Systemic Review: Martynia annua

SYSTEMIC REVIEW: PHARMACOGNOSY, PHYTOCHEMISTRY AND PHARMACOLOGY OF MARTYNIA ANNUA
Shankul Kumar*, A.K. Prasad¹, Satish V Iyer¹, S.K.Vaidya², Asit R. Sahu²
¹GHB Pharmacy College, Aniyad, Shehra, Gujarat, India
²CU Shah College of Pharmacy, Wadhawan city, Gujarat, India.
Received 29 Nov 2012; Accepted 22 Dec 2012

ABSTRACT
Over the past decade, herbal and ayurvedic drugs have become a subject of world importance, with both medicinal and economical implications. A regular and widespread use of herbs throughout the world has increased serious concerns over their quality, safety and efficacy. Martynia annua, locally known as “Vichchida or kagdo” (English name “Devil’s claw”) Fam. Martyniaceae has a diverse pharmacological and phytochemical importance. Thus, a proper scientific evidence or assessment has become the criteria for acceptance of herbal health claims. This review article explores the traditional knowledge or claims along with Pharmacognostical, Phytochemical, Pharmacological and future aspects of this plant. Over many centuries humans have been mining the bounties of nature for discovering new phytocconstituent that have been used for the treatment of number of diseases; many such treatments are useful even today as modern day medicine. Emerging evidence also suggests that search is still continuing for harnessing active compounds from nature in combating human illnesses and it also leads the path to search out new active natural and novel semisynthetic or synthetic compounds.

Keywords: Martynia annua, Vichchida, Martyniaceae, Devil’s claw.

INTRODUCTION:
During the past decade, the indigenous or traditional system has gained importance in the field of medicine. a large number populations depend on the traditional practitioners, who are dependent on medicinal plants to meet their primary health care needs.

*Corresponding Author
Shankul kumar
GHB Pharmacy College,
Aniyad, Gujarat
Email: kumar.sankul@gmail.com

Although, modern medicines are available, herbal medicine retained their image for historical and cultural reasons. Since the usage of these herbal medicines has increased, issues and moto regarding their quality, safety and efficacy in industrialized and developing countries are croppped up¹.². In order to make sure the safe use of these medicines, a necessary first step is the reviewing the whole plant for its potential as a medicinal plant. Martynia annua is a wild herb distributed throughout India. Materia medica of India provides lots of information on the folklore practices and traditional aspects of therapeutically important natural products.
PHARMACOGNOSTICAL REVIEW:

PLANT PROFILE:

<table>
<thead>
<tr>
<th>Taxonomy of <em>Martynia annua</em></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Kingdom:</strong> Plantae</td>
</tr>
<tr>
<td><strong>Phylum:</strong> Magnoliophyta</td>
</tr>
<tr>
<td><strong>Order:</strong> Scrophulariales</td>
</tr>
<tr>
<td><strong>Family:</strong> Martyniaceae</td>
</tr>
<tr>
<td><strong>Genus:</strong> Martynia</td>
</tr>
<tr>
<td><strong>Species:</strong> <em>Martynia annua</em> L.</td>
</tr>
<tr>
<td><strong>Common Name:</strong> Devil’s claw, Tiger’s claw, Shanke’s head</td>
</tr>
</tbody>
</table>

Vernacular Names:
Tamil: Thelkodukkukkay, Pulinagam; English: Devil’s claw, Tiger’s claw, shanke’s Head; Hindi, Punjabi, Urdu: Hathajori, Bichu; Malayalam: Puli – Nakam; Telugu: Garudamukku, Telukondicchettu; Marathi: Vinchu; Gujarati: Vichchida; Konkani: Shernui; Bengali: Bagbnoki.

Description:
*Martynia annua* Linn. is commonly known in ayurveda kaakanassikaa belongs to family Martyniaceae. It small herb found in throughout India and it is native of Mexico. It is herbaceous, stout, erect, branched, clammy pubescent, annual plant growing to a height of 90 – 120 cm. Found throughout India, in waste places, rubbish heaps and along road sides.
- Leaves large, 15 – 23 cm, opposite, chordeate, sinuate lobed and minutely dentate, broadly ovate to deltoid, often covered with a gelatinous dew-like substance.
- Flowers are pink and dark purple blotched with yellow inside, foxglove – shaped and ill – smelling having raceme inflorescence. Corolla glandular hairy with very oblique mouth lobes unequal, anterior transversely orbicular – oblong.
- Fruits are hard, bi-lobed, woody with 2 sharp recurved hooks⁴-⁷.

