

RESEARCH PAPER

Plants having anti-cancer properties used by the ethnic people of indo-Nepal sub-Himalayan international border region of Pilibhit Tiger Reserve (PTR), India

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Highlights

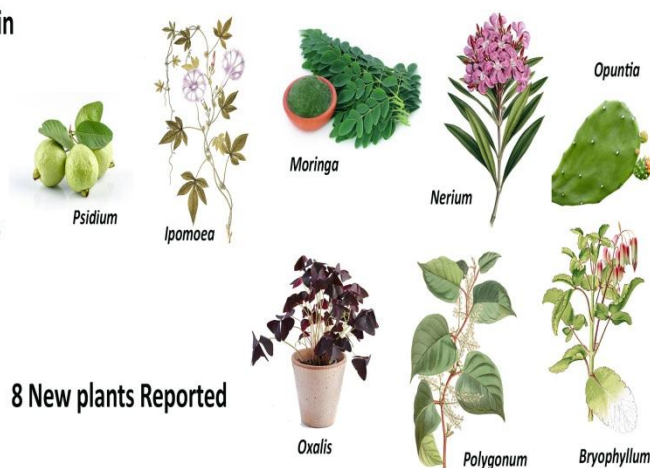
- Plants with anti-cancer properties used by the ethnic peoples of the indo-Nepal sub-Himalayan international border region have been studied.
- 20 plant species were enumerated for the treatment of tumor growth.
- Ethnobotanical Studies provide clues for the development of new low cost herbal medicines.
- Detailed perspectives need phytochemical, pharmaceutical, and clinical observations of all claimed plants to evaluate their anticancer properties.

Graphical Abstract

Anti-cancer Plants Used in

Pilibhit Tiger Reserve (PTR), India
2018-2020

20 Crude Drugs



8 New plants Reported

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Abstract

The present study deals with the detailed ethnomedical botanical observations on the use of various plants used by the tribals and rural people of the study area against tumors and cancer symptoms. It was found that 20 plant species were enumerated for the treatment of tumor growth. Most of these plants are easily available and usually found in the wild. During 2018-2020, intensive surveys were conducted in tribal inhabited localities and villages near dense forests. You will get information about these plants and how the drug is prepared and administered. This information is preliminary in nature and may feed into advanced scientific and therapeutic studies to develop useful, approved drugs for the treatment of human tumors and cancers.

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1. Introduction

Cancer is considered as one of the threatened and serious health problem world over and mainly appears as tumor. Tumors are typically showing a type of inflammation and may be either benign or malignant in nature. Medically there exist more than 100 types of cancers that can affect cells in the human body. Similarly, cancer is widespread in the animal kingdom also. Their nomenclature depends upon shape and size of tumor (Hartwell, 1967; Mathew and Unnithan, 1992). Modern advanced medical system of the world is in the search of easy, cheap, effective and side effects free herbal drugs to control the spread of human cancers and malignant tumors (Dixit and Vakshasya, 2019). For the said purpose, researches are being carried out world-over on certain herbal products that may prove beneficial. In the meantime few active anti-cancerous compounds have been isolated successfully with limited actions and other economic constraints. In this regards, certain plants with proven history of use in folklore are always a choice for scientists working on cancer therapy. In western world researchers are working relentlessly on herbal way of cancer treatments. *Podophyllum peltatum* L. (Mayapple) is an important American plant for the treatment of cancer (Hartwell, 1967; Cragg and Newman, 2003).

Nowadays, modern science is searching for effective, reliable, environment friendly and economical plant based drugs to combat a battle with cancers. Keeping in mind the above facts, authors are searching an alternative way of cancer treatment with the help of different ethnic and rural communities of the study area (Fig. 1). But this information is very preliminary in nature and authors do not make any claim of their efficacy over cancer treatments especially in human beings. Although ethnic people successfully using these plants for the treatment of cancer like tumors from generations. Their knowledge is mainly based upon the trial and error methods with no reported side effects (Dixit and Vakshasya, 2020). The present study focuses on the enumeration of plants used by the rural and ethnic people of the study area for the sure cure of tumorous and cancer-like swellings and wounds in different parts of human body. However it is recommended for further clinical and therapeutic investigations in the guidance of modern science before making any conclusion (Tan et al., 2006; Wang et al., 2011; Yang et al., 2014).

