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ASTHI SHRANKHALA (*Cissus quadrangularis* L.) : AN ETHNOMEDICINAL PLANT

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Key words : *Slope of the Western Ghats, osteoporosis, osteopenia, collagen, callus.*

Cissus quadrangularis is a medicinal plant which is effectively used in curing bone fractures. Ethnomedicinal aspects of this species have been discussed in this communication.

INTRODUCTION

The medicinal plants are widely used by all sections of the Indian population whether directly as folk remedies or as effective medications because they are less expensive, easily available and are without any side effects. Folk medicines are growing in importance as repository of information on medicinal plants and folk drugs. Various features of folk medicines in different tribal and rural areas of the country have been documented recently by Jain (1991). Indigenous system of medicines are widely prevalent in the rural areas, urban slums and tribal belts in the state of Bihar since long. Most of the ethnobotanical work carried out in this state has been related to south Bihar because from the beginning the tribal areas of south Bihar have been an interesting field for study for many ethnobotanists whose contributions throw light on the folklores of various ethnic groups.

Medicinal plants stand out as being exceptional for their ethnic, botanical and pharmaceutical uses. The present paper deals with the ethno-medicinal values of *Cissus quadrangularis* L. which belongs to the family Vitaceae of angiospermic plants, commonly known as HADJOD. It is a herb, growing in different localities of Sitamarhi and tarai areas of Nepal. The plant is known by different names like *Vajravalli*, *Hadbhanga*, *Vedhari*, *Veldgrap*, edible stemmed vine, etc. It is a perennial herb found in subtropical and warmer parts of the world, reaching a height of 1.5 m and having quadrangular sectioned branches with internodes 8-10 cm long and 1.2-1.5 cm wide. It grows in hot, dry regions of the Deccan Peninsula and lower slopes of the Western Ghats. The leaves are simple or lobed, cordate, broadly ovate or reniform, serrate, dentate, sometimes 3-foliate and glabrous. The flowers are small, greenish white, bisexual, tetramerous and fruits are globose or obovoid. The stem of *Cissus quadrangularis* L. resembles the shape of bones and joints in the body.

Plants of this family are known for their medicinal uses and as a potential source of raw material for pharmaceutical industries. The whole plant is used for the treatment of various diseases. It is used as a tonic and analgesic, and is prescribed to heal broken bones in ayurveda and hence named as *asthisamharaka*.

Some of the noteworthy contributions in this regard are those of Tarafdar (1984, 1988), Jain (1986), Kumar and Goel (1998), Topno (1997, 1999) and Sharma (1999).

Cissus quadrangularis L. has important medicinal values and is used by ethnic population as a medicine for bone fractures, osteoporosis and osteopenia. *Cissus quadrangularis* L. increases the rate of fracture healing and enhances entire remodeling process of the bones (Singh *et al.* 2011).

Study Area: The present work is based on the intensive study of medicinal plants of Sitamarhi and Tarai areas of Nepal. Sitamarhi is a district situated in the Northern part of Tirhut division having an area of 2643.0 sq kms. It is spread lengthwise from

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east to west covering about 55 kms and north to south about 48 kms in breadth. It is part of Bihar plains and is 80 meters above the sea. Rainfall normally ranges between 1100 mm and 1370 mm in the district. The maximum temperature ranges between 32.2°C and 40.5°C. Humidity becomes high in the rainy season in the northeast region due to its proximity to the Himalayas. The soil of the district can be classified as loam, sandy loam, clay and clay loam.

MATERIALS AND METHODS

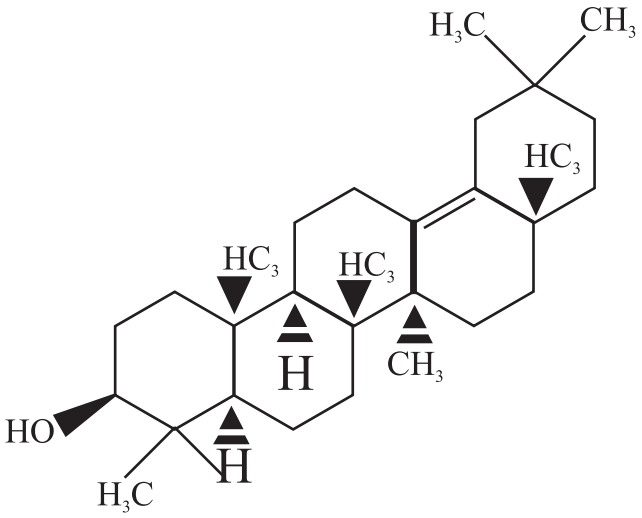
The district Sitamarhi consists of two subdivisions namely Sitamarhi east and Sitamarhi west. There are 15 community development blocks in the district. The survey of folk medicinal plants was conducted in all the fifteen blocks of Sitamarhi and in Nepal Tarai in different seasons of the experimental years. The medicinal plants and their ethno-medicinal information have been collected during the field trips.

