ANTICANCER PROPERTY OF MEDICINAL PLANTS

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ABSTRACT

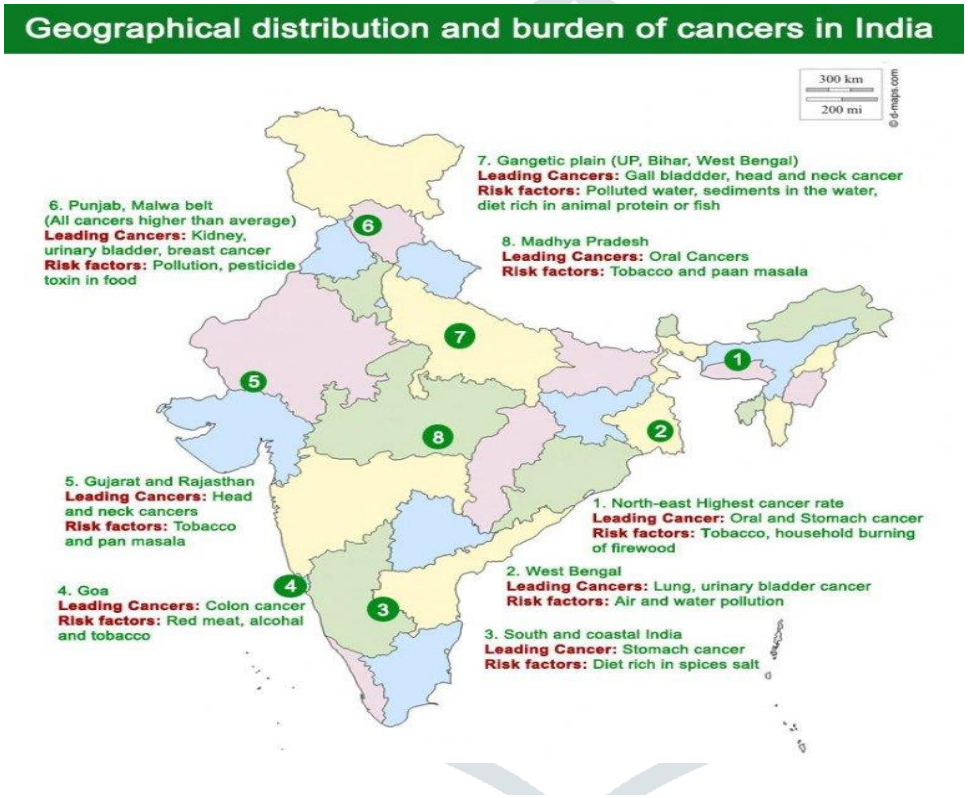
Cancer is a major public health problem in most of the developed countries in around the world; however, there has been a notable improvement in the survival rate of patients over the past few decades owing to early detection and progress in medical treatment [1][2]. A few numbers of patients with cancer receive chemotherapy or chemo radiotherapy and benefit from treatment with anticancer drugs [1]. However this anticancer drug causes many side effects with a variety of symptoms, such as nausea, vomiting, anorexia, diarrhoea, oral mucositis, and numbness, because of their toxic effects on normal cells/tissues [10]. Although many valuable strategies have been developed to treat or prevent these side effects, as these side effects often compromise patients' quality of life. Therefore, an alternative or novel approach to treat or prevent these side effects is required[10]. The causes for cancer can be the use of tobacco, alcoholic beverages, infections such as hepatitis B, hepatitis C and HPV. There is a constant demand for new therapies of treatment and prevent this life from this dangerous threatening disease. The plant kingdom produces a lot of naturally occurring secondary metabolites which are being investigated for the anticancer activities for the development of new clinical drugs[10]. Since many years herbal medicines had been used and are still used in developing countries around the world as the primary source of medical treatment. Many plant species in the plant kingdom are already being used to treat or prevent the development of cancer. In recent years, several Kampo medicines (Japanese traditional herbal medicines- were imported from China 1,500 years ago and developed independently)[3] have been investigated using animal models and clinical trials to assess their effects on chemotherapy-induced side effects. In this paper we will discuss about the demand for natural compounds from medicinal plants and their properties which make them targets for potential anticancer treatments.

