



Ethno-botanical study of some medicinal plants used for treatment of Cancer in Narendra nagar block, District Tehri Garhwal (Uttarakhand) India

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Received: 25.04.2011

Revised:18.06.2011

Accepted: 28.08.2011

Abstract

Ethno-botanical survey of some medicinal plants used in the treatment of cancer was carried out in the Narendra Nagar block, district Tehri Garhwal (Uttarakhand), India. Herbalists, herb sellers and traditionalists living within the study area were interviewed by the administration of questionnaires. Twenty six plant species of Angiosperm were found to be used in the treatment of cancer. Prominent species among these are the members of family Liliaceae and Rutaceae which were found to be very important and useful in the treatment of the disease based on their frequency of occurrence in the recipes. Several plants parts which were said to be useful were indicated in the recipes.

Keywords: *Cancer, ethnobotany, medicinal plants, traditional healers*

Introduction

Over the past decade, herbal medicine has become a topic of global importance, making an impact on both world health and international trade. Medicinal plants continue to play a central role in the healthcare system of large proportions of the world's population. This is particularly true in developing countries, where herbal medicine has a long and uninterrupted history of use. Recognition and development of the medicinal and economic benefits of these plants are on the increase in both developing and industrialized nations (WHO, 1998). Continuous usage of herbal medicine by a large proportion of the population in the developing countries is largely due to the high cost of western pharmaceuticals and healthcare (Koduru *et al.*, 2007). In addition, herbal medicines are more acceptable in these countries from their cultural and spiritual points of view. Use of plants for medicinal remedies is an integral part of the Uttarakhand cultural life, and this is

unlikely to change in the years to come. Several studies employing methodologies of modern medicine have been conducted on a multitude of herbs of ethno-botanical importance (Dahanukar *et al.*, 2000; Duke and Ayensu, 1985). Ayurveda, the Traditional Indian System (TIS) of medicine, has been successful from ancient times in using natural drugs, mostly herbal preparations, in preventing or suppressing various diseases using several lines of treatment.

Among the human diseases treatment of cancer with medicinal plants, which is probably the most important genetic disease as well as other factors. Cancer has been defined as a disease in which there is uncontrolled multiplication and spread within the body of abnormal forms of the body's own cells (Rang *et al.*, 2001). All cancer types arise through a series of steps characterized by progressive loss of normal growth control. There are proteins in the cells that ensure this continuity (Brooks and La Thanque, 1999). Death from cancer often comes not from the primary site but from metastases. Cancer may affect people at all ages even foetus but the risk for most varieties increases with age. Thousands of herbal and traditional compounds are being screened

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worldwide to validate their use as anticancerous drugs (Diwanay *et al.*, 2004; Liu *et al.*, 1998).

The disease causes about 13% of all death. Reports have shown that during 2007, about 7.6 million people died from cancer in the world. All cancers are caused by abnormalities in the genetic material of the transformed cells and these abnormalities may be due to the effect of carcinogens such as tobacco, smoke, radiation, chemicals and infectious agents.

Every year, millions of people are diagnosed with cancer, leading to death in a majority of the cases. According to the American Cancer Society (ACS) 2006, deaths arising from cancer constitute 2–3% of the annual deaths recorded worldwide. In India, cancer rates are increasing every year, breast cancer being the most common form of cancer in women worldwide and the second most common cancer amongst Indian women (Mouli *et al.*, 2009). Current statistics indicates that across all ethnic groups, one in every 31 women in this country is likely to develop breast cancer. Many traditional healers and herbalists have been treating cancer patients for many years using various medicinal plant species. Despite the long history of cancer treatment using herbal remedies in the study area, the knowledge and experience of these herbalists have not been scientifically documented. Information on traditional herbal practice is passed from one generation to the other through oral tradition. Considering the rapid rate of deforestation and loss of biodiversity, there is a need for accurate scientific documentation of the knowledge and experience of these herbalists. In this paper, we report the informations on plants gathered from traditional and elder rural dwellers, used in the study area for the treatment of cancer.