2. Materials and Methods

For the collection of firsthand information about the plants used in the treatment of cancer by the ethnic and rural people of the study area, field visits at regular time intervals were undertaken during 2018-2020 to the remote tribal inhabiting areas in the vicinity of forests and nearby villages. Geographically, study area lies between 28°54'-28°60' N latitude and 79°37'-88°27' E longitude and at an altitude of 183.870 meter above mean sea level (MSL). The area receives an average annual rainfall of about 1256 mm and the maximum and minimum temperature is 45.5 and 3.6 °C respectively in June and January with a relative humidity of 76.2%. It has 310 km² of forest cover, the second largest forest cover of Uttar Pradesh state of India (Arroo et al., 2002).

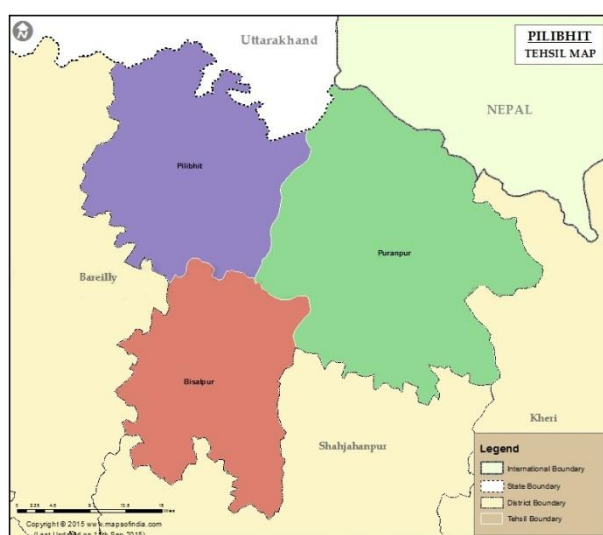


Figure 1. Map of the study area.

A questionnaire was prepared with every possible question to be asked with the tribal and rural people. Based on that, data of different plants used by these ethnic people in the treatment of cancer like symptoms were recorded and enumerated (Cragg and Newman, 2005). The inhabitants were asked simple questions, like:

- 1) Do they use any plant for these tumorous growths?
- 2) What is the local name of the plant?
- 3) Which part of the plant was used?
- 4) What method was used?
- 5) How was the successful rate?

During the field visits, tribal heads (Mukhiyas), herbalists and medicine men of that locality were contacted and interviewed and discussed to record the plants used for drug preparation, doses of the drugs and mode of administration. The reported plants were collected from their natural habitats, and identified with the help of available literature and floras (Carqueijeiro et al., 2020; Buyel, 2018; Umadevi et al., 2013). To determine their taxonomic identity voucher specimen number were allotted to each plant specimen. Identified specimens were deposited in the herbarium of Botany department of the Upadhi College, Pilibhit, India (Tariq et al., 2017).

3. Results and Discussion

In this study, 20 types of formulations were prepared and used by ethnic and rural people of the study area to cure cancer like symptoms and in the tumors of human beings. Results obtained after this study are enumerated with the details, viz., botanical name of the plant, family, vernacular name, plant part used, symptoms and method of drug preparation and administration.

• Crude drug 1

Plant Name: *Catharanthus roseus* L

Family: Apocynaceae

Vernacular Name: Sadaphuli

Plant part used: Leaves

Voucher specimen number: UMV 033

Symptoms of disease: Old ulcer with cancerous symptoms

Mode of administration: Decoction made from the green leaves is applied externally over the tumorous parts of the body, twice a day till cure.

• Crude drug 2

Plant Name: *Azadirachta indica* A. Juss.

Family: Meliaceae

Vernacular Name: Neeba

Plant part used: Leaves

Voucher specimen number: UMV 100

Symptoms of disease: Abnormal and prolonged swellings of joints

Mode of administration: In the case of unusual growth and prolonged pains in the joints of hind limbs, it is highly advisable to bandage the affected parts with the decoction of leaves, once a day at bed time for 30 days.

