

## **SOME HERBAL INSECTICIDES USED BY BHEEL TRIBE OF JHABUA DISTRICT (M.P.)**

**Dr. Chitrlekha Kadel<sup>1</sup>, Dr. Akhilesh Tiwari<sup>2</sup>**

1. School of Studies in Botany, Vikram University, Ujjain
2. Institute of Pharmacy, Vikram University, Ujjain

### **Abstract**

Bheel tribe of Jhabua district of Madhya Pradesh uses a large number of plants for killing mosquitoes and other crops insects. During Ethnobotanical survey of various localities of Jhabua district it was noted that over sixteen plant species are used as insect repellent. These species are either used singly or in combination with other herbs. Scientific preparation of such bio-insecticides could be beneficial to society. It may also generate some income of these tribals.

**Keywords: Herbs, Insecticides, Bheel Tribe, Jhabua district.**

### **Introduction:**

A large variety of insects occur in different seasons. Reports indicate that over 45000 species of insects are found in India. They prevail in atmosphere according to season in varying quantity. Hot humid weather conditions of most of the wide spread insects. Other insects are specific to various crops. Vegetables and orchards. While surveying Jhabua district it was reported that bheel tribe are much aware about some herbal preparations used as insect repellent. Preparations of various bio-insecticides are made in different ways. Such homemade insecticides are either sprayed or burnt to kill insects.<sup>1-3</sup>

### **Detailed research plan:**

#### **Present knowledge with relevant bibliography highlighting the gap in the existing knowledge in the field.**

Today, the global market for herbal products—with its appeal ranging from pharmaceuticals, nutraceuticals and health foods to cosmetics, toiletries, food and textile dyes, colouring agents and ethnic products—is estimated to touch US \$ 5 trillion by 2020. This turnover is largely based on the know-how of local and indigenous communities. It stands to reason that local communities must continue to use and nurture this knowledge and the bioresources associated with them, because through this IK will they be able to earn a rightful share in the benefits and receive a reasonable percentage of the profits that are today being made by commercialization of their know-how. But still the contribution of Herbal Insecticides is very limited due to lack of awareness and documentation of these Herbal Insecticides so the present work will provide a basic idea of IK of Bheel Tribe at Jhabua District.

In present work survey was organised among bheel tribe of Jhabua district to collect information of Herbal Insecticides used by them. Information was also collected about use of these Herbal Insecticides. This information can be use for the commercial utilization of IK and Research and development.

### **Work Already Done**

Medicinal and aromatic plants (MAPs) are gaining popularity globally as a source of raw material for pharmaceuticals and traditional health care system<sup>11,12,13</sup>. More than 85% of herbal medicines used in traditional health care systems are derived from medicinal plants<sup>14,15,16</sup> and ensure the livelihoods of millions of people, especially in the Indian Himalayan region<sup>17</sup>. The wide altitudinal variation, different

habitat types, and varying microclimatic conditions in the Himalayan region form an ideal environment for the growth and development of MAPs<sup>18,19,20</sup>. However, indiscriminate collection and overharvesting of MAP species from their natural habitats have adversely affected their availability.

Therefore, approaches for cultivation, sustainable harvesting, and protection against existing threats should be developed for the conservation of MAPs and livelihood enhancement of local communities in the Indian Himalayan region. This has become a priority agenda as part of meeting the international obligations under the biodiversity convention<sup>21</sup>. As such, MAP cultivation is emerging as a sector of self-employment<sup>22</sup> and an option for livelihood enhancement versus the cultivation of traditional food crops<sup>23,24</sup>. This is particularly important when demand for a variety of MAP species is increasing with the expanding growth of human population<sup>25</sup>.