Keywords: Medicinal Plants & Anticancer Agents.

INTRODUCTION:

In back 1950s, scientists began systematically examining natural organisms as a source of useful anti-cancer substances.[4] It has recently been argued that "the use of natural products has been the single most successful strategy in the discovery of novel medicines".[5] Plants are the best source of anti-cancer agents, the extract of which had been shown tremendous effect for the treatment and prevention of cancer disease in human being. Medicinal plants, also known as medicinal herbs, have been discovered and used as traditional medicine practices since prehistoric times. Plants synthesise hundreds of chemical compounds for survival functions including defence against insects, fungi, diseases, and herbivorous mammals. Numerous phytochemicals with potential or

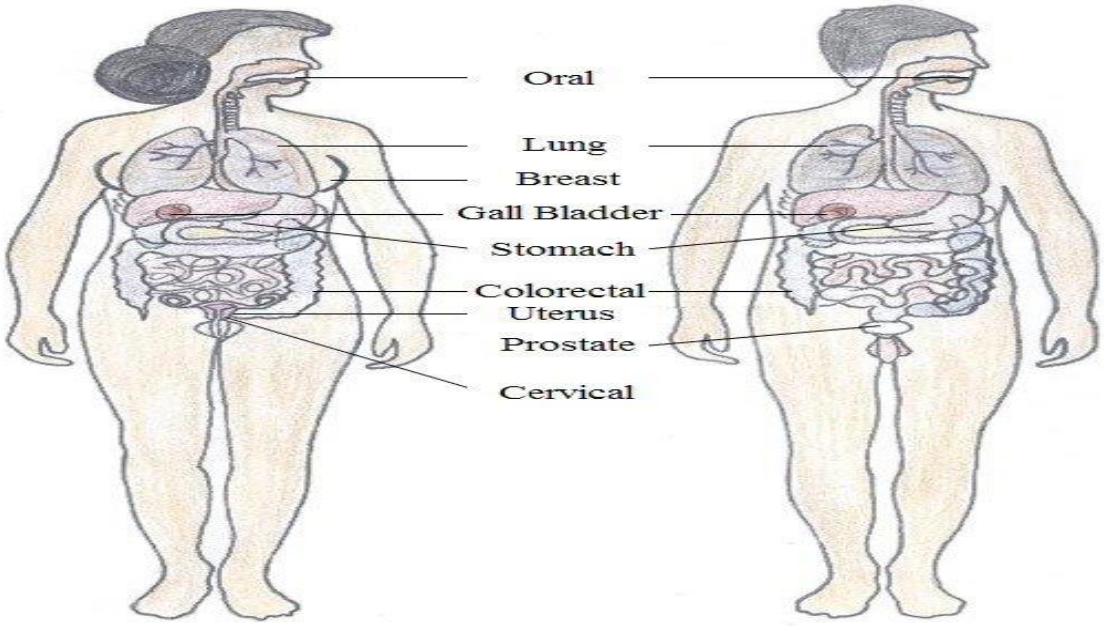
established biological activity have been identified. However, since a single plant contains widely diverse phytochemicals, the effects of using a whole plant as medicine are uncertain. Further, the phytochemical content and pharmacological actions, if any, of many plants having medicinal potential remain un-assessed by rigorous scientific research to define efficacy and safety.[6] Because fungal and human cells are similar at a biochemical level it is often the case that chemical compounds intended for plant defence have an inhibitory effect on human cells, including human cancer cells.[7] The World Health Organization estimates, without reliable data, that some 80 percent of the world's population depends mainly on traditional medicine (including but not limited to plants); perhaps some two billion people are largely reliant on medicinal plants. [8][9] Medicinal plants may provide three main kinds of benefit: health benefits to the people who consume them as medicines; financial benefits to people who harvest, process, and distribute them for sale; and society-wide benefits, such as job opportunities, taxation income, and a healthier labour force.[9]



