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# AN APPRAISAL OF TRADITIONAL MEDICINAL PLANTS AS ANTICANCER AGENTS FROM HIMACHAL PRADESH, INDIA

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## ABSTRACT

An attempt has been made to review some medicinal plants used for the prevention and treatment of cancer in Himachal Pradesh. Information on the name of plants, family, parts used and method of preparation has been collected from Ethnomedicinal literatures. Many bioactive components in the plants are responsible for their anticancer activity. These active compounds are still a matter of thorough research. In today's world, where cancer disease is so much prevalent, medicinal plants have become the need of the hour so as to bypass costly treatment and so many side effects of chemotherapy and radiotherapy. Over the years, advancement in clinical research has been seen for use of these medicinal plants and a number of anticancer drugs have come out of these as a result. The main problem with these drugs is the toxicity and side effects associated with them due to their lack of specificity, as these drugs also kill healthy cells. The apt study of these medicinal plants would develop in introducing a site specific and safe anticancer drug with higher therapeutic values to eliminate cancer. In addition this review forms a good basis for selection of the plant for further phytochemical and pharmacological investigation. Though a good number of anticancer drugs have been developed from plants or their derived active compounds, development of a safe, economic and site-specific anticancer drug is still a challenge.

**KEYWORDS:** Anticancer, Medicinal plants, phytochemicals, drug, phytochemicals.

## INTRODUCTION

Cancer is major health problem in human beings all over the world. Cancer is one of the major causes of death along with cardiovascular disease and diabetes. Every year, millions of people are diagnosed with cancer, leading to death. At present, for India as a whole the magnitude of the cancer incidence projections by site and sex based on scientific methods was available till the year 2016 (Murthy et al., 2008) and 2020 (Takiar et al., 2010). Cancer is the abnormal growth of cells in human body that can lead to death. High death rate associated with cancer and because of serious side effects of chemotherapy and radiation therapy, cancer patients seek unconventional harmonizing methods of treatment. Plants have been used for treating diseases since time immemorial. More than 50% of modern drugs in clinical use are of natural products. Natural products and related drugs are used to treat 87% of all categorized human diseases including bacterial infection, cancer and immunological disorders (Newman *et al*., 2007). About 25% of prescribed drugs in the world originate from plants and over 3000 species of plants have been reported to have anticancer properties (Graham *et al*., 2000). According to the National Cancer Institute, at least 70 percent of new drugs introduced in the United States in the last 25 years are derived from natural sources (Steenhuysen, 2007).

The study has made an effort in order to explore and document indigenous knowledge and practice of Himachal Pradesh. Especially, elderly people and healers have knowledge about the medicinal plants and their uses in healthcare. With their long experiences and practices, they have acquired rich knowledge about the utilization of plant resources in various ways. It is found that medicinal plants are the first levels of health care providers to majority of the people in the study area.

Himachal Pradesh is a mountainous state in northern India known for its forests, rivers, and valleys, a rich cultural heritage. Himachal Pradesh extends from the Shivalik Hills in the south to the Great Himalayan ranges including a slice of trans-Himalayas in the north. The state falls between latitude 30'22" and 30'12" north and longitude 75'45" and 79'04" East. It is located between the Ravi river in the west and Yamuna river in the east. The altitude ranges from 450 to 6500 meters above sea level, which increases from West to East and South to North.

It is immemorial that the Indian people have tremendous passion for medicinal plants and use them for wide range of health related applications from a common cold to memory improvement and treatment of poisonous snake bites to a cure for muscular dystrophy and the enhancement of body's general immunity. In the oral traditions local communities in every ecosystem from the trans himalayas down to the coastal plains have discovered the medical uses of thousands of plants found locally in their ecosystem. India has one of the richest plant medical culture in the world. It is a culture that is of tremendous contemporary relevance because it can on one hand ensure health security to millions of people and on the other hand it can provide new and safe herbal drugs to the entire world.