OBSERVATION

The present study involves field work, interviews, medicinal uses collected from the native informants, elderly village people, common people of the district, banjaras, nuts. bhutias, saints, hermits, saharias and paharias of tarai areas of the Himalaya in Nepal. New informations were recorded on the spot and specimen of *Cissus quadrangularis* L. was collected and preserved for future use. Herbarium specimens were deposited in the Department of Botany, B.R.A. Bihar University, Muzaffarpur. The plant species were identified with the help of available floras (Hooker, 1872-1897; Duthie, 1903-1929 & Maheshwari, 1962). Detailed taxonomic identification of the plant was made with the help of "The botany of Bihar and Orissa" by H. H. Haines (1961 vols-1, 2, and 3). Collected plant (*Cissus quadrangularis* L.) was noted with family, common name and distribution.

Active Constituents : The plant (*Cissus quadrangularis* L.) contains potassium, calcium, zinc, sodium, iron, lead, cadmium, copper, calcium oxalate and magnesium. It contains flavonoids, triterpenoids, vitamin C, phytosterols, etc. Out of these, ascorbic acid, triterpene, b-sitosterol, ketosteriod, penta cyclictriterpenoids (delta-Amyrin) and calcium were identified as major constituents of this plant (Data on file R & D Zandu zanosto).

Chemical structure:



Chemical structure of Delta-Amyrin

Medicinal Uses : *Cissus quadrangularis* L. is very effective in strengthening the bones and joints and is used for bone fractures and weak bones (osteoporosis). In addition to speeding the modeling process of healing bones, it also leads to a much faster increase in the tensile strength of the bone (Raj and Joseph, 2011). The anabolic steroidal principles from *Cissus quadrangularis* L. has a prominent influence on the rate of fracture healing by influencing the early regeneration of all connective tissues involved in the healing process and also by quicker mineralization of the callus, as recorded by Mishra *et al.* (2010). Pharmacological studies of *Cissus quadrangularis* L. showed better fracture healing property and can be a breakthrough in the management and early mobilization of facial fractures recorded (Mohammad *et al.* 2014). It is also considered important as a herbal remedy in mandibular fracture healing.

Parts used: The stem or stem bark is most commonly used to prepare medicine, which is of highest value in treating bone fracture. It is also administered for bone strengthening, pain relieving, inflammation reduction and speedy recovery for augmenting bone development.

RESULT AND DISCUSSION

Cissus quadrangularis L. which belongs to the family Vitaceae and is found in Sitamarhi and Nepal Tarai, has been analysed for its morphological characteristics, distribution, folk and medicinal uses, parts used and its active constituents. Plants of this family are well known for their medicinal values in strengthening the bones and joints and are used for bone fractures and osteoporosis and as a source of raw material for the pharmaceutical, herbaceutical, ayurvedic and allopathic industries. The chemical constituents do contain the required minerals such as calcium, magnesium, sodium and potassium. They have been identified as major constituents of this plant for bone strengthening, pain relieving, inflammation, reduction and speedy recovery. Apart from this, plant runs the risk of containing toxic chemical constituents that can harm humans. The present study unveils and divulges that at any rate research on this plant is important.

CONCLUSION

Cissus quadrangularis L. is effective in the management of colle's fracture, the commonest fracture in the people of more that 40 years of age and common due to post-menopausal osteoporosis. It is safe, cost effective and free from side effects, as recorded by Arawatti *et al.* (2012). The varied phytochemical properties, ethno-botanical attributes and medicinal uses of the plant accelerate fracture healing and also cause early remodeling of fracture bones. The study compels to think that cultivation and conservation of medicinal plants of different climatic conditions is essential. The cultivation and conservation of medicinal plants in varied climatic conditions are growing in nature. It is highly desirable that steps should be undertaken for their protection, propagation and systematic scientific exploration for meeting out the future needs.

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