India recorded an estimated 3.9 million cancer cases in 2016, data available with the National Cancer Registry Programme of the Indian Council of Medical Research (ICMR) shows. The worst affected states were Uttar Pradesh with 674,386 cases, followed by Maharashtra with 364,997 and Bihar with 359,228. In South India Tamil Nadu recorded 222,748 cases, Karnataka 202,156, Andhra Pradesh 159,696, Telangana 115,333 and Kerala 115,511 cases of cancer. "The numbers are too high in UP, Maharashtra and Bihar because these are the most populous states in the country. More than 40% of the cancer cases in India are totally preventable such as lung cancer and cancers of mouth. One of the major reasons of cancers of mouth and lung is tobacco consumption. India is the hub of smokeless tobacco users. UP and Bihar has the highest number of people chewing tobacco products which causes cancer thus, the numbers are high in these states. The government has laid down four priority cancers - **breast cancer, cervical cancer, oral cancer, and lung cancer which together constitute 41 per cent of cancer burden**, the report mentioned. The cases of Cancer are rapidly increasing, experts attribute the

increasing incidence of the disease to rapidly changing lifestyles, including stress, food habits and consumption of tobacco products and alcohol [11].

Most common cancers in India



1. Breast Cancer

There are various symptoms to detect breast cancer.

A painless lump in the breast, a sudden change in the shape and size of the breast, bloody discharge from the nipple, nipple retraction is some of the important signs.

The main screening tool to detect early breast cancer is mammography which includes taking an x-ray of the breast that produces an image of breast tissue and gives out the normal and abnormal structures within the breast.

Self-breast examination (SBE) should be taught to every female and encouraged from the age of 20 years.

2. Cervical cancer

Cervical Cancer occurs when the abnormal cells on the cervix grow out of control. The cervix is the lower part of the uterus that opens into the vagina.

Detection

This cancer can be treated completely only if it is detected at an early stage.

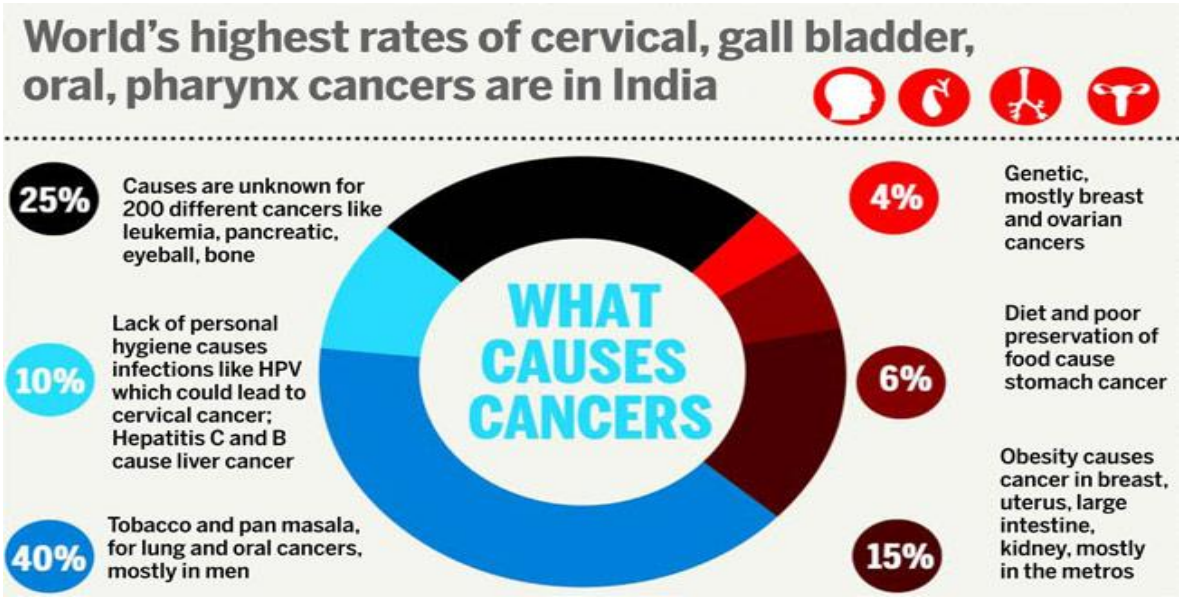
It is diagnosed by a PAP test**.** The symptoms of cervical cancer are bleeding from the vagina which is abnormal i.e. bleeding after menstruation cycle, menopause or after sex. Pain in the lower belly or pelvis and pain during sex are other symptoms.