The Indian System of Medicines, viz Ayurveda, Siddha, Unani and Homeopathic system predominantly use plant based raw materials in most of their preparations and formulations. Medicinal plants as a group comprise approximately 8000 species and account for around 50% of all the higher flowering plant species of India. Millions of rural households use medicinal plants in a self-help mode. Over one and a half million practitioners of the Indian System of Medicine in the oral and codified streams use medicinal plants in preventive and therapeutic applications.

Over the past two decades, herbal medicines have 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 extent of the world's population (Akerele, 1995). This is particularly factual in developing countries, where herbal medicine has a long and incessant 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, 2004). In addition, herbal medicines are more acceptable in these countries from their cultural and spiritual points of view (Koduru *et al*., 2007).

Natural phytochemicals derived from medicinal plants have gained significant recognition in the potential management of several human diseases, including cancer (Desai *et al*., 2008; Guilford *et al*., 2008; Mehta *et al*., 2010). Much research has been geared towards the evaluation of plant extracts as prophylactic agents, which offer great potential to inhibit the carcinogenic process. The preventive mechanisms of tumor formation by natural phytochemicals range from the inhibition of genotoxic effects, increased antioxidants and anti-inflammatory activity, inhibition of proteases and cell proliferation, protection of intracellular communications to modulate apoptosis and signal transduction pathways (Soobrattee *et al*., 2006). The Indian sub-continent has great botanical diversity and widespread use of traditional medicine practice known in ayurveda; however, only a relatively small number of these plants have been subjected to accepted scientific evaluation for their potential anticancer effects (Krishnaswamy, 2008).

There are several medicinal plants all over the world, including India, which are being used traditionally for the prevention and treatment of cancer. However, only few medicinal plants have attracted the interest of scientists to investigate the remedy for neoplasm (tumour or cancer). Hence, an attempt has been made to review some medicinal plants from Himachal Pradesh used for the prevention and treatment of cancer in India where medical facilities are very meager and inexpensive.

**Table: Commonly used medicinal plants against cancer.**

| S. No. | Common name | Botanical Name | Family | Part Used |
|---|---|---|---|---|
| 1. | Ak | *Calotropis procera* | Asclepiadaceae | Root extract |
| 2. | Arind | *Ricinus communis* | Euphorbiaceae | Roots and leaves |
| 3. | Arjuna | *Terminalia arjuna* | Combretacae | Bark |
| 4. | Arlu, Sonapatta, kinnauri phool | *Oroxylum indicum* | Bignoniaceae | Bark |
| 5. | Ashwagandha | *Withania somnifera* | Solanaceae | Roots |
| 6. | Avaram | *Cassia auriculata* | Caesalpinaceae | Roots, Leaves |
| 7. | Bael | *Aegle marmelos* | Rutaceae | Bark and flower |
| 8. | Bahera | *Terminalia belerica* | Combretacae | Fruit |
| 9. | Bankakri, Papra | *Podophyllum hexandrum* | Berberidaceae | Rhizome, roots, fruits |
| 10. | Bhojpatra | *Betula utilis* | Betulaceae | Bark and Leaves |
| 11. | Bhutika, Lemon grass | *Cymbopogon citratus* | Poaceae | Leaves |
| 12. | Carrot | *Daucus carota* | Apiaceae | Roots |
| 13. | Chameli | *Jasminum officinale* | Oleacaeae | Leaves, Flowers |
| 14. | Chirayita | *Swertia chirayita* | Gentianaceae | Whole plant |
| 15. | Costus, Kut Root | *Saussurea lappa* | Asteraceae | Dried Roots |
| 16. | Dhania | *Coriandrum sativum* | Apiaceae | Seed and whole herbs |
| 17. | Dhatura | *Datura metel* | Solanaceae | Plant and fruit |
| 18. | Gambhari | *Gmelina arborea* | Lamiaceae | Roots and bark |
| 19. | Ginger | *Zingiber officinalis* | Zingibaracae | Rhizome |
| 20. | Gokshura | *Tribulus terrestris* | Zygophyllaceae | Fruit, leaves |

