

## A minireview on *Cynoglossum* L. (Boraginaceae)

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### Abstract

The genus *Cynoglossum* L. consists of 55 species and it is widely distributed all over the world. It belongs to the Boraginaceae family; Members of *Cynoglossum* L. contain mainly pyrrolizidine alkaloids of many types that are reported to be used in various indigenous medicinal systems throughout the world for the treatment of cough, burns, wounds, ear infection, fever, antibacterial and sometimes as veterinary medicines. A wide range of phytochemical compounds like phenolic, tannins, alkaloids, flavonoids are isolated and identified from different species. Some plants of this genus were reported to be used for medicinally for their anti-inflammatory, antihyperglycemic, antihyperlipidaemic, analgesic, diuretic, antifertility, hepatoprotective activity antioxidant activity, etc. The literature on the genus of *Cynoglossum* L. is not well organized. Therefore, in the present study, a review has been carried out on various detailed pharmacognostic as well as medicinal values of the genus.

**Keywords:** *Cynoglossum* L, phytochemistry, anti-inflammatory

### Introduction

From ancient times a huge number population is depending on the traditional health care system in which locally available medicinal plants were used to meet primary health care. *Cynoglossum* L. (Boraginaceae) comprises about nearly 55 species that occur throughout temperate regions and upland parts of the tropics, which is widely distributed in Asia, Africa, and Europe. James *et al.* (2005) [1]. It contains biennial, perennial, or rarely annular herbs, leaves are usually basal and long petiolate and it is present in lower stem. It is uniform in external morphology and taxonomically difficult genus. Detailed observations of the micro-morphology of most of the *Cynoglossum* L. species are little and thus cannot be solved without proper research and investigation. Natural antioxidants have been studied, extensively, for decades in order to find compounds protecting against a number of diseases including atherosclerosis, neurodegenerative diseases, cancer, diabetes, and inflammatory, anti-cancer and hepatoprotective Ithem *et al* (2017) [3].

The members of *Cynoglossum* L. contains mainly pyrrolizidine, alkaloids of many types are reported to be used in various indigenous medicinal systems throughout the world for the treatment of cough, burns, wounds, ear infection, fever, antibacterial, anti-inflammatory, antihyperglycemic, antihyperlipidaemic, analgesic, diuretic, antifertility, hepatoprotective activity and sometimes as veterinary medicines. Anitha *et al.* (2013) [6]

### Phytochemistry

The literature survey showed that very little amount of phytochemical studied had been carried out of genus *Cynoglossum* and they are known accumulated pyrrolizidine alkaloids as a major role in folklore medicinal survey. Ithem *et al* (2017) [3] studied on *Cynoglossum cheirifolium* L. were preliminarily analyzed for their total amounts of phenolics, flavonoids, and tannins contents. Data revealed high

phenolic content 134.93±9.76 mg Gallic acid equivalent/g dry weight), flavonoid (99.99± 0.72 mg catechin Equivalent/g Dry weight). The antioxidant activity showed that inhibition concentration of 50% (IC<sub>50</sub>) value of 70±1µg/mL, Nicole *et al.* (1994) [9] reported on *Cynoglossum officinale* contained pyrrolizidine alkaloids in young leaves 190 times higher than older leaves. Anitha *et al.* (2012) [4, 5, 7] showed the phytochemical screening of *Cynoglossum zeylanicum* were revealed the presence of alkaloid, phenols, saponins, steroid, flavonoid, glycoside and xanthoprotein and antioxidant, antihyperlipidaemic, and antidiabetic effect were studied in Wister albino rats. The ethanol extracts of *Cynoglossum zeylanicum* at a dose of 150 and 300mg/kg of body weight were administered at a single dose per day to diabetes-induced rats. The extracts also caused a significant increase in plasma insulin ( $p<0.05$ ) in diabetic rats. Acute toxicity study revealed the non-toxic nature of the ethanol extract of *Cynoglossum zeylanicum* whole plant. Another study of Anitha *et al.* (2012) [4, 5, 7] revealed that Ethanol extract of *Cynoglossum zeylanicum* was evaluated for Oral Glucose Tolerance Test (OGTT) in normal and alloxan-induced diabetic rats. Oral administration of ethanol extract at doses of 100 & 150mg/kg body weight shows that the extract promotes glucose uptake.