Chemical constituent:
- Steroid, palmitic acid, Oleic acid, Arachidic acid, Chlorogenic acid.

Use:
The plant has medicinal values. In tribal pockets of Chhindwara and Betul Districts, Madhya Pradesh, root decoction is administered for snakebite. In Marudhamalai hills, tribes use the juice of leaf for epilepsy, tuberculosis and sore throat. Besides these, the stem of the plant is used by Tantriks in some parts of India⁹-¹⁰.
Systemic Review: Martynia annua

Quantitative Microscopy:
Quantitative microscopy includes stomatal number, stomatal index, palisade ratio, vein-islet number and vein termination number. The value obtained for leaf constant is tabulated in (Table 1).

Physicochemical parameters:
Physicochemical parameter includes moisture content, total ash, acid insoluble ash, water-soluble ash, water-soluble extractive and alcohol soluble extractive. The values for physicochemical parameter are tabulated in (Table 2).

Microscopy:
- Transverse section of leaf is charactering by presence of multicellular covering trichome on upper and lower epidermis, palisade cell, spongy parenchyma, vascular bundle and collenchymas below the upper epidermis and above lower epidermis.
- Transverse section of stem is charactering by presence of multicellular covering trichome, parenchymatous cortex, endodermis, vascular bundles and centralise pith.
- Transverse section of root is charactering by presence of epidermis, parenchymatous cortex, endodermis and vascular bundles.

Powder Microscopy:
- Powder microscopy of plant is characterising by the presence of spiral vessel, stomata, trichome, and breaded epidermis.

PHYTOCHEMICAL REVIEW:
The preliminary phytochemical screening revealed the presence of alkaloids, terpenoids, flavonoids, steroid, amino acid and tannins in different solvent extracts. Phytochemical studies in Martynia annua are very little. List of Phytochemical compounds reported in Martynia annua are tabulated in (Table 3).

PHARMACOLOGICAL REVIEW:
Ethanopharmacology:
It is the scientific study of ethnic groups and their use of drugs. Ethnopharmacology is distinctly linked to plant use, botany, as this is the main delivery of pharmaceuticals. It is also often associated with ethnopharmacy. However, Ethanopharmacology differs from ethnopharmacy in that it is the biological evaluation of how effective traditional medicines are, whereas ethnopharmacy deals instead with much broader considerations of drug use. These considerations are related to the perception, use, and management of pharmaceuticals within a given human society.
The leaves of the plant are eaten in times of scarcity. They are reported to be used in epilepsy and tuberculous glands of the neck, the juice are used as a gargle for sore throat. The fruit is considered alexiteric and useful in inflammations. The other ethanobotanical properties are tabulated in (Table 4).

PHARMACOLOGY OF EXTRACTS:
Antifertility effect
The effects of 50% ethanol extract of Martynia annua L. root on reproduction was studied on male rats. The study was divided into four groups of five animals each. The first group (I) received vehicle alone to serve as control. The second, third and fourth groups (II, III and IV) of animals were administered the root extract daily at 50 mg/kg body weight, po, 100 mg/kg body weight, po, and 200 mg/kg body weight, po, respectively, for a period of 60 days. Significant decreases in the weights of testes, epididymides, seminal vesicle and ventral prostate were observed. A dose related reduction in the testicular sperm count, epididymal sperm count and motility, number of fertile males, ratio between delivered and inseminated females and number of pups were observed. The tests showed a clear
Systemic Review: Martynia annua

correlation between the dose and severity of lesions of seminiferous epithelium. In general, the seminiferous tubules appear reduced in size with a frequently filled eosinophilic material. Spermatogenesis arrested at the secondary spermatocytes stage. Pachytene spermatocytes were undergoing degeneration. Disorganization and sloughing of immature germ cells were visible. Leydig cells were atrophied. No morphological changes were observed in Sertoli cells. Significant reduction in serum concentration of luteinising hormone and testosterone were observed. No distinct change in serum FSII concentration was recorded. The final body weights of all groups were elevated markedly. No alterations were recorded in any hematological parameters. It is concluded that the 50% ethanol extract of M. annua root produced dose related effects on male reproduction without altering general body metabolism.