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|---|---|---|---|---|
| 21. | Guduchi, Gloyen | *Tinospora cordifolia* | Menispermaceae | Stem, leaves, roots |
| 22. | Hathi-sundi | *Heliotropium indicum* | Boraginaceae | Roots |
| 23. | Himalayan Maiden hair Fern | *Adiantum venustum* | Adiantaceae | Whole plant |
| 24. | Indian Aloe | *Aloe barbadensis* | Liliaceae | Leaves |
| 25. | Jambu | *Syzygium cumuni* | Myrtaceae | Seed |
| 26. | Jayapala | *Croton tiglium* | Euphorbiaceae | seeds |
| 27. | Kachnar | *Bauhinia variegata* | Caesalpinaceae | Roots |
| 28. | Kalimusli | *Curculigo orchioides* | Amaryllidaceae | Root |
| 29. | Kalmegh | *Androgarphis paniculata* | Acanthacae | Dried leaves |
| 30. | Karamarda | *Carissa carandas* | Apocynaceae | Leaves and Fruits |
| 31. | Langli, kalihari | *Gloriosa superba* | Liliaceae | Rhizome |
| 32. | Lemon Anticancer | *Citrus medica* | Rutaceae | Roots |
| 33. | Makoi | *Solanum nigrum* | Solanaceae | Whole plant |
| 34. | Manjishtha | *Rubia cordifolia* | Rubiaceae | Roots |
| 35. | Mint | *Mimosa pudica* | Mimosaceae | Whole plant |
| 36. | Mulathee | *Glycyrrhiza glabra* | Fabaceae | Roots |
| 37. | Nirgundi, Bana | *Vitex negundo* | Verbenacaeae | Leaves |
| 38. | Onion | *Alium cepa* | Liliaceae | Bulb |
| 39. | Punarnava | *Boerhavia diffusa* | Nyctaginaceae | Roots |
| 40. | Pushkar | *Inula racemosa* | Asteraceae | Roots |
| 41. | Ratanjot | *Arnebia euchroma* | Boraginaceae | Roots |
| 42. | Ratanjot | *Arnebia euchroma* | Boraginaceae | Roots |
| 43. | Sadabahar | *Catharanthus roseus* | Apocynacae | Whole plant |
| 44. | Sanay, Sana ka patt | *Cassia senna* | Caesalpinaceae | Leaves |
| 45. | Sanjana | *Moringa oleifera* | Moringacaeae | Leaves |
| 46. | Shatavari | *Asparagus racemosus* | Asparagaceae | Roots |
| 47. | Sirin | *Albizia lebbeck* | Fabaceae | Flower and bark |
| 48. | Sitaphala | *Annona squamosa* | Annonaceae | Seeds |
| 49. | Thuno, Thangi, Birmi | *Taxus baccata* | Taxaceae | Leaves/Needles |
| 50. | Tulsi | *Ocimum sanctum* | Lamiaceae | Seed and leaves |
| 51. | Turmeric | *Curcuma longa* | Zingibaracae | Rhizome |
| 52. | Vasa | *Adhatoda vasica* | Acanthaceae | Roots, Leaves |

## CONCLUSION

Many bioactive components in the plants are responsible for their anticancer activity. These active compounds are still a matter of thorough research. In today's world, where cancer disease is so much prevalent, medicinal plants have become the need of the hour so as to bypass costly treatment and so many side effects of chemotherapy and radiotherapy. Over the years, advancement in clinical research has been seen for use of these medicinal plants and a number of anticancer drugs have come out of these as a result. The main problem with these drugs is the toxicity and side effects associated with them due to their lack of specificity, as these drugs also kill healthy cells. The apt study of these medicinal plants would develop in introducing a site specific and safe anticancer drug with higher therapeutic values to eliminate cancer. In addition this review forms a good basis for selection of the plant for further phytochemical and pharmacological investigation. Though a good number of anticancer drugs have been developed from plants or their derived active compounds, development of a safe, economic and site-specific anticancer drug is still a challenge.

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