As a result, indiscriminate collection of the MAPs from the wild is occurring, which has threatened the status of several high-value MAP species. This outcome has been widely recognized, and threatened wild species need to be brought under cultivation<sup>26,27</sup>. As such, production through cultivation can reduce the pressure on wild medicinal plant populations, and maintain uniformity in production. In addition, the present approach will prevent environmental degradation and loss of genetic diversity in the wild<sup>28,29</sup>. Therefore, promoting the cultivation of medicinal and aromatic plants in the farmer's field was attempted (1) to evaluate the yield and cost-benefit analysis of cultivated MAP species and (2) to provide technical skill to local Community.<sup>30</sup>

It is increasingly recognized in Malwa region that the land users have valuable environmental knowledge themselves. This review explores two hypotheses: first, that much can be learned from previously ignored indigenous soil and water conservation practices; second, that can habitually act as a suitable starting point for the development of technologies and programmes. However, information on ISWC (Indigenous Soil and Water Conservation) is patchy and scattered. Total 14 indigenous Soil and water Conservation practices have been identified in the area. Result showed that these techniques were more suitable accord to geographic location<sup>31</sup> Importance of having an integrated system of knowledge, in which indigenous peoples will have the opportunity not only to share their experiences to overcome future challenges, but also to become active agents of change by being involved in the decision making processes.<sup>32</sup> Indigenous knowledge systems hold detailed information on current and past environments that can inform ecological understanding as well as contemporary environmental management. Despite its applicability, there are limited examples of indigenous knowledge being incorporated in species distribution models, which are widely used in the ecological sciences. In a collaborative manner, we designed a structured elicitation process and statistical framework to combine indigenous knowledge with survey data to model the distribution of a threatened and culturally significant species<sup>33</sup>. Ethnomedicinal information and conservation status of medicinal trees used by the Manobo and Higaonon indigenous communities of Esperanza, Agusan del Sur, Philippines. Data were obtained through semistructured interviews, group discussion, and guided field walks with a total of 145 informants comprising of 95 Manobo and 50 Higaonon people with their traditional medical knowledge. A total of 43 tree species belonging to 36 genera and 22 plant families were recorded as ethnomedicinally important. Family importance value (FIV) was highest in Moraceae (99.33), followed by Lamiaceae (97.33), Rutaceae (96.00), Lauraceae (94.00), and Fabaceae (93.33).

### **Area of Project**

Jhabua district lies in the western part of Madhya Pradesh. It is surrounded by Panchmahal and Baroda districts of Gujrat, Banswara district of Rajasthan Alirajpur, Dhar and Ratlam districts of Madhya Pradesh. It has an area of 3,782 km<sup>2</sup>. The terrain is hilly and undulating. Average rainfall in the district is about 800 mm. The district is divided into five tehsils and six community development blocks.

## Economy

Jhabua is a predominantly *Adivasi* district, and suffers from high rates of illiteracy and poverty. Almost half of the population lives below the poverty line. The Bhil and Bhilala peoples inhabit the interior of the district.

In 2006 the Ministry of Panchayati Raj named Jhabua one of the country's 250 most backward districts (out of a total of 640).<sup>[2]</sup> It is one of the 24 districts in Madhya Pradesh currently receiving funds from the Backward Regions Grant Fund Programme (BRGF).

The district is highly drought-prone and degraded waste lands form the matrix of Jhabua and still the basic source of income they are producing by utilizing IK. The women make lovely ethnic items including bamboo products, dolls, bead-jewellery and other items that have for long decorated the living rooms all over the country. The men have for ages adorned "Teer-Kamthi", the bow and arrow, which has been their symbol of chivalry and self-defence.

## Population

According to the 2011 census Jhabua District has a population of 1,025,048,<sup>[4]</sup> roughly equal to the nation of Cyprus<sup>[5]</sup> or the US state of Montana.<sup>[6]</sup> This gives it a ranking of 440th in India (out of a total of 640).<sup>[4]</sup> The district has a population density of 285 inhabitants per square kilometre (740/sq mi).<sup>[4]</sup> Its population growth rate over the decade 2001–2011 was 30.58%.<sup>[4]</sup> Jhabua has a sex ratio of 989 females for every 1000 males,<sup>[4]</sup> and a literacy rate of 44.45%.



Credit: [www.mapsofindia.com](http://www.mapsofindia.com)

Fig. 1: Map of Jhabua District

## Enumeration:

The insecticides are arranged according to their properties or type of insects which prevail in the atmosphere. Botanical names of prime ingredient species are following by family and method of preparations. The insect's types affected by such insecticides are mentioned afterwards.<sup>4-5</sup>

## Evidence Acquisition

Information about medicinal plants used as insecticides in literature, and searched in modern medical databases to find studies that confirmed their efficacy and then information was also collected by personal interaction with bheel tribe of Jhabua district.