Methodology

The study area falls within the block Narendra Nagar, district Tehri Garhwal, Uttarakhand, India. It lies in between 30° 10'–30° 17' N latitude and 78° 18'–78° 30' E longitude and has an average elevation upto 1700m a.s.l. and covering an area of 6,8,123 hectors. The head quarter of the block is away from Rishikesh (16km) on the route of Yamunotri and Gangotri, offering a splendid view of the snow-capped Himalaya. It stretches from Dhalwala Than, Amsera, Jaikot, Gaja to Marora, Nigyer, Shivpuri, Kaudiyala, Byasi etc. The information was collected from herbalists,

traditional healers and rural dwellers in the study area and was compiled through scientifically guided questionnaires, interviews and general conversations. Although informants were not scientifically literate, they were born in the region and had lived there for most of their lives. Healings homes were not left out in this exercise. Relevant information regarding the plant species, recipes, their local names, modes of administration and dosage pattern were also collected to enhance permanent record (Table 1). The plants were initially identified by their vernacular names through consultations with the local people. Standard method of collection, preservation and maintenance of specimens in the herbarium were followed by Jain and Rao, (1977), Singh and Subramanyam, (2008). The plant specimens were properly identified with the help of available taxonomic literature and monographs (Hooker, 1872-1897; Osmaston, 1927; Polunin and Stainton, 1984) etc. The collected plant specimens were deposited in the Herbarium of H.N.B. Garhwal Central University, S.R.T. Campus, Botany Department Badshahi Thaul, Tehri Garhwal.

Enumeration of recipes

Recipe:-1.

Botanical Name	Vernacular Name	Plant part used
<i>Calotropis procera</i> (Aiton) Dryander	Aak	Leaves
<i>Kigelia africana</i> (Lam.) Benth.	Kanguli	Leaves and bark
<i>Diospyros malabarica</i> (Desrousseaux) Kosteletsky	Gab	Bark and fruit

Preparation: - Leaves bark and fruit should be rinsed and boiled in 4 liters of fermented corn water for 6 hours.

Application:- It is taken as a tea thrice a day with a cup.



Recipe:-2

Botanical Name	Vernacular Name	Plant part used
<i>Mangifera indica</i> L.	Aam	Bark
<i>Citrus medica</i> L.	Nimbu	Fruit juice
<i>Allium cepa</i> L.	Pyaz	Leaves
<i>Bryophyllum pinnatum</i> (Lam.) Oken	Bish-Kapru	Root

Preparation: - The Root, bark and leaves as indicated above should be rinsed and boiled in the water for 40 minutes. *Citrus medica* fruit juice is added when cooled.

Application: - Cup full 3 times daily upto 2 months .

Recipe: - 3

Botanical Name	Vernacular Name	Plant part used
<i>Citrus medica</i> L.	Nimbu	Fresh juice
<i>Citrus aurantifolia</i> (Christmann) Swingle	Kagjinimbu	Fresh juice
<i>Plumbago zeylanica</i> L.	Chitrak	Root

Preparation: - It should be ground together smoothly and mixed with black soap and gum powder.

Application: - Use the preparation to wash all the part of the body, once in a week.

Recipe: - 4.

Botanical Name	Vernacular Name	Plant part used
<i>Zingiber officinale</i> Roscoe	Adrak	Rhizome, Seed/fruit
<i>Curcuma domestica</i> Valeton	Haldi	Whole plant
<i>Allium sativum</i> L.	Lahsun	Bulbs
<i>Allium cepa</i> L.	Pyaz	Leaves

Preparation: All the plants should be ground together when dried and taken with honey.

Application: - Take one full cup as tea 3 times daily after meal.

Recipe:-5

Botanical Name	Vernacular Name	Plant part used
<i>Chenopodium ambrosioides</i> L.	Bethuali	Twigs and roots
<i>Citrus aurantifolia</i> (Christmann) Swingle	Kagjinimbu	Fruit Juice
<i>Allium sativum</i> L.	Lahsun	Leaves
<i>Oroxylum indicum</i> (L.) Ventenat	Tantia	Fruit, bark and leaves
<i>Potash</i>		

Preparation: - Soak all the above with lime and dry gin with gun powder for 30 days.

Application: - Two teaspoonful morning and evening after meal.

Recipe: - 6.

Botanical Name	Vernacular Name	Plant part used
<i>Cannabis sativa</i> L.	Bhangulu	Leaves
<i>Solanum nigrum</i> L.	Makoi	Leaves, root, bark and fruit.

Preparation: Whole plants are boiled until they burst into pieces. It is filtered and the decoction is made.

