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RESEARCH ARTICLE

A HERBAL DRUG OF VINCA: USED AS A ANTICANCER AGENT

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ABSTRACT

In the earth there are near about 350,000 species of plants are found & each plant have a great medicinal value. The plant vinca is also known as catharanthus, Sodafuli, periwinkle & barmasi & which is belong from the family of apocynacae. It produce very preety flower the flower of vinca is blue, purple & also white in colour. It produce late springly to summer & grown any where in the garden.The vinca plant is very useful across the world-wide & it can be cultivated in dry & nutitional condition. The plant is constituent with following chemical contituent but mainly two chemical contituent increase play a vital role in medicinal field vinblastine mainly used to treat Hodgkin lymphomus on the other hand vincristine used to treat childhood leukemices . Many time both chemical contituent cause toxic effect in our body such as bone,Narrow depression, anurexice Muscle weakness etc. The chemical contituent of vinca bind to the tubulin & prevent, the formation of microtubules & block the mithosis in meta phase. The vinca have lots of medicinal value such as Anti cancer drug, anti-diabetic, anti-microbial & anti-dysenteric.Anti cancer drug vinca can be given as targeted therapy & combination therapy & it is a class of cytoxic drug & have ability to inhibit the cancerous cell.

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INTRODUCTION

Vinca Rosea is an important medicinal Plant which is belong to the family of Apocynaceae. It is a Dicotyledonous Angiosperm and has two terpenes alkaloids that is Vinblastine and Vincristine which is use to treat cancer (Ajaib, 2010). Vinca grows is whole India up to 500 meter. It is grown freely in tropical & subtropical area in South India & North Eastern States of India (Kokate, 2017). Its flower look white to dark pink with a darker red centre & a Basal Tube of 0.2 – 3.0 cm long with a corolla of about 2.0 – 5.0 cm diameter with five petals like lobes. These fruits follicles are found in pair about 2.0 – 4.0 cm long & 3mm broad (Manpreet kaur, 2002). The various synonyms of vinca are Sadabahar, Ratanjot, Sadfuli, Catharanthus roseus.

Biological Source: It is dried whole plant of *Vinca rosea.*

Geographical Source: It is indigenous to Madagascar. Vinca plant is cultivated for the decorating plant and found in tropical regions like Africa, Australia, Eastern Europe, South, India, Taiwan and Thailand (Manpreet kaur, 2002).

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Botanical Classification

Botanical Name(s): Vinca Rosea (Catharanthus Roseus)
Family Name: Apocynaceae
Kingdom: Plantae
Division: Magnoliopsida (Flowering plants)
Class: Magnoliopsida (Dicotyledons)
Order: Gentianales
family: Apocynaceae
Genus: Catharanthus
Species: C. roseus

Vernacular names

English: Cayenne, jasmine, old maid, periwinkle
Hindi: Sada-bahar
Malayalam: Banappuva,Nityakalyani, Savanari .
Marathi: Sadaphool, Sadaphul,Sadaphuli
Sanskrit: Nityakalyani, Rasna, Sadampuspa, Sadapushpi
Tamil: Cutkattu malli, Cutukattu malli, Cutukattuppu
Telugu: Billaganneru
Gujarati: Barmasi
Bengali: Noyontara

Morphological Character: A Vinca is found in blue, purple and white color. It is a type of annular or corneal plant. Vinca is near about 0.52 to 1 cm in length and its leaves is oblong, ovate, glossy and bitter in taste with slight odour **(**Erdogrul, 2002).

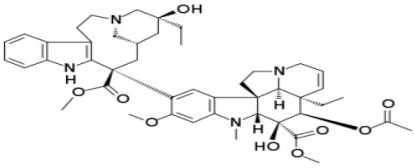
Fig. Vinca a popular anti-cancer drug

Chemical Constituents: In vinca plant constitute of vinblastin and vincristine, on the chemotherapy medication it is used for several types of cancers [(6)]. These are the biosynthesized from the compuling on the cantharanthine and vindoline alkaloids (Hirata, 1994). Vinorelbin agent are semisynthetic chemotherapeutic which are used to treat non small cell of lung cancer (Keglevich, 2012). They can be prepared either from vindline and catharthine **(**Keglevich, 2012; Ngo, 2009) or from the vinca alkaloid leurosine (Hardowin *et al*., 2002), in both case via anhydrovinblastin (Ngo, 2009). vinca flower is constitute of Rosinidin pink anthracynidin pigments which are responsible for the flower color (Ngo, 2009).