### 1) **Mahua-Imli-medicine**<sup>6</sup>

*Madhuca indica* (Moraceae) L.N.- Mahua; *Tamarind indicus* (Caesalpiniaceae) L.N-Imli.  
Bark paste extract of both plants mixed with 500g in (15lit.) water and sprayed on crops early in the morning time.

Cure-To kill pink colour and spotted insects. Spray this medicine after 8 days intervals.

### 2) **Phoolpadi medicine**

*Azadirachta indica* (Meliaceae) L.N. Neem

1kg. Tobacco leaves dip in water for three days. On fourth day well agotted this mixture and add 500gm. Neem seed oil and spray this solution only in the morning time.

Cure-To kill catter pillar, white and green Mosquito and Housefly, spray it after 15 days intervals.

### 3) **Kamliya-Keet-medicine**

*Azadirachta indica* (Meliaceae) L.N. Neem; *Datura metal* (Solanaceae) L.N. Dhatura; Tobacco leaves.

1kg. Tobacco leaves dip in water for three days. On fourth day mashed welly soaked leaves. Extract take and add in it 100g black Dhatura leaves sap 250g green chili paste. All these material mixed into 500g neem oil.

Cure- To kill insects of on all crops.

Spray it after 15 days intervals.

### 4) **Green colour catter pillar medicine**

Tobacco

Citrus (LN) - Lemon Neeboo. Harakasis (Znso4) 250g. Tobacco leavesb + 50g. Lemon sap Zink Sulphate (300g.) boiled and filter it and spray this solution in the morning time.

Cure - To kill green colour catter pilar for on all crops.

Spray it after 7 days intervals.

### 5) **Mahoo-Moula medicine**<sup>7</sup>

*Azadirachta indica* (Meliaceae) L. N. Neem

10kg. Dried leaves of Neem dip in water (5lit.) for over-night than boiled abd filter it. Filtrates mixed with (10lit.) water and spray this solution in the morning time.

Cure- To kill mahoo (*Lipapise erysiri*) and eating insects.

### 6) **Catter pillar, Mosquito medicine**

*Datura innoxia* (Solanaceae) LN-Dhatura 100g. Crushed leaves mixed in cow-urine (5Lit) and filter it. Take (1Lit) solution and (15Lit) water in it and spray this solution in the morning time.

Cure-To kill Catter-pillar and Mosquito. Spray it after 15 days interval.

### 7) **Green and white mosquito and housefly medicine**

Tobacco leaves (500g)

500g. tobacco leaves boiled in (5Lit) water for half an hour. Filtrate cooled and adds (20g) soap and prepares a solution. Take (1Lit) solution and mixed it in (15Lit) water and spray it on crops.

Cure- To kill green white mosquito and housefly. In spraying period medicine should to be fall on soil.

### 8) **Dwarfness of leaves-medicine.**

Wood ash and kerosene oil mixed and spray it before sun-rising. It used for all crops except chili crop.

Cure- kerosene oil quantity should not be more and ash also not is hot.

### 9) **Catter pillar medicine.**

*Allium sativum* (Liliaceae) L.N. Lashun Abel moscus esculentum L. Mireh.

1kg. Crushed garlic paste (2Lit.) kerosene oil keep it as it is for over-night, add 2kg. Chili paste in solution. This mixture dilutes in water (200Lit.) and spray on crops.

Cure-to kill caterpillar and insects.

**10) Red tuar medicine-**

*Annona squamosa* (Annonaceae) *Meliaceae* L.N. sitaphal.

*Hibiscus rosasinesis* (*Meliaceae*) L. China rose.

Boiled plants leaves mashed and extracted. From this extract (200g.) extract diluted in (10Lit) water than spray on crops.

Cure- To kill caterpillar and insects.

Spray this solution in 8 days intervals.

**11) Gram and cotton-medicine.**

*Azadirachta indica* (*Meliaceae*) L.N. Neem, *Calotropis procera* (*Asclepiadaceae*) L.N. Ankada, *Allium sativum* (*Liliaceae*) L.N. Lashun.

Plants leaves dip in cow-urine for 15days. After that 100g. garlic paste adds & boiled it till 5it. Take 750g mixture and dilute it in water (15 Lit) and spray on crops.

Cure- To kill smooth and hairy caterpillar.