• Crude drug 3

Plant Name: *Mirabilis jalapa* L

Family: Nyctaginaceae

Vernacular Name: Gulabaans

Plant part used: Roots

Voucher specimen number: UMV 010

Symptoms of disease: Stomach tumors and ulcers

Mode of administration: Fresh roots are grounded into the paste and applied externally on the tumorous swellings on the stomach and other body parts.

• *Crude drug 4*

Plant Name: *Achyranthes aspera* L

Family: Amaranthaceae

Vernacular Name: Chirchita

Plant part used: Leaves and inflorescence

Voucher specimen number: UMV 074

Symptoms of disease: Tumorous growth in women breasts

Mode of administration: Green leaves and inflorescence are grounded into the paste and applied over the affected part of the breast twice a day for a month or till the relief.

• *Crude drug 5*

Plant Name: *Ipomoea fistulosa* L

Family: Convolvulaceae

Vernacular Name: Besharam

Plant part used: Leaves

Voucher specimen number: UMV 062

Symptoms of disease: Chronic ulcers and tumors

Mode of administration: Mature and fresh leaves are gently warmed over the flame and placed on the affected tumorous parts of the body, once a day for 30 days.

• *Crude drug 6*

Plant Name: *Bryophyllum pinnata* (L) Oken

Family: Crassulaceae

Vernacular Name: Chotmaar

Plant part used: Leaves

Voucher specimen number: UMV 103

Symptoms of disease: Tumorous out growth

Mode of administration: Mature and green leaves are luke warmed and applied externally over the affected body part once a day at night, till the relief. Leaf extract is also recommended to consume for inhibitory effects on many tumorous growths.

• *Crude drug 7*

Plant Name: *Cissampelos pareira* L

Family: Menispermaceae

Vernacular Name: Pattha

Plant part used: Green aerial parts

Voucher specimen number: UMV 123

Symptoms of disease: Internal tumors and mouth ulcers

Mode of administration: Decoction made from green aerial parts of the plant is recommended as oral medicine once a day for 30 days.

• *Crude drug 8*

Plant Name: *Helianthus annuus* L

Family: Asteraceae

Vernacular Name: Surajmukhi

Plant part used: Leaves

Voucher specimen number: UMV 174

Symptoms of disease: Tumors and ulcers

Mode of administration: Green leaves are warmed over the flame and wrapped on the affected body parts with tumors.

• *Crude drug 9*

Plant Name: *Oxalis corniculata* L

Family: Oxalidaceae

Vernacular Name: Khatti booti

Plant part used: Leaves

Voucher specimen number: UMV 124

Symptoms of disease: Tumorous outgrowths

Mode of administration: Paste made from green leaves is applied on the affected body parts once a day at bed time.

• *Crude drug 10*

Plant Name: *Polygonum glabrum* Willd

Family: Polygonaceae

Vernacular Name: Narkul

Plant part used: Leaves

Voucher specimen number: UMV 131

Symptoms of disease: Chronic Tumors

Mode of administration: Paste of leaves is mixed with *Brassica* oil and applied externally on the tumorous body part for relief from pain and inflammation.

• *Crude drug 11*

Plant Name: *Psidium guajava* L

Family: Myrtaceae

Vernacular Name: Jaddak

Plant part used: Leaves

Voucher specimen number: UMV 123

Symptoms of disease: Unnatural and Tumorous outgrowths

Mode of administration: Green and fresh leaves are grinded as paste and applied externally on the affected body part for relief from unusual outgrowths.

• *Crude drug 12*

Plant Name: *Moringa oleifera* L

Family: Moringaceae

Vernacular Name: Saijana

Plant part used: Leaves

Voucher specimen number: UMV 107

Symptoms of disease: Chronic Skin Tumors

Mode of administration - Paste made from green leaves is applied externally on the tumorous skin of any body part once a day till cure.

• Crude drug 13

Plant Name: *Nerium indicum*. L

Family: Apocynaceae

Vernacular Name: Kaner

Plant part used: Stem bark

Voucher specimen number: UMV 087

Symptoms of disease: Chronic mouth ulcers

Mode of administration: Paste of stem bark mixed with *Coconut* oil and applied externally on the affected body part once a day at bed time.

