactericidal compound [218]. It inhibits the growth of *E. coli*, *Bacillus typhi*, *B. dysenteriae*, *Pseudomonas* and *Staphylococcus aureus* [218]. Shikonin also promotes the healing of wounds on topical application [176].

Other uses

The root contains a copious purple dye

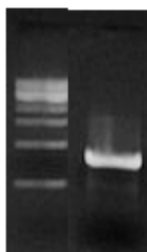
Pharmacological activities

Crude alcoholic extract, shikonin and its derivatives showed antitumor activity and anti HIV activity. Arnebin -1 showed antibacterial activity. Acetyl-shikonin and arnebinol derivatives showed prostaglandin synthesis inhibitory effect and anti-inflammatory activity. Anti complement activity and enhancement of immune-complex binding were observed in different polysaccharide fractions of root.

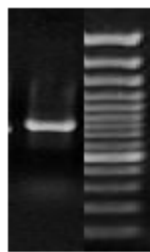
Adulterants/substitutes

A. euchroma var. *euchroma* is adulterated/substituted with *A. benthamii* (wall. ex G. Don) Johnston, *Onosma hispidum* wall ex D. Don, *A. euchroma* Var.

Genes involved in shikonin biosynthesis from *Arnebia euchroma*:



**Acetoacetyl CoA
Thiolase**



**Phenylalanine Ammonia
Lyase**



A cDNA library of *Arnebia euchroma* using colour producing and non producing suspension cultures was made. An emphasis was laid on sequencing of the library. Degenerate primer based cloning of gene was adopted. Construction and validation of the library and cloning of partial HMG COA reductase from *Arnebia* was done. Further, cloning of the following genes: DOXP-reductoisomerase, geranyl diphosphate synthase, calnexin, phenylalanine ammonia lyase and cytochrome P450 reductase, acetoacetyl CoA thiolase, IPP isomerase, PHB geranyl transferase and Full-length gene of geranyl diphosphate synthase and HMG C0-A reductase was achieved.

Dosage and safety aspects

There are no edible uses listed for *Arnebia euchroma*.

References

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