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Sharwan Kumar Srivastava

Department of Botany, Lal
Bahadur Shastri P.G. College,
Gonda, Uttar Pradesh, India

Ethnomedicinal plants and their active compound for anticancer therapy

Sharwan Kumar Srivastava

Abstract

Traditional medicine plays an important role in health care provision in the developing countries. The aim of the present investigation was to document the indigenous medicinal plants traditionally used by Tharu tribe of Davipatan division of U.P. to treat various types of cancer. In the present study total 20 plant species were used by the tharu community to treat various types of cancer. The information collected from the tribal community suggests that tribal traditions may have much to contribute to the therapeutic armamentarium.

Keywords: Ethnobotany, tharu, cancer therapy, anticancer compound

Introduction

The traditional medicine is not only a source of healing, but the practice is also an important part of their religion and culture. So far as modern medicine is concerned, it is reported that more than half of the world's modern drugs are of biological sources (Prakash, 2017; Prakash and Yadav, 2020; Prakash and Prakash, 2021; Prakash and Verma, 2021) [4, 7, 5, 8]. Ethnobotany, a modern branch of plant science, is very old in concept but is new in its execution. Ethnobotany study highlights how the plants found in tribal areas and their communities could be conserved and utilized for the betterment of tribal races who exploit nature for their survival. More than 95,00 wild species of plants are used by tribals for their requirements as food, medicine, fodder, fiber, gums, resins, dyes, perfumes and other purposes (Sharma and Sharma, 2014) [9]. Plants have been used for both the prevention and cure of various diseases of humans. Ethnomedicinal plants are widely used in worldwide in numerous disciplines of healthcare from thousand years. The medicinal properties lie in plant roots, stem, leaves, flower, fruit, seeds, and sometimes an entire plant is used to cure various ailments like anemia, jaundice, smallpox, leprosy, antiseptic, anticancer, cough, skin disease, cancer, piles, diarrhea, diuretic, low blood pressure, dysentery, headache, diabetes, asthma, toothache, purify blood, fever, madness, disorders, ulcer, and others (Pandey, 2019). In Indian subcontinent, the plants have played crucial role in the socio-cultural development of human species concurrently in different parts of human civilization and exerted larger impact because of varied climatic conditions and diversified socioeconomic conditions (Pandey, 2019). Now day's importance of immunity booster plants and their products are continuously being enhanced since first wave of COVID-19, which has now been declared pandemic (Kumari and Shukla, 2020; Verma and Prakash, 2020) [2, 10].

Cancer is a group of diseases having varying characteristics and prognoses. Different diseases fall under cancer are classified on the basis of their origin. There are four types of cancer including carcinomas of the epithelium, tumors of the nervous system and lymphomas and leukaemias which arise from the haematopoietic lineage (Prakash and Upadhyay, 2021) [6]. Since ancient time natural products especially plants and microorganisms (Cragg and Newman, 2000) [1] have been utilized as medicines for treating various diseases. Natural products provide an important source for the development of new more potent and safer drugs. Since long time plant derived compounds have been a valuable source of medicines for various diseases. They possess diverse pharmacological properties including cytotoxic and cancer chemopreventive effects. The common active agents of indigenous plants are curcumin (Turmeric), resveratrol (red grapes, peanuts and berries), S-allyl cysteine (allium), allicin (garlic), lycopene (tomato), genistein (Soyabean), diallyl sulfide (allium), capsaicin (red chili), diosgenin (fenugreek), 6-gingerol (ginger), ellagic acid (pomegranate), ursolic acid

Corresponding Author:

Sharwan Kumar Srivastava

Department of Botany, Lal
Bahadur Shastri P.G. College,
Gonda, Uttar Pradesh, India

(apple, pears, prunes), catechins (green tea), eugenol (cloves), indole-3-carbinol (cruciferous vegetables), limonene (citrus fruits), silymarin (milk thistle), anethol (anise, camphor and fennel), beta-carotene (carrots), and dietary fiber. In present paper an attempt has been made to document the indigenous plants used by Tharu tribe of Davipatan Division of U.P. as an anticancer agent.

Material and Methods

An extensive survey was made in Tribal belts of Davipatan division of Eastern Uttar Pradesh covering number of villages of Gonda, Balrampur, Shravasti and Bahraich districts. The ethnomedicinal information and associated folk claims were collected either by personal contact with local healers, village headmen, elder person of various tribal communities (Tharu) of this area. Information of aboriginals was collected from District Officers and Block Development Officers regarding their location, population and social structure. Interviews

were arranged through the help of senior persons of the communities. In each and every district, the different tribes were interviewed from as many localities as possible to obtain accurate and elaborate information regarding the drugs derived from various species of plants, mode of their application and therapeutic used in cancer disease. Field visits were also carried out to collect claimed plants for identification purpose. Whenever language difficulty arose, the services of interpreters were utilized.