• Crude drug 14

Plant Name: *Solanum nigrum* L

Family: Solanaceae

Vernacular Name: Makuiya

Plant part used: Leaves

Voucher specimen number: UMV 122

Symptoms of disease: Breast Tumors

Mode of administration: Paste made from aerial shoot is highly recommended for external application over the affected breast to inhibit the growth of tumor cells.

• Crude drug 15

Plant Name: *Ocimum tenuifolium* L

Family: Lamiaceae

Vernacular Name: Tulsi

Plant part used: Leaves

Voucher specimen number: UMV 090

Symptoms of disease: Colon Tumors

Mode of administration: Paste made from green and fresh leaves is used to reduce the adverse effects of colon cancer.

• Crude drug 16

Plant Name: *Curcuma longa* L

Family: Zingiberaceae

Vernacular Name: Haldi

Plant part used: Underground rhizome

Voucher specimen number: UMV 176

Symptoms of disease: Cancerous lesions

Mode of administration: Paste made from underground rhizome is recommended for external application over the affected body parts having cancerous lesions to get symptomatic relief.

• Crude drug 17

Plant Name: *Opuntia dillenii* (Ker Gawl) Haw

Family: Cactaceae

Vernacular Name: Naagfani

Plant part used: Phylloclade

Voucher specimen number: UMV 095

Symptoms of disease: Tumorous outgrowths

Mode of administration: Paste made from modified green stem (phylloclade) is often recommended for external use over the cancerous body part, once a day till the relief.

• **Crude drug 18**

Plant Name: *Sorghum vulgare* (L) Pers.

Family: Poaceae

Vernacular Name: Jwaar

Plant part used: Seeds

Voucher specimen number: UMV 067

Symptoms of disease: Cancerous outgrowths

Mode of administration: Paste made from seeds mixed with Brassica oil and extensively used externally over the affected body part once a day for continuous 30 days

• **Crude drug 19**

Plant Name: *Cannabis sativa* L

Family: Cannabinaceae

Vernacular Name: Bhaang

Plant part used: Green toping

Voucher specimen number: UMV 013

Symptoms of disease: Cancer pain and inflammation

Mode of administration: Paste made from aerial green toppings of the plant is frequently recommended for oral consumption for relief from nausea, vomiting as contraindications of the cancers.

• **Crude drug 20**

Plant Name: *Cassia occidentalis* L

Family: Malvaceae

Vernacular Name: Kasaundha

Plant part used: Leaves

Voucher specimen number: UMV 120

Symptoms of disease: Unusual tumorous swellings

Mode of administration: Green shoot is grounded to make a paste for external application over the tumorous swellings in the human body, once a day for 30 days.

4. Conclusion

In this investigative study, 20 crude drugs were prepared from plants used by the tribal and rural people of the study area to treat various cancers like symptoms in the common population. As most of the tribal communities of the region live in the remote areas in the vicinity of forests away from the urban localities, hence having a limited access to the modern healthcare systems. To fulfill their day to day medical needs, they mainly depend on forest resources. Few of the plants recorded here have shown effects on tumor like symptoms in earlier studies, however, more therapeutic studies are needed to access cancer treating properties of some of the reported medicinal plants viz. *Catharanthus roseus*, *Achyranthes aspera*, *Mirabilis jalapa*, *Datura strumarium* etc. A comparison of plants recorded in the present study with the earlier studies suggests that eight plants reported in the present study viz. *Bryophyllum*, *Ipomoea*, *Moringa*, *Nerium*, *Opuntia*, *Oxalis*, *Polygonum*, *Psidium* have not been reported earlier as a remedy for cancer treatment. Ethno medicinal plants play a very important role in treating and controlling several chronic and lethal diseases, but little attention has been paid to highlight their efficacies. Studies based on certain ethno medicinal plants provide clues for the development of new cost

effective herbal drugs. In this connection, more recent studies require phytochemical, pharmaceutical and clinical observations of all the claimed plants for the evaluation of their anti-cancer properties.

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