There are following chemical constituents of vinca as follows

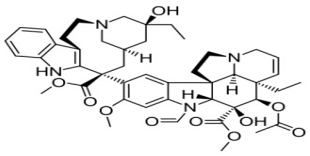
- **Vinblastin:** Vinblastin, under the marketed brand name Velban amongst others, is chemotherapy. It is topically used combined with other medications. These are treat various type of cancer includes non-small cell lung cancer, hodgkin's lymphoma, bladder cancer, brain cancer, testicular cancer and melanoma. It is administered by injection into a vein (Vinblastine Sulphate, 2015).

Vinblastine



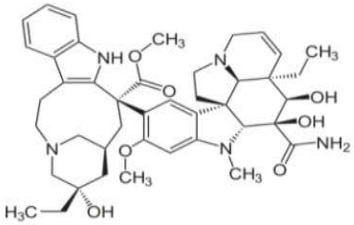
- **Vincristin:** Vincristin is also called *leurocristine* and under marketed brand name is Oncovin among other,in a chemotherapy . It should bemused in the treat of different types of cancer .These include acute lymphocytic leukemia, acute myeloid leukemia, hodgkin's disease, neuroblastoma, and small cell lung cancer amongst other. It is administered by intravenously. These are also used as an immunosuppressant (Vincristine Sulphate, 2015).

Vincristine



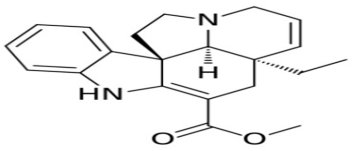
- **Vindesine:** Vindesine is used in Chemotherapy, Vindesine is the anti – mitotic Vinca alkaloid . It should be used in the treatment of various type of cancer including or under the leukemia, multiple melanoma, Lymphoma, breast cancer and lung cancer. It is administrated by the intravenous (http://en.wikipedia.org/wiki/vinpocetine).

Vindesine



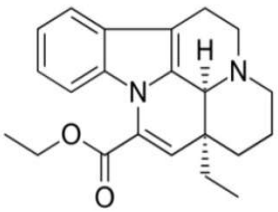
- **Tabersonine:** Tabersonine is the terpenes of indole alkaloid which are found in the medicinal plant of vinca rosea. These are hydroxylated at the 16 position by the enzyme tabersonine 16-hydroxylase (T16H) was form16-hydroxytabersonine.It is first intermediate leading to form the vindoline one of the two precursors are required for vinblastine biosynthsis (St-Pierre, 1995).

Tabersonine



- **Vinpocetine:** These are the chemical syntheticaly derivative of the vinca alkaloid vincamine . These are the extracted from the leaves of vinca minor (lesser periwinkle) or the seeds of voacangan africona. Vinpocetin supplement was banned for the sale in New Zealand, Australia and Canada because it is potentially harmful nootropil characteristics (https://en.m.wikipedia. org/wiki/vinpocetine).

Vinpocetine



Cultivation of vinca

•Vinca is an decorative plant, it is appreciated for its hardiness in dry and nutritionally deficient condition, famous subtropical gardens these temperature never fall below 5-7 C⁰ (41-45

degree F⁰), and as a summer season bedding plant in temperature gardens .It's flowering period was long, throughout the year in tropical conditions, spring to late autumn, in summer temperature climates .To choice the full sun and well-drained soil. Various cultivars have been selected, for the variation in flower color (white, mauve, pink, peach, scarlet and reddish orange), and also for tolerance of cooler growing conditions in temperate regions. The famous cultivars include "Albus "(white flowers),"Grape cooler"(rose pink,cool – tolerant), the ocellatus group (various colors), and "peppermint cooler " (white with red centre, cool-tolerant) (Huxley, 1992).

Anticancer Agent: Uncontrolled growth of cell & destroy body tissue is called cancer. Anticancer agents are those which work against the cancer**.**

Mechanism Of action of Vinca: Vinca cause cytotoxicity is due to their interactions with disruption of microtubule function and tubulin, especially of microtubules comprising the mitotic spindle fiber and causing metaphase arrest. They can perform some other biochemical response which can be effective or may not be effective on microtubules. Have some effect which do not interrupted the microtubule only after treatment of cells with clinically irrelevant doses of the vinca. Vinca and other anti microtubule drug are also shows effect on both malignant cells and non-malignant cells in the non-mitotic cell cycle, because microtubules are involved in various non-mitotic functions.

