TRADITIONAL INDIAN HERB CATHARANTHUS ROSEUS USED AS ANTICANCER- A REVIEW

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Abstract

Cancer is one of the leading causes of death due to lack of medicines in the market for the treatment of cancer. But there is no such drug is found which can fully cure or treat this disease. Generally plants or products derived from plant exacts said to be more successful and safe for the cure of cancer like diseases. Many traditional medicines are produced from medicinal plants, minerals and organic matter. India is one of the largest producers of medicinal herbs in world. No. of attempt are being made throughout this article to emphasize medicinal plants which are known as anti-cancer agents and the latest plant which is found for the treatment of cancer having anti-cancer properties available named as Caharanthus roseus L (C. roseus). Catharanthus roseus is a vital medicinal plant which is found in various parts of the world. The Catharanthus alkaloids have been used from ancient time in medicine for treating a variety of ailments. The unexpected discovery of antineoplastic property of Catharanthus alkaloids in the 1950s has had far reaching effects in clinical oncology and has covered the path for the discovery of a number of plant-derived anticancer drugs. The current review focuses on Caharanthus roseus used in the treatment cancer in the world. This paper will highlight the benefits of Caharanthus roseus as Anti-cancerous.

Keywords: Anticancer alkaloids, Catharanthus roseus, traditional medicine, alkaloids

Introduction

Catharanthus roseus or Vinca alkaloids belong to an important class of anti-cancer drugs. It is one of the important medicinal plant spread all over the world. This plant is more interesting as it contains approximately 120 terpenoid indole alkaloids (TIAs), they have strong pharmacological properties. Since ages in various parts of the world the plant has been used in traditional medicine. Numbers of alkaloids isolated from this plant are already in clinical use, e.g. ajmalicine – an antihypertensive alkaloid, and vincristine and vinblastine – the anti-neoplastic bisindole alkaloids. The successful transition of this
plant’s economic utility from traditional to modern medicine has indeed set an example that is worth-emulating.

**Catharanthus roseus**

The genus name, *Catharanthus*, means “pure flower”. *Catharanthus roseus* (often synonymous with *Vinca rosea*; though certain authors disagree with the proposition that *Catharanthus* and *Vinca* are one and the same[1]) is a common plant that grows in tropical countries. The plant is referred to with a variety of names in various countries. Seven species of the genus are known from Madagascar; one is found in India and Sri Lanka, while one species is grown in China. The plant is believed to be a native of the West Indies. *Catharanthus* is more commonly known as Madagascar periwinkle. The conditions for plant growth are suitable warm regions of the world and specified areas are Southern United States. [2]

**Table.1.** Common names of *Catharanthus* in different countries [2]

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Country</th>
<th>Common Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Brazil</td>
<td>Boa-noite, Congorca</td>
</tr>
<tr>
<td>2.</td>
<td>India</td>
<td>Ainskati, Billaganneru, Nayantara, Nityakalyani, Periwinkle, Sada bahar, Sadaphul, Ushamanjairi</td>
</tr>
<tr>
<td>3.</td>
<td>Japan</td>
<td>Nichinich-so, Nichinichi-so</td>
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<tr>
<td>4.</td>
<td>Kenya</td>
<td>Maua</td>
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<tr>
<td>5.</td>
<td>Mexico</td>
<td>Ninfa</td>
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<tr>
<td>6.</td>
<td>Pakistan</td>
<td>Sada-bahar</td>
</tr>
</tbody>
</table>

**Medicinal plant for treatment of Cancer Patients**

*Catharanthus* is extensively used for the treatment of cancer and The National Cancer Council of Malaysia (Majlis Kanser National, MAKNA) uses the periwinkle logo as its symbol of hope for cancer patients. [3]

**Catharanthus roseus as a Traditional Medicine**

Since time immemorial, *Catharanthus* has been used for curing many diseases. This plant firstly introduced in Europe during the mid of 1700s. At that time, it was sophisticated as an ornamental. This plant has wide application in folk medicine. Extracts of the plant have been used for ailments like diabetes, hemorrhage and ocular inflammation, to treat insect stings and cancers. In India, juice which is present in leaves of this plant was used to cure wasp stings. In Hawaii, we used to boil this plant...
and use it to stop bleeding. In China, this plant has its various uses such as a cough remedy, astringent and diuretic remedy. In Central and South America, this is applied to console lung congestion, swelling and sore throats. In the Caribbean, this flower is used to treat eye irritation and infections. Catharanthus was regarded as a magic plant as Europeans considered it could ward off evil spirits, and French referred to it as “violet of the sorcerers.” The plant came to the notice in the 1950’s of the western research when they came to know of a tea Jamaicans used this plant to drink to treat diabetes.

