

# National Conference on Future Trends in Marine Biotechnology (FTMBT 2019)



Centre for Marine Science and Technology  
Manonmaniam Sundaranar University  
Rajakkamangalam, Kanyakumari District  
Tamilnadu, India- 629502

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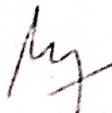
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# PROCEEDINGS OF NATIONAL CONFERENCE ON FUTURE TRENDS IN MARINE BIOTECHNOLOGY (FTMBT-2019)

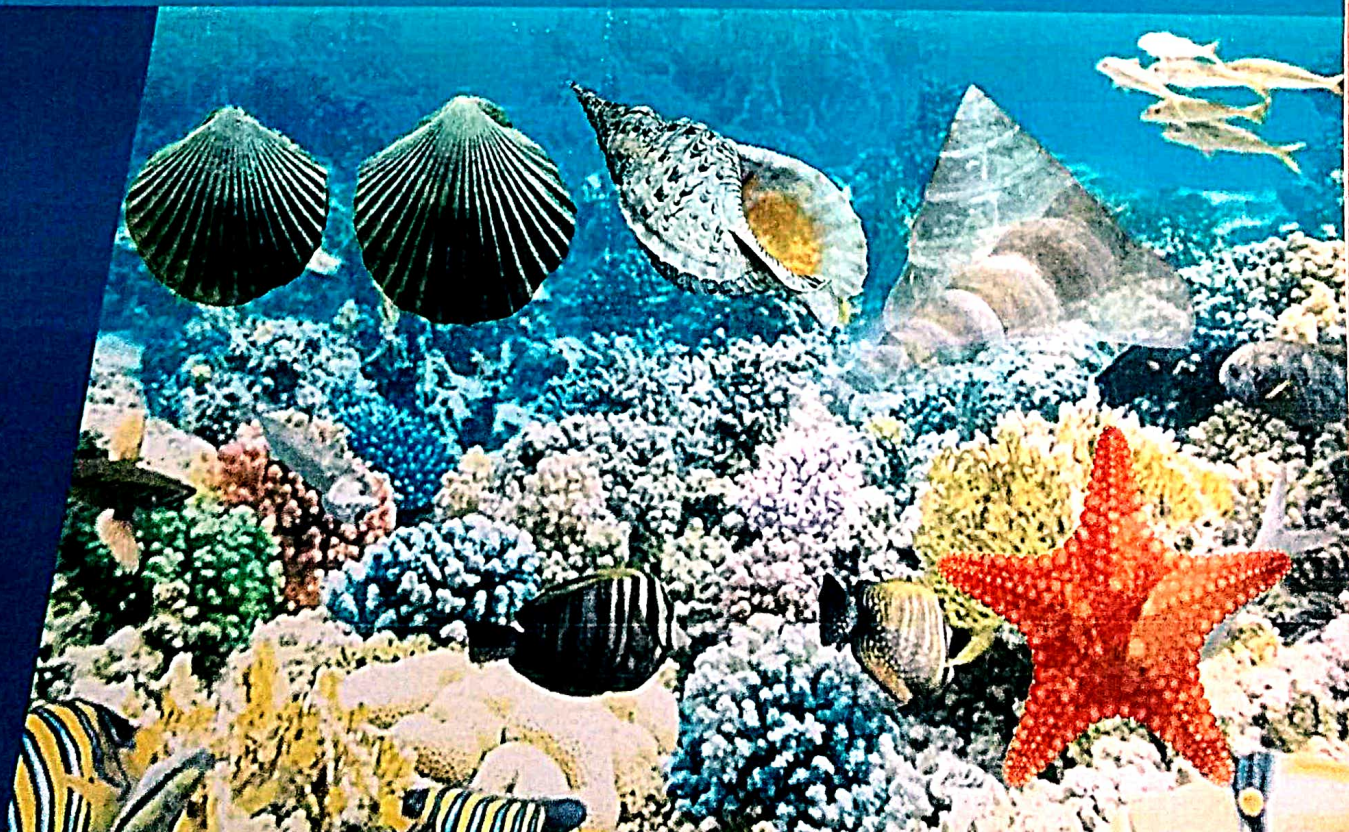
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## STUDIES ON THE DISTRIBUTION OF PLANTS HAVING ANTICANCER ACTIVITY FROM MUGALIADI HILLS IN WESTERN GHATS OF TAMILNADU