Vinca are connected to binding sites of tubulin which is separate from the taxanes, colchicine, podophyllotoxin and guanosin-5'-triphosphate . Binding occur rapidly and can reverse too. Maintains the existence of vinca binding site / mole of tubulin dimer . 16-17 high affinity binding sites in each microtubule which is located at the end of per microtubule. The vinca bind at the binding site and interrupts microtubule congregations,but low drug concentration can be decreasing the rates of both growth and shortening at the assembly end of the microtubule that can cause produces a " kinetic cap "and suppresses function[(17)].The distributing effects of the vinca on microtubules dynamics, particularly at the ends of mitotic spindle, which causes metaphase arrest, occur at drug concentrations below those that decrease microtubule mass [(18)]. The vinca and other microtubule distort agents have power to inhibit malignant angiogenesis in vitro.

Pharmacological Value

- **Anticancer Property:** The anticancer active ingredients Vinblastin and Vincristine are derived from the leaf and stem of vinca. They inhibit the growth of human tumors. Vinblastine is used experimental or treatment of neoplasmas and for Hodakins disease, choric carcinoma. Vincristine and anothers active ingredients are used for leukemia in children (Banskota, 2002; Wang, 2004).
- **Memory Enhancement Property:** Vinpocetine produces various actions that would hypothetically be beneficial in Alzheimser disease (AD). When study investigating this agent in a well defined cohart of AD patients found no benefit . Vinpocetine has been well tolerated at doses up to 60 mg/d in clinical trials of dimention and stroke and no significant adverse events[(21).]
- **Wound Healing Property:** Vinca is useful for management of wound healing when wound contraction together with increased tensile strength and hydroxyproline (Nayak, 2007).
- **Hypolipidiemic Property:** Important anti-atherasclerotic activity as suggested by reduction in the serum level of total cholesterol, triglycerides, LDLc, VLDLc and histology of aorta,liver and kidney with the action of leaf juice of vinca (Jai Narayan Mishra, ?).
- **Hypotension Property:** The vinca leaves extract play significant role in hypotension .The leaves have been contain 150 useful alkaloids among other pharmacologically active compound.
- **Antidiabetic Property:** The ethanolic extracts of vinca leaves showed a dose dependept lowering of blood sugar in comparable to the standard drug and lower the blood sugar in camparable to the standard drug glibendamide.
- **Anti-microbial property:** The extract from different parts of vinca is tested for anti-microbial property and the vinca leaf extract showed significantly higher efficacy .The anti-bacterialproperty of the leaf extract of the vinca was checked agonist micro-organism and found that the extracts could be used as the prophylactic agent in the treatment of many of the disease (Prajankata Patil, 2010).
- **Antioxidant Property:** The **antioxidant** potential of the ethanolic extract of the roots of the varieties of vinca namely rosea (pink flower) and alba (white flower).
- **Anti-helminthic Property:** Helminthes infection are the chronic illnes which affects the human beings and cattle. In vinca found to be used from the traditional period as an anti – helmenthic agent. The ethanolic extract of the vinca concentration of 250mg/ml was found to show the significant anti-helmenthic property.
- **Anti- ulcer property:** Vincamine and Vindoline alkaloids of the plant showed anti-ulcer property.The vincamine are present in the leaves of vinca plant shows cerebrovaso dilatary and neuroprotective property.
- **Anti-diarrheal property:** The ethanolic leave extract of vinca is show the anti- diarrheal property as tested in the wistar rats with castor oil which are the experimental diarrhea inducing agent by addition of pretreatment of the extract. These effect of ethanol extracts C.roseus are showed for the dose dependant inhibition on the castor oil decrease diarrheal (Mithun Singh Rajput, 2011).

Conclusion

In this review literature we are discussed about the vinca. It is broadly used in medical field. These are consist of following chemical constituents and each and every constituents are play a vital role like vinblastine and vincristins have anticancer properyty. Vinca is popular for antcancer property but as well as it have memory enhancement, anti helmentic, antioxidant properties.

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