3. Oral Cancer

Oral Cancer is a major problem in India. Of the global three lakh cases detected annually, 86 per cent are reported from India, where it's the third most common cancer. The main risk of developing oral cancer is tobacco and alcohol consumption. The detection of oral cancer at an initial stage has led to a significant decrease in death rates and sufferings.

Detection

Oral cancer can be detected by symptoms like pain in the throat, long-standing ulcers in the mouth, loosening of teeth, change in voice and difficulty in chewing and swallowing. Regular self-examination of the oral cavity is advised to people who eat or smoke tobacco.



Medicinal Plants & Anticancer Agents

Scientists have found that certain foods, including some herbs and spices, contain phytochemicals, which can affect our bodies biologically. Through their ability to stimulate the immune system, phytochemicals may aid in keeping cancer at bay.

Ayurveda, as we all know, consists of many remedies that have been successfully treating various health problems of people for centuries. While many claims that it has the power to treat cancer as well, medical experts disagree for the lack of scientific research. However, various health institutions are including Ayurveda in their treatment, along with radiotherapy and chemotherapy to reduce the side effects. Ayurveda originated in India more than 5000 years ago but modern science and allopathy now believe in its principle and more and more research is being directed towards ancient herbs and natural therapies. A lot of health centers and universities are integrating Ayurveda into their programmes to combat the ever-increasing load of non-communicable diseases. All medical practitioners believe that prevention is better than cure and Ayurveda provides the path to a healthy lifestyle. Ayurveda sees health as a perfect balance between mind, body and consciousness. To achieve this it promulgates a daily regimen of exercise, emotional balance and a healthy diet. This, in itself, is a great way to prevent the onset of many life style diseases. Ayurveda recommends a number of herbs for preventing cancer and there is a growing body of scientific studies that backs this ancient knowledge. Here are some common herbs which are proven to have anti-cancer properties.

Turmeric

The spice turmeric contains curcumin, which gives curry powder its yellow colour. "Curcumin is one of the most powerful anti-inflammatories identified to this day," says Amanda Bontempo, RD, CDN, an ambulatory oncology dietitian at Montefiore Medical Center in the Bronx, N.Y. Cancer tumours have a network of blood vessels that feed them, explains Bontempo, and curcumin can work against these blood vessels and essentially choke the cancer cells to death. Mixing turmeric with black pepper and olive oil can activate curcumin's power. With its mild and pleasant flavour, turmeric can be used as a

dry rub on chicken or even vegetables. A teaspoon or two can also be added to soups, sauces, or stews — a tasty way to practice cancer prevention.

Garlic

Along with onions, shallots, scallions, and leeks, garlic is an allium vegetable that may help prevent cancer, especially of the stomach. Allium vegetables contain organosulfur compounds, the chemical that causes eye-tearing when they're chopped. Organosulfar has immune-strengthening and anti-carcinogenic qualities. Garlic is a versatile cooking essential. It can be sautéed in a tablespoon of olive oil and served with whole grain bread, or baked in the oven and then mashed into a spread. It's delicious added to vegetables and meats dishes.