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### Abstract

Disease is an impairment of the normal state of a human being that interrupts vital functions. Cancer is often deadly and affects a considerable number of people worldwide. There is a constant demand for new therapies to treat and prevent this life-threatening disease. Anticancer activity is the effect of natural and synthetic or biological and chemical agents to reverse, suppress or prevent carcinogenic progression. Recent days medicinal plants have become the most important source of drug discovery in research for treating many diseases including cancer. The herbal medicines have a key role in the precaution and medication of cancer which accomplish their therapeutic effect by interdicting cancer activating enzymes and hormones, stimulating DNA repair mechanism encouraging production of protective enzymes persuading anti-oxidant action and magnifying immunity. This article deals with the diversity of anticancer activity of plants in the Western Ghats. Here an attempt is being made through this study to highlight the natural products and their analogues established as anti-cancer agents

and the plant species identified with anti-cancer properties.

**Keywords:** Cancer; Anticancer; Distribution; Medicinal Plants; Immunity.

### Introduction

Diseases are an impairment of the normal human being and affect vital functions. Cancer has always been the most serious disease in humans around the world due to its high morbidity and mortality (Jemal *et al.*, 2011). Cancer is a major public health burden in both developed and developing countries. It is characterized by multiplication of cells without control. Then these can be invade and destroy healthy tissue including organs (Gatzemeic *et al.*, 1995). Many aspects relate to the cause of cancer besides heredity, food habits, smoking, nutritional behavior, radiation, etc (Lakshmi *et al.*, 2015, Harrison, 1998). There are different types of cancer which include breast cancer, prostate cancer, lung cancer, cancer of colon or rectum, blood cancer, ovarian cancer etc (Sanjar *et al.*, 2013). Cancer is one of the leading causes of death and globally the number of cases cancer is increasing gradually (Prakash *et al.*, 2013).

### Current treatment methods

Even though medicine progressed and flourished in some ancient civilizations, there was a little progress in cancer treatment. Ancient physicians and surgeons supposed that cancer would usually come back after it was surgically removed. The belief that cancer cannot be cured has persisted even into the 21<sup>st</sup> century. Cancer treatment has gone through a slow process of development. Galen, a Greek doctor, has written about the surgical cures of breast cancer in the 2nd century (Ames *et al.*, 1995). More advances were made in the 19<sup>th</sup> century and 20<sup>th</sup> century in general surgery and cancer therapy with the development of anesthesia in 1846 (Sudhakar, 2009). At that time, three surgeons Billroth in Germany, Handley in London, and Halsted in Baltimore became famous for their outstanding contribution in the complete removal of tumor by surgery (Kapur, 2014). Thomas Beatson introduced an important and modern method called hormone therapy to treat and prevent breast cancer in the 19<sup>th</sup> century (Sudhakar, 2009). Radiation therapy began with radium and with relatively low-voltage diagnostic machines. Later, the methods and machines that deliver radiation therapy have steadily improved. However, the major disadvantage of the radiation therapy is that normal cells surrounding the cancer tissue are also destroyed along with cancer cells (Cancer Research, 2014). Today several new drugs, new combinations of drugs and new delivery techniques were developed to reduce the side effects of chemotherapy. Later, in 1970s, modern clinical trials

demonstrated less expensive surgery such as modified radical mastectomy, lumpectomy and radiation therapy were developed in the treatment of breast cancer. The progress in the development of cancer imaging test started in 1970s with the development of ultrasound (sonography), computer tomography scans, magnetic resonance imaging scans and positron emission tomography scans. Surgeons have developed greater techniques such as colostomy for the treatment of rectal cancer during the last decades of 20<sup>th</sup> century to minimize the mounts of normal tissue removed in cancer operations (Kosinski *et al.*, 2012)

