Traditional Remedy for Muscle Strain Using *Ipomoea carnea* Jacq. and *Ricinus communis* L. Leaves in Haryana, India

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Abstract

Traditional practices have played an important role in various Indian medicine systems, but have now become confined to remote rural areas. Due to change in the lifestyle and economic status with increased influence of market economy, the transfer of indigenous knowledge about medicinal plants to the younger generations has been declining. There are few studies available from the state of Haryana which document the traditional knowledge of locals, of various medicinal plants and their uses. This might lead to loss of local knowledge in due course of time. The article describes a unique traditional practice of treating muscle strain by farmers using leaves of two widespread wild medicinal plants viz., *Ipomoea carnea* Jacq. (Convolvulaceae) and *Ricinus communis* L. (Euphorbiaceae). Focused group discussions with experienced rural folk and extensive household survey were conducted in village Muradnagar in the district Kurukshetra of Haryana, India. The mature leaves in former and tender in later were found effective in this ailment. The practice has been reported to provide healing in acute pain within one week of regular use. The documentation will help in the preservation of indigenous knowledge from rural sector of Haryana.


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1. Introduction

The modern medical system coexists with several traditional systems across the globe, mostly based on use of natural and locally available products including wild plants available in the region. A large number of wild plants are reputed to have tremendous medicinal value and have been playing a significant role in folk medicines as remedy for treating various ailments for centuries in many societies across the globe (Srivastava et al., 1996). Indigenous traditional practices have been an important part of various Indian medicine systems for long but have now become confined to certain communities in remote rural areas because of various reasons; primarily changing lifestyle and economic status. In these areas, local communities use herbal medicines to cure a variety of diseases with a number of plants particularly used as folk medicine to cure various diseases including muscle strain. Demographically, agriculture is broadest economic sector in India that employs both traditional as well as modern farming techniques. Farmers in remote rural areas do heavy physical activities daily, often resulting in muscle strain. Many of them use traditional remedies because of their beliefs and knowledge inherited from forefathers, poor economic conditions or lack of medical facilities. Hence, traditional knowledge plays a significant role in the local health care system. However, the knowledge is not well documented in many regions but has passed on from one generation to other verbally without knowing scientific phenomenon lying behind.
Documentation of such knowledge has greatly been confined to remote hill communities of Himalaya or tribal across the country, while rural folks of agricultural state such as Haryana found negligible representation. Thus, we have tried to document the ethnomedicinal use of two widely available species by farmers of Haryana. Both the species described here are widely available in their range and method of usage described is very easy which could be repeated and studied further. Also, further studying the species may add to the development of pharmaceutical sector.

1.1. Description of Ipomoea carnea Jacq.
Vernacular name: Gulabansh, Gulabansha, English name: Bush morning glory, Family: Convolvulaceae Ipomoea carnea, known as Besharam in Hindi (meaning shameless, due to its rampant spreading habit) is a native of South America and grows in dense populations along the river beds, banks, canals and waterlogged areas. In India, it has become a naturalized species invading the wetlands, canals, drain banks, waste lands, field edges and road sides. The plant can propagate both vegetatively by stems which show rooting within a few days and sexually by seeds, and has rapid growth rate. Leaves are 6-9 inches long with a rich green colour (Figure 1, a).

The species is used as folk medicine in traditional medicinal systems including Ayurveda, Siddha, and Unani (Sharma and Bachheti., 2013). The most successful use of the species is in skin diseases; particularly the milky juice (latex) of plant is beneficial in treatment of leucoderma (Adusul et al., 2009). The latex is used as an antiseptic for treating lesions in traditional medicines because of its anti-inflammatory effects (Chowdhury et al., 1997). Extract of whole plant prepared in hot water is used as an antiseptic for treating wounds, skin infections and inflammation (Inman, 1967). However, it has spread in many regions of North and South America, Africa, Asia and Europe (Scarpa and Guerci, 1982). It is a fast growing plant growing up to 8 feet tall; while in the cooler regions, it grows up to 1.5 feet tall. Leaves are 6-11 lobed, palmate with uneven serrated edge (Figure 1, b).

The species is used in the traditional systems of medicine across the globe (Scarpa and Guerci., 1982). Plant is shown to have hepatoprotective, hypoglycemic, diuretic, laxative and antibacterial properties (Scarpa and Guerci, 1982; Visen et al., 1992; Capasso et al., 1994). Various parts of the plant, particularly the leaf, root and seed oil have been used for treatment of various liver disorders, respiratory diseases, cardiovascular conditions, digestive disorders, bone deformities, articular pains, rheumatism and as a therapeutic agent in acute inflammatory conditions (Pierre-Noel, 1959; Kirtikar and Basu 1991). Plant is also used in various ailments of urogenital apparatus and nervous system and for infectious diseases (Dastur, 1962; Watt and Breyer-Brandwijk, 1962). The seeds contain ricin (one of the main toxic protein present in the plant), which has been proven toxic to humans, animals and even insects (Kingsbury, 1964).