**Anticonvulsant activity**

The methanolic extract of Martynia annua Linn. (MEMA) was subjected to acute toxicity and then screened for anticonvulsant activity on Maximal Electroshock (MES) and Pentylenetetrazole (PTZ) induced seizures models in albino wistar rats. Acute toxicity of extract was non toxic up to the recommended dose 2000 mg/kg body weight orally as per OECD guidelines No. 423. Animals were treated with MEMA at doses of 200 and 400 mg/kg body weight. These studies showed, the mean duration of extensor phase of test group reduced to significant level as compared to control group. In Pentylenetetrazol induced seizure test, onset of myoclonic spasm and clonic convulsion was delayed in the test group. MEMA showed anticonvulsant activity against MES and PTZ animal models.

**Antibacterial activity**

The Chloroform, ethyl acetate and methanol extracts of Martynia annua were tested against 6 Gram positive and 9 gram negative bacteria. In Chloroform extract the activity was high in Proteus vulgaris which is followed by Bacillus subtilis and B.thuringensis. In Ethyl acetate, the activity was very high, only in gram negative bacteria namely Salmonella paratyphi. A, B., Proteus mirabilis, P.vulgaris and Klebsiella pneumoniae. In Methanol extract, Proteus vulgaris, B.subtilis, S.paratyphi .B and Pseudomonas aeruginosa the activity ranges from 12mm to 22mm. In all the three solvent systems the antibacterial activity was very high in 100% concentration alone.

**Antioxidant Activity**

The antioxidant activity of the methanolic and aqueous extracts of Martynia annua Linn. leaves were studied in vitro systems of assay, namely, reducing power assay, DPPH radical-scavenging activity, nitric oxide scavenging activity, H2O2 radical scavenging activity, superoxide radical scavenging assay, hydroxyl radical-scavenging activity, and total antioxidant capacity. Total phenolic content was measured by Folin–Ciocalteau reagent. The antioxidant property depends upon concentration and increased with increasing amount of the extract. The free radical scavenging and antioxidant activities may be attributed to the presence of phenolic and flavonoid compounds present in the extract. The results showed that the methanolic extract exhibited higher antioxidant activity than the aqueous extract.

**Wound healing activity**

The wound healing property of M. annua Linn leaves extract were studied by using two wound models Excision wound model and incision wound model. Epithelialization period was decreased as a result of treatment with different fractions of M. annua Linn. Additionally, there was a reduced visible scar area. There was a significant increase in the tensile strength and hydroxyproline content compared with control group and comparable to reference group (P<0.01). The observation and results in this study indicate that MAF-C fraction of M. annua Linn. may significantly stimulate wound contraction as well as epithelialization.

**Antifungal activity**

Fourteen coastal sand dune plants (CSDPs) belonging to nine families were screened for AM fungal association from Amala and Kalamb
beach and the results obtained suggest that, all fourteen plant species belonging to nine different families were colonized by AM fungi (Table 1). CSDPs which exhibited 50-75% AM fungal colonization are viz., I. pes-caprae (Kalamb beach), Panicum spp 2, S. portulacastrum, S. rhombifolia, T. procumbens etc. Whereas, CSDPs viz., C. rotundus, E. prostrata, E. zeylanica var. zeylanica, Hedyotis spp., I. pes-caprae (Arnala beach), L. procumbens, M. annula, Panicum spp 1, P. punctatum, and S. orientale etc. showed more than 80% AM fungal colonization. In present investigation out of 14 plant species, seven showed more than 90% colonization which were: C. rotundus, E. zeylanica var. zeylanica, I. pes-caprae (Arnala beach), L. procumbens (Kalamb beach), M. annua, P. punctatum and S. orientale etc., amongst these seven plants exhibited highest percentage colonization which was absolutely 100% in L. procumbens (Kalamb beach) and S. orientale.

**Antipyretic Activity**

The aqueous extract of Martynia annua is having Antipyretic and anti allergic activity. It is also having blood purifying action.

**ACKNOWLEDGEMENTS:**
The authors are thankful to, The Chairman, Director, and Principal of GHB college of Pharmacy for providing facilities.

**REFERENCE:**

9. Traditional knowledge on ethno-medicinal uses prevailing in tribal pockets of Chhindwara and Betul Districts, Madhya Pradesh, India - Nath Vijendra and Khatri Pavan Kumar.
10. Some Medicinal plants used by Irular, the tribal people of Marudhamalai hills, Coimbatore, Tamil Nadu - M.Senthilkumar, P.Gurumoorthy, and K.Janardhanan