Current treatments include surgery, chemotherapy, radiotherapy and chemically derived drugs (Nidhi *et al.*, 2017). Only chemotherapy and radiation treatments are at times successful and much times toxic and lethal (Lakshmi *et al.*, 2015).

### Disadvantages of current treatments

There are several medicines available in the market to treat the various types of cancer but no drug is found to be fully effective and safe (Prakash *et al.*, 2013). These treatments can put patients under a lot of strain, damage their health and also costly (Nidhi *et al.*, 2017). Already available conventional therapies for the treatment of cancer are radiotherapy and chemotherapy which have various side effects like neurological, cardiac, renal and pulmonary toxicity, seriously affecting the health of the person. Therefore, an alternative method is required to develop that include less toxic and more potent

anticancer drug as compare to the drugs available in the market (WHO, 2017).

### **Need of alternative treatments**

Some cancers can be cured if detected early enough. Due to the lot of disadvantages, there is a focus on alternative treatments and therapies against cancer. In view of serious side effects of chemotherapy and radiation treatment for cancer, there should be immediate search for alternative and safer methods of treatment (Ames and Gold, 1995). Several chemo preventive agents are good to treat cancer, but they stimulate toxicity that eliminates their usage. The increasing costs of conventional treatments (chemotherapy and radiation) and the lack of effective drugs to cure solid tumors encouraged people in different countries to depend more on folk medicine which is rooted in medicinal plants use (Maryam Moudi *et al.*, 2017). Moreover, during the last decade, novel synthetic chemotherapeutic agents currently in use clinically have not succeeded in fulfilling expectations despite the considerable cost of their development. Therefore there is a persistent dictate to come out new, fruitful and economical anticancer drugs (Coseri, 2009).

### **Benefits of natural products**

Natural products, especially plants have been used for the treatment of various diseases for thousands of years (Samuelsson, 1999). Many natural products and their analogues have been identified as potent anti-cancer agents. They have been found to possess anticancer and chemo protective effects. The medicinal plants are easily available, cheaper and possess no

toxicity (Umadevi *et al.*, 2013). Phytochemicals acquired from conventional medicinal plants have been established to possess anticancer and chemoprotective effects. They are cautious for long term usage in cancer patients. They dispense nutrition and decrease the reactions of traditional cancer treatment anticipated to successful antioxidant activity (Jeeva *et al.*, 2013). Approximately 60% of drugs currently used for cancer treatment have been isolated from natural products (Gordaliza, 2007) and the plant kingdom has been the most significant source. These include vinca alkaloids, taxusditerpenes, camptotheca alkaloids and podophyllum lignans (Saklani and Kutty, 2008). Medicinal plants have various advantages over chemical products, because plant derived compounds are more tolerant and non-toxic to the normal human cells.

### **Anti-cancerous compounds**

Plants have been a major source of highly effective conventional drugs for the treatment of many forms of cancer and while the actual compounds isolated from the plant frequently may not serve as the drug, they provide leads for the development of potential novel agents like paclitaxel, vinblastine and vincristine (Iqbal, 1993; Ahmad, 1987; Yadav and Tripathi, 2005; Malhotra and Rastogi Ram, 2001). The plant species contain biologically active compounds that protect human health. Compounds from plants could act as protective agents with respect to human carcinogenesis, acting against initiation, promotion or progression stages, or destroying/blocking the DNA damaging

mutagens, thus avoiding cell mutations. The plant sources of India are likely to provide effective anti-cancer agents (Dimayuga *et al.*, 1991). Anti-cancerous compounds are bioflavonoids, polyphenols, terpenes, alkaloids, bromelain, curcumin etc. Secondary metabolites like polyphenols, terpenes and alkaloids have been reported to possess antimutagenic and anticancer properties (Gupta, 2004).