1.3 Anti-inflammatory property of Ipomoea and Ricinus
A number of studies (Afifi et al., 1988; Ilavarasan et al., 2006) have revealed the presence of alkaloids and flavonoids in both the plants, which may be responsible for their pharmacological activities. These phytochemicals are well known for their
ability to inhibit pain perception. Flavonoids inhibit the activity of enzymes involved in the production of chemical mediator for inflammation. These constituents have been reported to exert potent analgesic and anti-inflammatory properties (Li et al., 2002; Okwu and Josiah, 2006).

Both the species grow rapidly and are widely distributed throughout India, often occurring as weed. *Ipomoea carnea* has rapid growth rate and is adaptable from aquatic to xerophytic habitats, and has the potential to become another ecological disaster like water hyacinth (Mohanty and Mishra, 1963). The sustainable pharmaceutical exploitation of these plants can help to reduce and control their spread in agriculture lands.

1.4 Objective of Research
Changes in the life styles and economic status of indigenous communities with increased influence of market economy, and lack of interest among youth have resulted in decline in transfer of indigenous knowledge about medicinal plants from one generation to other. There are few studies available from the state of Haryana which document the traditional knowledge of locals of various medicinal plants and their uses. This might lead to loss of local knowledge in due course of time. Therefore, present study is an attempt to document a unique traditional practice to cure acute muscle strain (pull), using leaves of two widespread wild plants viz., *Ipomoea carnea* Jacq. (Convolvulaceae) and *Ricinus communis* L. (Euphorbiaceae) by a farmer community in Haryana, India.

1.5 Justification of Research
The information on ethnomedicinal use will be helpful in preservation of traditional knowledge of farmer community from state of Haryana, as several indigenous remedies are neither well documented nor known to younger generations. Both the species described here are widely available in their range and method of usage described is very easy which could be repeated and studied further. Also, further studying both the species may add to the development of pharmaceutical sector.

2. Materials and Methods

2.1 Need of study
Despite the varied and vast flora (1062 plant species) in Haryana, information on the traditional knowledge of locals about medicinal plants and their uses is still limited and only a few studies have been made to understand the medicinal floristic wealth of the state. Due to low forest cover and predominant agricultural as well as industrial sector, documentation and preservation of traditional knowledge on ethnomedicinal plants have not received attention in the state.

2.2 Methodology
The practice was first noticed in the year 2013 by one of the authors during a visit to the area and a study framework was formulated later on. The study is based on the detailed survey and systematic record of traditional remedy being practised for muscle strain in the region conducted in the same year (2013). The study consisted of two parts: (i) Focused group discussion with experienced rural folk (randomly 4-5 people) at village level, and (ii) extensive survey at household level with practical demonstrations by willing informant. An initial brief, open-ended discussion was conducted with the community in local language, i.e. *Haryanvi* (a dialect of Hindi) prior to ethnobotanical data collection based on a standardized set of questions and to explain to them that study would be a valuable contribution to the documentation of the traditional plants from the region and incomplete without their cooperation. This was later followed by a door to door survey. Households were the basic sampling units with a sample size that best represented the population. Semi-structured questionnaire consisting of both open and close ended questions were used (Bernard, 1988), which included questions regarding plant parts used for curing disease, vernacular name, their formulation and mode of administration and also if the use is frequent in the family or by the informant. Informants were also asked the reason for not using the remedy if they knew about it. The respondents included family heads, village youth, and old experienced and knowledgeable informants. A total of 30 households (over 10% of total) were interviewed. The practical demonstrations were closely observed and documented systematically.

2.3 Study site
Haryana (30°43’48.00” N, 76°46’48.00” E), predominantly an agriculture state in northern India has almost 80% of its land under cultivation. The geographical area of the state is 44212 km² (1.3% of India’s total geographical area). State is not bestowed with bounty of natural forests and only 3.9% of its geographical area is under notified forests. The forest cover and tree cover in the state is 1608 km² (3.64% of the state's geographical area) and 1395 km² (3.16% of the geographical area), respectively. Along with agriculture, manufacturing, retail, and industries like business process outsourcing (BPO) are the backbone of the state's economy. The study area viz., village Muradnagar (29°57’26.84” N, 77°06’20.29” E) is located in Kurukshetra district (Thanesar tehsil), which is bordered by Karnal district in Northern Haryana, India (Figure 2). Village had a total of
285 households with a population of 1370, out of which 41.4% are literate. Out of 631 workers (both male and female) engaged in different sectors, 500 (79.24%) were cultivars or agricultural labourers.

3. Results and Discussion

3.1 Informant's details

Respondents’ age ranged between 23 to 70 years. Respondents were divided into two age categories, firstly <35 of years (10 respondents) and secondly >35 years of age (20 respondents; Table 1). In the first category, four said they knew about using either of the two or both the species and rest had no knowledge about the species’ usage. However, only two of them said they used the species on a regular basis. In the second category, twelve respondents said they knew about using either of the two or both the species. However, only five of them said it’s a common practice to use these species as remedy for muscle strain. The result shows that practice is not common (used in <25% of the sampled households) despite being known by a fairly good number (>50% of the sampled households). Reasons given by respondents of not using the species included the laborious process of usage or slow effect or they believed that these are not much effective (half of them had never tried the remedy though), while few others preferred to go to allopathic doctors. Thus, the transfer of indigenous knowledge of medicinal plants to the younger generations is declining due to changes in the lifestyle and economic status and increasing number of nuclear families.