**12) Medicine for all insects.**

*Vitex negundo* (*Verbenaceae*) L.N. Nirgundi 5Lit. cow-urine nirgundi leaves sap (1Lit.) boil with (10Lit.) water till it 1 Lit. add (10g) hing. Mixed all these things in (8Lit) water and spray on crops.

Cure- To kill all type of insects. Leaves sap and hing quantity should not be more.

**13) Neem Khali ark.**

*Azadirachta indica* (*Meliaceae*) L.N. Neem.

*Datura innoxia* (*Solanaceae*) L.N. Datura, *Abel moscus esculentum* L.N. Mirch.

5kg. neem fruits sowed in water for three days after third day extracted it. Add (100g) Datura leaves sap and (250g) green Chili sap. In (15Lit.) water this mixture spray on crops before sun-rising.

Cure-To kill leaves and stem eating caterpillar, mosquito, mahoo.

Spray it after 15days intervals.

**14) Termite or white ant medicine.<sup>8,9</sup>**

*Calotropis procera* (*Asclepiadaceae*) L.N. Ankada

Whole plants paste put in a bag and hangs near on irrigation pipe in fields.

Cures-This paste is used only in termite affected fields and sprays or applies it in one month intervals.

High production medicine.

**15) *Azadirachta indica* (*Meliaceae*) L.N. Neem**

1 lit. Neem seed oil + 3 kg. Sandy soil + 3kg. Cow - dung. Mixed above three materials very well and keep it as it is for three days. On fourth day mixed it in (150lit.) water and spray on crops early in the morning. Cow-dung should be fresh. This solution will be sprayed in 15 days intervals.

**16) High production through seed treatment.<sup>10</sup>**

10 kg. Cow-dung.

125g. Cow-milk-ghee

500g. Honey

125gm. Cow-ghee and 500gm. Honey is mixed properly in the cow dung (10kg.). For seed treatment dilutes 1 kg. of the above mixture with water and sprayed on the seeds to be sown. Treated seeds dried in the shed and sowed. Before sowing the seeds 20kg. soil (Obtained from root of banyan tree) is sprayed in 2.5 hectare field. Remaining paste is dissolved in (200lit.) water and sprayed in 2.5 hectare field before sowing the seeds.

To cure- from insects on all crops.

**17) Insecticide for seed treatment.**

1. Leguminous vegetables, Pumpkin, karela, seeds before sowing treated with milk in overnight and second day they sowed. This treatment given a very good growth of plants.
2. Radish and Sweet beat seeds treated with water in overnight than sowked.
3. For storage of maize seeds-ash of maize crop wastage stems mixed and store grains to prevent from insects.
4. For all grains storage all use dried neem leaves and small size onion to protect from insects.
5. For production of red floue beetle (*Tribolium castaneum*) mixed aritha with wheat grains.

## Conclusion

This study confirmed the Indian traditional medicine claims of the insecticidal and insect repellent activity of certain plants. Further pharmacological and clinical studies are recommended to evaluate the overall efficacy and possible mechanisms underlying these herbs.