### Preventive measures

Cancers can be prevented by proper dietary habits, saying no to tobacco, treatment of inflammatory diseases effectively and taking nutritional supplements that aid immune functions (Madhuri and Pandey, 2009). The discovery of medicinally important herbs and their mechanism of action would provide an alternative and effective treatment towards the cancer prevention (Lee, 1993).

**Table 1** Anticancerous medicinal plants from Mugaliadi hills in western ghats

Sl. No	Botanical name	Tamil name	Phytochemicals	Action against specific cancer
1.	<i>Picrorrhiza kurroa</i> (Scrophulariaceae)	Kadugurrhogni	Picosides	Liver cancer
2.	<i>Withania somnifera</i> (Solanaceae)	Ammukura	Withanolides and withaniferin	Antitumor and radio sensitizing effect
3.	<i>Asparagus racemosus</i> (Liliaceae)	Thannirvittan kizhangu	Saponin and fructo oligosaccharide	Leukemia
4.	<i>Tinospora cardifolia</i> (Menispermaceae)	Seenthil	Tinosporin	Breast cancer, leukemia and cervical cancer
5.	<i>Vitex negundo</i> (Verbanaceae)	Nochi	Chrysopenetin	Human pancreatic cancer
6.	<i>Emblia officinalis</i>	Nelli	Polyphenols, flavons and tannins	Lymphoma and melanoma
7.	<i>Andrographis paniculata</i> (Acanthaceae)	Nilavembu	Andrographiolide and andrographiside	Lymphatic leukemia and squamous cell carcinoma of nasopharynx
8.	<i>Albezia lebbek</i> (Mimosaceae)	Vagai	Budmunchiamine and flavanoids	Sarcoma and human epidermal carcinoma of nasopharynx
9.	<i>Calotropis procera</i> (Apocyanaceae)	Vellerukku	Sterols, Flavanoids, Saponins, steroids and cardiac glycosides	Hepatocellular carcinoma
10.	<i>Capsicum frutescens</i> (Solanaceae)	Chillies pepper	Capsaicinoid, alkaloid, flavanoid and tannins	Breast and stomach cancer
11.	<i>Plumbago indica</i> (plumbaginaceae)	Kodiveli	Plumbagin, apigenin and glycosides	Prostate cancer

12.	<i>Annona muricata</i> (Annonaceae)	Mullumunthiri	Annonamine	All types of cancer
13.	<i>Aloe vera</i> (Liliaceae)	Kumari	Emodin, Aloien, glycoprotein and polysachharides	Anti-angiogenic activity
14.	<i>Boerhavia diffusa</i> (Boraginaceae)	Mukkiratai	Punarnavine and boeravionones G&H	Malignant melanoma, and breast cancer
15.	<i>Vitis vinefera</i> (Vitaceae)	Thiratchai	Resveratol	Breast cancer, prostate cancer and non-hodgkins lymphoma
16.	<i>Rubia cordifolia</i> (Rubiaceae)	Manjitti	Rubiadin	Melanoma, sarcoma, lung carcinoma, lymphatic and leukemia

## Conclusion

Plant obtained phytochemicals owns anticancer activities have sustained significant heed in the last few years due to the unfortunate consequences fabricated by chemotherapy and radiation therapy. They possess anticancer and chemo protective effects. They are cautious for long time usage in cancer patients. It provides nutrition and decreases the side effects of conventional cancer therapy due to powerful antioxidant activity. The cheap herbal drug treatment may highly be recommended to the rural and poor people to treat effectively the cancers of various type is an ideal choice. Traditional medicines are easy to consume by the rural people because they were obtained from the local plant species seen around us.

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