**Catharanthus roseus used as Modern Medicine**

*Catharanthus* Alkaloids: The Anticancer Arsenal resulting from Plants. Alkaloids are naturally occurring chemical com pounds which contain basic nitrogen atoms. *Catharanthus* have momentous anticancer activity against several cell types. One of the major activities of this plant is seen against multi-drug resistant tumor types, which suggests that there are compounds in *Catharanthus* that are associated with antineoplastic elements by inhibiting resistance to them. An excess of alkaloids are produced by *C. roseus*, quite a few of which are accumulate in various parts of the plant. The medicinally useful *Catharanthus* alkaloids are low-volume, high-value compounds and difficulties in their synthetic derivatization has created immense interest in exploring biotechnological routes for their enhanced production [4]. Following are various alkaloids which we obtained from this plant.

**How Catharanthus roseus grow or its Growth condition**

*Catharanthus* prefers sunny condition, hot weather and bloom all through the summer until iciness appears. The related plants to *Catharanthus roseus*, Vinca minor and Vinca major, are evergreen vining ground plants. They are propagating from cuttings and not from the seed unlike *Catharanthus*. Another plant which is very much related to *catharanthus roseus* Vinca vine, is a sprawling vine having soft green variegated leaves. *Catharanthus* plants are self-propagating plant in nature (from seed). It propagates by itself. The seeds of this plant need total darkness to germinate a cutting from full-grown plants also has capability to build up its roots. *C. roseus* plant grows in poor and well-drained soils. Tis plant is not grown or it does not need fertile soils. Flowers of the plant drop off when they finish blooming. Full sun light or partial shade is supportive for the growth and alkaloid yield. We need sunlight for the growth of this plant. [5]. Watering of the plant is extremely suitable for growth of this plant. However, it is relatively lack resistant once established. The plant is very much sensitive to overwatering. So we have to give only limited water to this plant.
Catharanthus Alkaloids in Clinical Use

Vinblastine is the official specific name for the Catharanthus alkaloid and known as vincaleukoblastine. It is a colorless compound. The sulphate derivative of Vinblastine compound is used in the clinic, it is a white to slightly yellow crystalline compound which is soluble in water and methanol. It is an anti-cancer drug which is widely used medicines for the treatment of different kinds of cancers disease, e.g, head and neck cancer and Hodgkin’s lymphoma.

Uses of Catharanthus Alkaloids

When Vinblatine is used in encapsulate form in multilamellar liposomes which shows substantial enhancement of anticancer activity against VLB- resistant cells. This strategy can also be useful to overcome the problem of multidrug resistance (MDR). We can store Solid VLB at room temperature at dark conditions in inert atmosphere.

However, the present IC50 of Catharanthus roseus was 0.66% which shows that its extract has low antioxidant activity and also have cytotoxic activity [6]. Catharanthus roseus extract is used to induce DNA fragmentation by gel electrophoresis [7, 8]. Crude extract of Catharanthus roseus using 50% and 100% methanol has significant anticancer activity against different cell types in vitro [9]. Crude decoction shows moderate in vitro antiangiogenetic effect [10-12]. Vincristine and vinblastine, alkaloid compounds in Catharanthus roseus, are significantly used against a number of cancers [13, 14]. Vincristine and vinblastine, alkaloids are used to inhibit cancer cell growth during metaphase leading to cell death [15]. Apoptosis is increased by Vinca alkaloids by increasing concentrations of the cellular tumor antigen p53 and cyclin-dependent kinase inhibitor 1 (p21), and by inhibiting Bcl-2 activity. When concentrations of p53 and p21 increased lead to modifications in protein kinase activity [16].

Side Effects of Catharanthus Alkaloids

There are some side effects of this plant. As we know VLB include bone marrow suppression gastrointestinal toxicity, potent vesican activity, and extravasation injury. Patients who are suffering from the bacterial infections are not prescribed to take this drug. Vinblastine has been shown to be toxic and mutagenic in animal studies and is also carcinogenic and, therefore it should not be used by ladies in time of pregnancy. Breast feeding is also not suggested because of its potential secretion into breast milk.

Conclusion
In conclusion, *Catharanthus roseus* aqueous extracts can act as anticancer agents by inducing apoptosis, as well potential antioxidant activity. *Catharanthus roseus* (*Catharanthus* alkaloids) and their derivatives have been used in the clinic from very long time. This plant is very beneficial for innumerable cancer patients. *Catharanthus* plant has reached the bedside in modern medicine. There are many other anticancer drugs of plant origin have yielded success stories, e.g. Taxol, combretastatins, camptothecin, etc. But the medicine from this plant *Catharanthus* stands apart from all other medicine in view of its serendipitous discovery. There is a need to discover several such agents from nature’s storehouse, given to us in the form of gift as plants. Plant-derived molecules can serve as an inimitable template for the synthesis of more potent anticancer drugs. Whether the *Catharanthus* alkaloids will serve this purpose or not in the future can’t be predicted, but certainly the leads obtained so far have shown promise for plants.

**Acknowledgments**

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