3.2 Traditional practice and usage

The procedure of traditional practice and usage is given in Table 2. The exercise should be done during night and also, heavy physical activities must be avoided during the treatment.
**Table 1**: Status of knowledge and use of traditional remedies among villagers of different age groups

<table>
<thead>
<tr>
<th>Category</th>
<th>No. of respondents</th>
<th>Knowledge about the remedy (% of total)</th>
<th>Regular use of remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>I (&lt;35 years)</td>
<td>10</td>
<td>4 (40%)</td>
<td>2 (20%)</td>
</tr>
<tr>
<td>II (&gt;35 years)</td>
<td>20</td>
<td>12 (60%)</td>
<td>5 (25%)</td>
</tr>
</tbody>
</table>

**Table 2**: Steps involved in the traditional practice and usage (Figure 3)

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Collect the matured leaves (in senescence stage) of <em>Ipomoea</em> or tender or immature leaves of <em>Ricinus</em>.</td>
</tr>
<tr>
<td>2</td>
<td>Store them in cool place to avoid the heat stress due to sunlight.</td>
</tr>
<tr>
<td>3</td>
<td>Lightly rub warm mustard oil* on the affected area (hereafter referred as AA) with muscle pull or strain.</td>
</tr>
<tr>
<td>4</td>
<td>Apply mustard oil on the lower surface (dorsal) of leaf and put the upper surface (ventral) on a pan (preferably an iron pan, locally known as <em>tawa</em>) in order to warm it lightly.</td>
</tr>
<tr>
<td>5</td>
<td>Quickly put warmed leaf on the AA before it cools. Depending on the size of AA put about 6-10 matured leaves in 3 layers in case of <em>Ipomoea</em> and 4-5 tender leaves in 2 layers (as comparatively large sized leaves) in case of <em>Ricinus</em>, in order to completely cover the AA due to strain.</td>
</tr>
<tr>
<td>6</td>
<td>Then cover the AA tightly with cloth (preferably cotton) or bandage.</td>
</tr>
<tr>
<td>7</td>
<td>Repeat it every day in the evening for 6-7 days.</td>
</tr>
</tbody>
</table>

*Mustard oil is effective in relaxing stiff tissues of the body (Agarwal, 2003).

**Conclusion**

Several indigenous remedies used in rural areas of Haryana are neither well documented nor known to people outside the state. These traditional remedies form an integral part of local health care system passing from one generation to other; however, their usage has been decreasing because of various factors including changing economic conditions, improved access to medical facilities and lack of documentation. Most of the people are ignorant towards the traditional knowledge today, further augmenting the rate of disappearance of knowledge. There is a need to create awareness among the civilians about the local remedies from widely available plants and also to document the knowledge. Hence, the present documentation of this unique practice will not only aid in the preservation of traditional knowledge, but will also provide an insight to pharmacological sector for the betterment of society. As, both the species have
spread over a large area across the globe outside their native range, their use might check the unwanted spread of both the species.

**Research Highlights**

Documentation of unique traditional practice for treating muscle strain.

The practice has been reported to provide healing in acute pain within one week of regular use.

The documentation will help in the preservation of indigenous knowledge of locals of the region.

**Limitations**

The study was conducted during a short span of time with limited resources and further work on phytochemicals responsible for the action in these species will add to the findings of this work.

**Recommendations**

There is a need of documenting the traditional knowledge of farmer community of the state which has not received due attention in the past. Also, research focused on phytochemicals in widely available plant species would add greatly to the development of pharmaceutical sector.

**Funding and Policy Aspects**

Various policy tools have failed to recognize economic value of widely available medicinal plants for the pharmaceutical industry that has resulted in a dearth of studies that document traditional knowledge. People have recognized the importance of medicinal plants and role they could play in developing the industry. However, still it has not covered all the ecosystems and local communities across the country. Focus has been given to mountainous region of country and local communities in remote valleys of Himalaya or tribal across the country. But, rural communities of states such as Haryana should not be neglected who might have vast knowledge about ethnomedicinal use of plants from their surroundings. Thus, there is a need of policy mix and inter-sectoral integration which focus on coordination at spatial and instrumental scales. Block offices in various districts might be encouraged to get involved in documenting the traditional knowledge of locals across the country. In order to preserve traditional knowledge, the management authorities need to prepare community biodiversity register which should include documentation of local medicinal herbs, their medicinal usage as well as indigenous knowledge lying behind the biological resources. An adaptive and integrated policy approach both at national and local levels should be developed to document and preserve the traditional knowledge before it goes extinct.

**Authors’ Contribution**

Amit Kumar contributed to the collection of data through questionnaire surveys, analysis of data and writing the manuscript; Upma Manral and Sachin Sharma contributed to analysis and interpretation of data and writing the manuscript.

**Competing Interests**

The authors declare that they have no competing interests. All authors have read and approved the manuscript.

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**References**