## REFERENCES

- 1) Jadhav, Dinesh. "Ethnomedicinal plants used by Bhil tribe of Bibdod, Madhya Pradesh." (2006)
- 2) Wagh, Vijay V., and Ashok K. Jain. "Inventory of ethnobotanicals and other systematic procedures for regional conservation of medicinal and sacred plants." *Environment Systems and Decisions* 35.1 (2015): 143-156
- 3) Reddy, B. Suresh. "Patterns of Agricultural Transition in Tribal Areas of Madhya Pradesh: A Macro and Micro analysis." (2018)
- 4) Dinesh, Jadhav. "Pesticidal plants used by Bhil tribe of Ratlam district (MP) India." *Journal of Economic and Taxonomic Botany* 34.4 (2010): 757-759
- 5) Wagh, Vijay V., and Ashok K. Jain. "Status of ethnobotanical invasive plants in western Madhya Pradesh, India." *South African Journal of Botany* 114 (2018): 171-180
- 6) Boruah, Sarodee, Sanjoy Borthakur, and M. Neog. "Indigenous Technological Knowledge in Pest and Disease Management of Agricultural Crops—A Review." *Int. J. Curr. Microbiol. App. Sci* 9.9 (2020): 2867-2876
- 7) Benelli, Giovanni, et al. "Neem (*Azadirachta indica*): towards the ideal insecticide?." *Natural product research* 31.4 (2017): 369-386
- 8) Singh, R. K., P. K. Mittal, and R. C. Dhiman. "Laboratory study on larvicidal properties of leaf extract of *Calotropis procera* (Family-Asclepiadaceae) against mosquito larvae." *Journal of Communicable Diseases* 37.2 (2005): 109
- 9) Begum, Nighat, B. Sharma, and Ravi S. Pandey. "Calotropis procera and *Annona squamosa*: potential alternatives to chemical pesticides." *Current Journal of Applied Science and Technology* (2013): 254-267
- 10) Vijendra, Nath, and Khatri Pavan Kumar. "Traditional knowledge on ethno-medicinal uses prevailing in tribal pockets of Chhindwara and Betul Districts, Madhya Pradesh, India." *African Journal of Pharmacy and Pharmacology* 4.9 (2010): 662-670
- 11) H. Azaizeh, S. Fulder, K. Khalil, et al. Ethnomedicinal knowledge of local Arab practitioners in the Middle East Region *Fitoterapia*, 74 (2003), pp. 98-108
- 12) A.K. Bisht, A. Bhatt, U. Ujjain Assessment, extraction pattern and restoration through propagation of *Angelica glauca*, a critically endangered Himalayan medicinal herb
- 13) International Journal of Biodiversity Science and Management, 2 (2006), pp. 105-113
- 14) R. Chambers, A. Pacey, L.A. Thrupp *Farmer first: farmer innovation and agricultural research* Intermediate Technology Publications, London, UK (1989)
- 15) U. Ujjain, R.S. Rawal, J. Upreti Setting priorities for conservation of medicinal plants—a case study in Indian Himalaya, *Biological Conservation*, 95 (2000), pp. 57-65

- 16) D. Diallo, B. Hveem, M.A. Mahmoud, *et al.* An ethnobotanical survey of herbal drugs of Gourma district, Mali *Pharmaceutical Biology*, 37 (1999), pp. 80-91
- 17) V. Hoffmann, K. Probst, A. Christinck Farmers and researchers: how can collaborative advantages are created in participatory research and technology development? *Agriculture and Human Values*, 24 (2007), pp. 355-368
- 18) C.P. Kala Indigenous uses, population density and conservation of threatened medicinal plants in protected areas of the Indian Himalayas *Conservation Biology*, 19 (2005), pp. 368-378
- 19) C.P. Kala Local preferences of ethnobotanical species in the Indian Himalaya: implication for environmental conservation *Current Science*, 93 (2007), pp. 12-25
- 20) L.S. Kandari, P.C. Phondani, K.C. Payal, *et al.* Ethnobotanical study towards conservation of medicinal and aromatic plants in upper catchments of Dhaul Ganga in the Central Himalaya *Journal of Mountain Science*, 9 (2012), pp. 286-296
- 21) J. Lambert, J. Srivastava, N. Vietmeyer Medicinal plants Rescuing a global heritage, vol. 355, World Bank Technical Paper, Washington DC (1997)
- 22) R.K. Maikhuri, S. Nautiyal, K.S. Rao, *et al.* Role of medicinal plants in the traditional health care system: a case study from Nanda Devi Biosphere Reserve, Himalaya *Current Science*, 75 (1998), pp. 152-157
- 23) S.S. Samant, U. Ujjain, L.M.S. Palni (Eds.), Himalayan medicinal plants: potential and prospects, Gyanodaya Prakashan, Nainital, India (2001), pp. 217-328
- 24) R.K. Maikhuri, K.S. Rao, K. Chauhan, *et al.* Development of marketing of medicinal plants and other forest products: can it be a path way for effective management and conservation? *Indian Forester*, 129 (2003), pp. 169-178
- 25) R.K. Maikhuri, K.S. Rao, L.S. Kandari, *et al.* Does the outreach programme make an impact? A case study of medicinal and aromatic plant cultivation in Uttaranchal *Current Science*, 88 (2005), pp. 1480-1486
- 26) M.C. Nautiyal, B.P. Nautiyal Agro-techniques for High Altitude Medicinal and Aromatic Plants Bishen Singh Mahendra Pal Singh, International Book Distributors, Dehradun, India (2004), pp. 1-202
- 27) V.S. Negi, R.K. Maikhuri, L.S. Rawat Non- timber forest products (NTFPs): a viable option for biodiversity conservation and livelihood enhancement in Central Himalaya *Biodiversity and Conservation*, 20 (2011), pp. 545-559
- 28) V.S. Negi, R.K. Maikhuri, P.C. Phondani, *et al.* An inventory of indigenous knowledge and cultivation practices of medicinal plants in Govind Pashu Vihar Wildlife Sanctuary, Central Himalaya, India
- 29) *International Journal of Biodiversity Science Ecosystem Services and Management*, 6 (2010), pp. 96-105
- 30) P.C. Phondani, R.K. Maikhuri, L.S. Rawat, *et al.* Ethnobotanical uses of plants among Bhotiya tribal communities of Niti Valley in Central Himalaya, India *Ethnobotany Research and Application*, 8 (2010), pp. 233-244
- 31) P.C. Phondani, V.S. Negi, I.D. Bhatt, *et al.* Promotion of medicinal and aromatic plants cultivation for improving livelihood security: a case study from West Himalaya, India
- 32) *International Journal of Medicinal and Aromatic Plants*, 1 (2011), pp. 245-252
- 33) P.C. Phondani, R.K. Maikhuri, N.S. Bisht Ethnomedicinal knowledge towards conservation in the context of changing socio-economic and cultural values of traditional communities around Binsar Wildlife Sanctuary in Uttarakhand, India *Journal of Agricultural and Environmental Ethics*, 26 (2013), pp. 573-600
- 34) P.C. Phondani, R.K. Maikhuri, K.G. Saxena The efficacy of herbal system of medicine in the context of allopathic system in Indian Central Himalaya *Journal of Herbal Medicine*, 4 (2014), pp. 147-158