Application: - One teaspoonful is taken once a day till recovery.

Recipe: - 7.

Botanical Name	Vernacular Name	Plant part used
<i>Celtis eriocarpa</i> Decne.	Kharik	Bark and roots
<i>Citrus aurantifolia</i> (Christmann) Swingle	Kagjinimbu	Fruit juice

Preparation:- Bark and root dried in sun light and made a powdered and infused in lemon juice or milk.

Application: Taken orally every day till signs of relief are obvious.



Recipe: - 8

Botanical Name	Vernacular Name	Plant part used
<i>Solanum nigrum</i> L.	Makoi	Fruit extract
<i>Catharanthus roseus</i> (L.) G. Don.	Sadhabahar	Leaves
<i>Butea monosperma</i> (Lam.) Kuntze	Dhak	Leaves, flowers and seeds,
<i>Triticum aestivum</i> L.	Gehun	Seed

Preparation: - All the plants should be ground together when dried and taken with honey.

Application: Take one full glass cup as tea 3 times daily.

Recipe: - 9

Botanical Name	Vernacular Name	Plant part used
<i>Azadirachta indica</i> A.H.L. Juss.	Neem	Leaves and flower
<i>Plantago depressa</i> Willd.	Luhurya	Leaves and seeds
<i>Artemisia nilagirica</i> (C.B Clarke)	Kunjaa	Leaves and flowers

Preparation: - Leaves, flowers and seeds are stamped and boiled in water to make a decoction. It is administered orally till signs of relief are obvious.

Application: Drink when hot with a glass cup twice daily.

Recipe:-10.

Botanical name	Vernacular Name	Plant part used
<i>Aloe vera</i> (L.) Burm.	Patanguar	Leaves
<i>Alstonia scholaris</i> (L.) R.B.	Satni	Whole plant
<i>Allium sativum</i> L.	Lahsun	Bulbs

Preparation: - Plant should be ground together when dried and taken with honey or milk

Application: - One teaspoonful is taken 3 times daily.

Recipe: - 11.

Botanical Name	Vernacular Name	Plant Part Used
<i>Saccharum officinarum</i> L.	Ganna	Crushed stem (Juice)
<i>Citrus aurantifolia</i> (Christmann) Swingle	Kagajiinimbu	Fruit juice

Preparation:- Crushed stem and fruit juice should be rinsed and boiled in one liter of Palm oil for two hours.

Application: - Two tea spoonful morning and evening before meal.

Results and Discussion

It is revealed that several ethno-medicinal plant species parts such as leaves, roots, barks and seeds have been found efficient in the treatment of cancer. However, the prominent plant species in the recipes are *Solanum nigrum*, *Catharanthus rosesus*, *Butea monosperma*, *Triticum aestivum*, *Diospyrus malabarica*, *Kigelia africana*, *Citrus medica*, *Citrus aurantifolia*, *Allium cepa* and *Allium sativum* which are indicative of their importance in the treatment of cancer disease. Similarly, Fabaceae and Liliaceae families occurred more frequently in the list of plants identified but the occurrence of other families also suggested the importance of all those families as repository of useful chemical compounds which may be explored for drugs in the treatment of cancer (Madhuri and Pandey, 2009).

In orthodox medicine cancer can be treated with drugs and radiotherapy if detected early. Otherwise surgical operation is used at some stage after which it can become very difficult and hopeless. However, nature has some remedy for cancer patients. Some substances have been found to be anti-carcinogenic, i.e. they fight cancer forming cells and help to eliminate them from the body, for example cumaric acid and lycopene which are found naturally in tomatoes fruits (*Lycopersicon esculentum* L.) and the leaves of bitter leaf (*Vernonia amygdalina* Del.).

Also, a lot of research has been and is still being done on the effectiveness of *Aloe vera* (L.) Burm.f. *Azadirachta indica* A.H.L. Juss., *Catharanthus rosesus* (L.) G. Don., *Butea monosperma* (Lam.) Kuntze for treating cancer. Literature has revealed that most of the synthetic drugs that have been used in the past have negative effects that were of grave consequence in some cases, especially when taken by patients on self prescription after an initial visit to the physician (Olapade, 2002).

For this reason, it is imperative for ethno-botanists and pharmacognosists to do more analysis on the 26 wonderful plants mentioned in this paper (table 1).