Ginger

Another weapon in your kitchen's cancer prevention arsenal, fresh ginger contains gingerol while dried ginger forms zingerone. "Gingerol and zingerone are thought to have antioxidant and anti-inflammatory properties, and therefore may be protective against cancer," explains Bethany Smith, RD, a nutritionist at Georgia Cancer Specialists in Atlanta. Store ginger in the freezer and grate a bit into lentils or rice when cooking. Steeping a few thin slices in hot water for 10 to 15 minutes can create a calming tea that may help with nausea and also decrease cancer risk.

Black Pepper

Actually, a berry, black pepper contains the active substance piperine, a naturally occurring chemical compound with strong antioxidant properties. A study conducted by scientists at the University of Michigan Comprehensive Cancer and published in the journal *Breast Cancer Research and Treatment,* found pepper along with turmeric — inhibited the growth of cancerous stem cells of breast tumours. However, the spice didn't destroy healthy cells. Pepper can add flavour to a whole host of dishes, from scrambled eggs to sliced tomatoes to soups and casseroles. Plus it's an all-around healthful alternative to table salt.

Cayenne Pepper

Cayenne contains capsaicin, known to be a powerful antioxidant," says Bontempo. "Some lab studies have shown that capsaicin is toxic to cancer cells." One study by researchers at the University of California at Los Angeles School of Medicine, found capsaicin stifled the growth of prostate cancer cells, and even had the power to kill them off. In addition to fighting cancer, cayenne pepper also adds a tasty kick to a number of foods. Try it on popcorn and in dip to spice up snacks, or mix it with other spices for a smoky-heat taste.

Oregano

Oregano contains carvacrol, a molecule that may help offset the spread of cancer cells by working as a natural disinfectant. Carvacrol is also present in marjoram, mint, thyme, basil, and parsley. Marinating foods with oregano may also reduce the formation of heterocyclic amines (HCAs) — chemicals created when meat is cooked at high temperatures. HCAs have been found to increase cancer risk in animals. Oregano can be added to marinades, pizza, pasta, and tuna salad, just to name a few dishes.

Amla

Amla is an Ayurvedic superfood. It is one of the richest sources of Vitamin C and also contains quercetin, phyllaemblic compounds, gallic acid, tannins, flavonoids, pectin and various polyphenolic compounds, making it the king of rejuvenation. Scientific research of

three decades has proven the traditional use of amla to be correct. Laboratory trials of amla extracts have shown its ability to kill and prevent growth of cancer cells while not harming the healthy cells.

Ashwagandha

Also known as the Indian ginseng, it has been used to help the body deal with stress in Ayurveda. Its anti-cancer value was realized about 40 years ago when researchers isolated a crystalline steroidal compound (withaferin A) from this herb. Further research on these extracts which were taken from the leaf of ashwagandha showed that they were able to kill cancerous cells.

HolyBasil

Commonly known as Tulsi in India, this sacred herb is known for its healing powers. It is used for improving immunity and fighting stress. Research has shown that it also possesses anti-inflammatory, analgesic, anti-diabetic and anti-stress properties. Studies have shown that the phytochemicals present in tulsi prevented chemically induced lung, liver, oral and skin cancers by increasing the antioxidant activity, altering gene expressions, killing cancer cells and preventing the spread of cancer to other cells.[12][13]

CONCLUSION

Medicinal plants keep the health and vitality of individual and also cure various diseases including cancer without causing toxicity. Natural products discovered from medicinal plants have played an important role in the treatment of cancer. In this review, some anti-cancer plants have been presented. These plants possess good immunomodulatory and antioxidant properties leading to anticancer activity. In conclusion, this article provides knowledge about anticancer medicinal plants of Indian origin, which are used by people all over the world.

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