- 35) R. Prasad, P. Bhattacharya Sustainable harvesting of medicinal plant resources S.B. Roy (Ed.), Contemporary studies in natural resource management in India, Inter-India Publications, New Delhi, India (2003), pp. 168-198
- 36) U. Schippmann, D.J. Leaman, A.B. Cunningham Impact of cultivation and gathering of medicinal plants on biodiversity: global trends and issues Biodiversity and ecosystem approach in agriculture, forestry and fisheries. Satellite event on the occasion of the ninth regular session of the Commission on Genetic Resources for Food and Agriculture. 12–13 October 2002, Food and Agriculture Organization of the United Nations, Rome, Italy (2002)
- 37) H. Sher, N.A. Mohammed, F. Ullah Cultivation and domestication study of high value medicinal plant species (its economic potential and linkages with commercialization) African Journal of Agricultural Research, 5 (2010), pp. 2462-2470
- 38) D.K. Ved, M. Anjana, D. Shankar Regulating export of endangered medicinal plant species need for scientific rigour Current Science, 75 (1998), pp. 341-344
- 39) Pawar M, Bhargava N, Uday AK, Meena M, Prajapati A, Road D, et al. Received : 28 th Dec-2015 Revised : 27 th Feb 2016 Accepted : 4 th Mar 2016 Research article Indigenous Knowledge of Local Communities of Malwa Region On Soil International Journal of Plant , Animal and Environmental Sciences Available online at www.ijpae. 2016;(2):156–61.
- 40) Magni BG. Indigenous knowledge and implications for the sustainable development agenda. 2016;
- 41) Malmer P, Masterson V, Austin B, Tengo M. Mobilisation of indigenous and local knowledge as a source of useable evidence for conservation partnerships. Conservation Research, Policy and Practice. 2020 Apr 16:82.
- 42) Dapar ML, Alejandro GJ, Meve U, Liede-Schumann S. Ethnomedicinal importance and conservation status of medicinal trees among indigenous communities in Esperanza, Agusan del Sur, Philippines. Journal of Complementary Medicine Research. 2020;11(1):59-71.
- 43) Cheraghi Niroumand, M., Farzaei, M. H., Karimpour Razkenari, E., Amin, G., Khanavi, M., Akbarzadeh, T., & Shams-Ardekani, M. R. (2016). An Evidence-Based Review on Medicinal Plants Used as Insecticide and Insect Repellent in Traditional Iranian Medicine. *Iranian Red Crescent medical journal*, 18(2), e22361. <https://doi.org/10.5812/ircmj.22361>