Our medical health practitioners should also focus attention on more intense research on ethno-medicinal plants which can save the life of peoples without side effects.

Table 1: Medicinal Plants Used by Treatment of Cancer in the Narendra Nagar block, district Tehri Garhwal (Uttarakhand), India

S.No	Botanical Name	Family	Vernacular Name	Plant parts used
1.	<i>Allium cepa</i> L.	Liliaceae	Pyaz	Leaves
2.	<i>Allium sativum</i> L.	Liliaceae	Lahsun	Bulbs
3.	<i>Aloe vera</i> L.	Liliaceae	Patanguar	Leaves
4.	<i>Alstonia scholaris</i> (L.) R.B.	Apocynaceae	Satni	Bark and leaves
5.	<i>Artemisia nilagirica</i> (C.B Clarke)	Asteraceae	Kunjaa	Leaves and flowers
6.	<i>Azadirachta indica</i> A.H.L. Juss.	Meliaceae	Neem	Leaves, bark and flowers
7.	<i>Bryophyllum pinnatum</i> (Lam.) Oken	Crassulaceae	Bish-kapru	Root
8.	<i>Butea monosperma</i> (Lam.) Kuntze	Fabaceae	Dhak	Leaves flowers and seeds
9.	<i>Calotropis procera</i> R.B	Asclepiadaceae	Aak	Leaves
10.	<i>Cannabis sativa</i> L.	Cannabaceae	Bhanglu	Leaves
11.	<i>Catharanthus roseus</i> (L.) G. Don	Apocynaceae	Sadabahar	Leaves
12.	<i>Celtis eriocarpa</i> Decne.	Ulmaceae	Kharik	Bark and roots
13.	<i>Chenopodium ambrosioides</i> L.	Chenopodiaceae	Bethuli	Twigs and roots
14.	<i>Citrus aurantifolia</i> (Christmann) Swingle	Rutaceae	Kagjinimbu	Fruit juice
15.	<i>Citrus medica</i> L.	Rutaceae	Nimbu	Fruit juice
16.	<i>Curcuma domestica</i> Valetton	Zingiberaceae	Haldi	Whole plant
17.	<i>Diospyros malabarica</i> (Desrousseaux) Kosteletsky	Ebenaceae	Gab	Bark and fruit
18.	<i>Kigelia africana</i> (Lam.) Benth.	Bignoniaceae	Kanguali	Leaves and bark
19.	<i>Mangifera indica</i> L.	Anacardiaceae	Aam	Bark
20.	<i>Oroxylum indicum</i> (L.) Ventenat	Bignoniaceae	Tantia	Fruit bark and seeds
21.	<i>Plantago depressa</i> Willd.	Plantaginaceae	Lahurya	Leaves and seeds
22.	<i>Plumbago zeylanica</i> L.	Plumbaginaceae	Chitrak	Root
23.	<i>Saccharum officinarum</i> L.	Poaceae	Ganna	Crushed stem (Juice)
24.	<i>Solanum nigrum</i> L.	Solanaceae	Makoi	Leaves, root, bark and fruit
25.	<i>Triticum aestivum</i> L.	Poaceae	Gehun	Seed
26.	<i>Zingiber officinale</i> Roscoe	Zingiberaceae	Adrak	Rhizome, Seed/ fruit

Formulation of the dosages of extracts from the recipes must be strictly adhered for maximum efficacy and also the avoidance of over dosage which may lead to other complications in patients. One major advantage of traditional medicine is that, it is cheaper than orthodox medicine. While drugs alone are not the only means of providing health care, they do play an important role in protecting, maintaining, and restoring the health of people. Total information gathered from the herbalist's shows that increasing number of people is turning to the use of anti-cancer which shows that they are effective and efficient in the treatment of cancer. According to Olapade (1995),

traditional medicine has higher benefits than any other health care system as it is cheaper, readily available and could cure permanently. Apart from this, it has no side effect and is capable of saving for the nation, huge foreign exchange which can be used for other development programme. The vulnerability of medicinal plants to over exploitation and extinction needs to be dealt with seriously. Issues relating to the conservation of these medicinal plants should be addressed by the Government and Non-governmental Organizations. Conservation methods such as *in-situ* and *ex-situ* should also be adopted to protect our natural biodiversity (Soladoye *et al.*, 2006).