Results and Discussion

The 55-65 years old people of tharu community was interviewed and the information regarding indigenous medicinal plants used as anticancer agent. Tharu people used number of plants in the form of fruits and vegetables as anticancer therapy. The different plants and their parts used by tribal people to make their medicinal products for treating the various types of cancer are given in the table 1.

Table 1: The different plants and their parts used by tribal people to make their medicinal products for treating

S.N.	Botanical name (Common name)	Parts used (Active Compound)	Mode of application	Types of cancer treated
1.	<i>Curcuma longa</i> (Turmeric)	Rhizome (Curcumin)	Dry powder taken orally with hot water	All cancer
2.	<i>Punica granatum</i> (Anar)	Fruit/ seed (Linolenic acids)	Fresh fruit along with seed taken orally.	All cancer
3.	<i>Zingiber officinale</i> (Ginger)	Rhizome (Phenolic compound like gingeol, shogaol)	Used as spices in vegetable	All cancer
4.	<i>Capsicum annuum</i> (Red Chili)	Fruit/ Seed (Capsaicin)	Used as spices in vegetable	Skin & Blood cancer
5.	Soyabean	Seed (Genistein)	Used as vegetable	Breast & Prostate cancer
6.	<i>Allium sativum</i> (Garlic)	Bud/ Garlic oil (Diallyl trisulfide)	Used as spices in vegetable. Garlic boiled with mustard oil and taken orally.	Colon cancer
7.	<i>Vitis vinifera</i> (Grapes)	Fruit (Resveratrol)	Taken orally	Breast Cancer
8.	<i>Azadirachta indica</i> (Neem)	Seed extract (Nimbolide, a tetranortriterpenoid)	Taken orally with water and applied externally	Prostate cancer
9.	<i>Catharanthus roseus</i> (Sadabahar)	Plant extract (Vincristine, a Catharanthus alkaloid)	Taken orally with hot water	Blood cancer
10.	<i>Asparagus officinalis</i> (Satawar)	Bark, Root, Leaves (Saponin, a steroid)	Crushed and the sap is applied on the affected area	Skin & Prostate cancer
11.	<i>Achyranthes aspera</i> (Lahchichra)	Leaves (Triterpenoid saponins)	Dried powder of leaves mixed in animal fat and applied on the affected area	Skin cancer
12.	<i>Calotropis procera</i> (Madar)	Roots (Calotropin)	Sap of fresh root are applied on affected area.	Breast cancer
13.	<i>Crotalaria juncea</i> (Barseen)	Seeds (Triterpenes)	Seed powder mixed with honey and applied on affected area	Skin cancer
14.	<i>Centella asiatica</i> (Brahmi)	Leaves (Pentacyclic triterpenes)	Fresh leaves crushed and taken orally	Throat cancer
15.	<i>Croton bonplandinum</i> (Ban Tulsi)	Leaves, Steam (Toxalbumin/Crotonoside)	Sap of fresh leaves and steams are applied on the affected area	Breast & skin cancer
16.	<i>Duranta erecta</i> (Dhatura)	Leaves, Fruits, Root (β -sitosterol)	Dry powder of leaves, root and fruit taken orally	All cancer
17.	<i>Hibiscus rosa-sinensis</i> (Gudhal)	Leaves, Root, Flower (Octadecatrienoic acid)	Soup of leaves, root and flower taken orally	Blood & Prostate cancer
18.	<i>Hetromorpha trifoliata</i> (Van Dhania)	Leaves, Bark, Root ()	Paste of leaves, root & bark are applied on affected area.	Skin cancer
19.	<i>Kigelia africana</i> (BalamKhira)	Fruit, Seed	Dry powder of fruit and seed with honey taken orally	Blood cancer
20.	<i>Moringa oleifera</i> (Sahjan)	Leaves, Roots, Seeds	Boiled with salt and taken orally	All cancer

Out of the various types of cancer, five type of cancer (Skin, Breast, Prostate, Blood and Throat) claimed to be treated by respondents. Table shows total 20 plant species were used by the people of tharu community to treat five types of cancer. Cancers of skin, breast and prostate were the most commonly treated cancer by local healers. Hence, based on these finding, there is urgent need to evaluating the *in vitro* Antiproliferative activities of cited indigenous plants.

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