### Diuretic, Analgesic and Anti-Inflammatory Activity

Chang *et al.* (2011) [2] studied the *Cynoglossum lanceolatum* Forsk has been used as in folk medicine to treat acute nephritis, periodontitis, acute submandibular lymphadenitis, snake bite, etc. To studied anti-inflammatory activity was evaluated using fresh egg white-induced paw edema in rats, carrageenan-elicited paw edema in adrenalectomized rats, and dimethylbenzene-induced inflammation in mice, and the analgesic action was estimated in mice using the acetic acid-induced writhing test and the hot-plate test. *Cynoglossum*

*lanceolatum* extract has evident diuretic, anti-inflammatory, and non-central analgesic activities.

Maruthiah *et al.* (2017) studied the *Cynoglossum zeylanicum* whole plant was with ethanol extracted and evaluated for anti-inflammatory activity in rats using a carrageenan-induced paw edema method. ethanol extract exhibits potent anti-inflammatory activity at 150mg/Kg 3rd hr after administration is compared with the reference standard drug, Indomethacin.

### GC-MS Analysis Of Bioactive Compounds

Anitha *et al.* (2012) [4, 5, 7] studied the *cynoglossum zeylanicum* (Vahl Ex Hornem) Thunb. Ex. Lehm. Was carried out to determine the possible bioactive components of whole plant of *cynoglossum zeylanicum* using GC-MS analysis. In the ethanol extract of whole plant of *cynoglossum zeylanicum* were 9,12-octadecadienoic acid, n-hexadecanoic acid, Borazine, 2,4,6-trimethyl, oleic acid, 9,12-octadecadienoyl chloride, isosorbide, ethanamine, n-ethyl-N-nitro, 2-furancarboxaldehyde, 5-hydroxyl methyl and phytol.

### Anti-Fertility Activity

Anitha *et al.* (2013) [6] was carried the ethanol extract of *Cynoglossum zeylanicum* was studied anti fertility activity in male albino rats. The weight of the testes and epididymis were decreased and the epididymal sperm count, motility and sperm abnormality were reduced in treated rats and in the plant extract treated rats an increase in serum urea, creatinine and the activity of liver marker enzymes (SGOT, SGPT and ALP) levels. The activities of serum antioxidants (CAT, SOD, GPX, GST and GRD) were decreased. It showed that increased serum levels of FSH and estrogen but decreased in the serum levels of LH and testosterone compared to control. The fertility test indicated that the treated adult male rats reduced the number of female's impregnation. The ethanol extract of *Cynoglossum zeylanicum* inhibited sperm concentration, motility and testosterone which might result in a male sterility.

### Induced Chemical Defenses In Invasive Plants

Sanford *et al.* (2008) [11] reported the evolution of increased competitive ability' (EICA) hypothesis is an extension of optimal defense theory and predicts that reduced pressure from insect herbivores in the introduced range. The EICA hypothesis considered that if herbivory is reduced in the introduced range, but chemical defenses are inducible in response to herbivory, induced and constitutive levels of induced defenses should be similar in introduced and native ranges. And the induced levels will occur less frequently in the introduced range where herbivory is reduced. For the preliminary studied the concentrations of total pyrrolizidine alkaloids (PAs) constitutive and induced concentrations did not differ between continents, but the variability of the induced concentrations was significantly greater for plants from the introduced range. Most chemical defenses in plants have been found to be inducible, so similar patterns may occur widely.

### Toxicological Evaluation

Rabinarayan *et al.* (2009) studied the Roots of *Cynoglossum glochidiatum* Wall. ex. Benth used by tribal people of Orissa (Kandha) for treating male sexual dysfunctions and infertility. Animal studies were done to find out the toxic

effect of the root of *C. glochidiatum*. The extract used did not produce any lethal effects but symptoms of high blood urea and fatty liver were observed.

### Conclusion

The majority of the research about the beneficial functions and it promotes for the treatment of cough, burns, wounds, ear infection, fever, antibacterial, anti-inflammatory, phytochemical, antihyperglycemic, antihyperlipidaemic, analgesic, diuretic, antifertility, hepatoprotective activity and sometimes as veterinary medicines.

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