A need for further scientific research based on the findings of this survey is indeed very necessary and recommended so that adequate records of indigenous methods for the management of cancer can be kept for posterity especially in the study area. A need for analytical work on the plants identified as useful for the management of cancer is also necessary in order to determine the actual dosage applicable so that the medicinal value of these plants could be made available to humanity and hence reduce pain, cost and sudden death of the peoples.

Acknowledgement

The authors are thankful to the peoples of Narendra Nagar block for providing us ethno-medicinal plants information's and valuable suggestion.

References

- Brook, G., and La Thanque, N. B., 1999. Drug discovery and the cell cycle, The promise and the Hope, *Drug Discovery Today*, 4: 455-464.
- Dahanukar, S. A., Kulkarni, R. A., and Rege, N. N., 2000. Pharmacology of medicinal plants and natural products. *Indian Journal of Pharmacy*, 32: S81-S118.
- Diwanay, S., Chitre, D., and Patwardhan, B., 2004. Immunoprotection by botanical drugs in cancer chemotherapy. *Journal of Ethno-pharmacology*, 90(1): pp 49-55.
- Duke, J. A., and Ayensu, E. S., 1985. *Medicinal Plants of China*. Reference Publications, Inc. Gaur, R. D., 1999. *Flora of the District Garhwal: North West Himalaya (with ethnobotanical notes)* Transmedia, Srinagar Garhwal.
- Hooker, J. D., 1872-1897. *Flora of British India*. 7 vols. Oxford (Rep.ed. 1982), Bishan Singh Mahendra Pal Singh, Dehradun.
- Jain, S. K., and Rao, R. R., 1977. *Field and Herbarium Methods*. Today and Tomorrow Printers and Publishers, New Delhi.
- Koduru, S., Grierson, D. S., and Afolayan. A .J. , 2007. Ethno-botanical information of medicinal plants used for treatment of cancer in the Eastern Cape Province, South Africa, *Current Science*, 92 (7): pp 906-908.
- Liu, W., Kato, M. and Akhand, A., 1998. The herbal medicine Sho-saiko-to inhibits the growth of malignant melanoma cells by up-regulating Fasmediated apoptosis and arresting cell cycle through down regulation of cyclin dependent kinases. *International Journal of Oncology*, 12: pp 1321-1326.
- Madhuri, S. and Pandey, G., 2009. Some anticancer medicinal plants of foreign origin, *Current Science*, 96 (6): pp 779-783.
- Mouli, K. C., Vijaya, T. and Rao, S. D., 2009, Phytoresources as potential therapeutic agents for cancer treatment and prevention, *Journal of Global Pharma Technology*, 1(1) : pp 4- 18.
- Osmaston, A. E., 1927. *A Forest Flora of Kumaon*. Govt. Press, Allahabad.
- Olapade, E. O., 1995. *Medicinal Plants: Conservation, Exploitation and Uses with special reference to Diabetes Mellitus*. Paper presented at the special seminar. Forestry Research Institute of Nigeria, Ibadan 26th April, 26pp.
- Olapade, E. O., 2002. *The herbs for Good health*. NARL specialist clinic, Ibadan, Nigeria. pp 98-105.
- Polunin, O., and Stainton, A., 1984. *Flowers of the Himalaya*, Oxford University Press, Delhi.
- Rang, H. P., Dale, M. M., and Ritter, J. M., 2001. *Pharmacology*, 4th edition Churchill living stone, London, 830pp.
- Singh, H. B., and Subramaniam., 2008. *Field manual of Herbarium Techniques* NISCAIR (CSIR), New Delhi
- Soladoye, M. O., Yakubu, F. A., Kola, O. K., Alabi, D. A., and Agbomeji Y.O. , 2006. *The Collection, Conservation and Cultivation of Local Medicinal Plants for Natural Medicine Production*. Paper presented at the Seminar/Workshop and Exhibition of Natural Medicine Products. Organized by Nigeria Traditional of Medical Association, Ijebu-North in the collaboration with Faculty of Science, Olabisi Onabanjo University Ag-Iwoye, held 19-23 September.
- WHO, 1998. *Regulatory situation of herbal medicines. A worldwide review*, Geneva Switzerland pp 1-5.

