

PROCEEDINGS

National Workshop
on
Instrumentation Techniques
for
Research in Chemical Sciences
(WITRCS - 2017)

22-23 December, 2017



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National Workshop on Instrumentation Techniques for Research in Chemical Sciences

Proceedings

Of the National Workshop on

Instrumentation Techniques for Research in Chemical Sciences

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Potential Phytopharmacology of *Catharanthus Roseus* (Sadaabahaar)

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Abstract

Indian Ayurvedic system of medicine developed centuries ago primarily employed herbs and plants in treatment of ailments. The modern system of medicine profoundly reduced the time taken for cure. However, the drugs which were earlier considered to be safe over the time period reported significant side effects. This has induced renewed interest in traditional and herbal system medicine. The traditional herbs are studied for extraction of bio-active compounds and development of bio similar of these active ingredients. *Catharanthus roseus* is one such plant found all over the world and has been investigated widely.

Keywords: Medicinal plants, *Catharanthus roseus*, Alkaloids, Anti-diabetic, Anti-oxidant, Anti-cancer.

INTRODUCTION:

Catharanthus roseus belongs to Apocynaceae family. This is considered to be native plant of Madagascar. It is flowering plant having eight species one of which *C. pusillus* is native to India and Sri Lanka. However, *C. roseus* specie has naturalised all over the world¹. It was earlier widely known as *Vincarosea* because of alkaloidesvinca or bisindole present in it and used in folk medicine². In India this plant is referred as "Sadapushpa" or "Sadaabahaar" in hindi/Sanskrit.

Morphology:

C. roseus is a perennial shrub having five petal flowers, which are primarily rose pink in colour but also found in white, pink, purple and red colours, in which pink and white varieties are primarily used for medicinal properties. This shrub is around 60 cm to 100 cm tall having 2 to 3 inch wide non glossy leaves with rigid like stem. The flowers are tubular in shape with about 2.5 cm long corolla tube. The fruits are classified as follicles and are generally 2 to 4 cm long.

Traditional Therapeutic Use:

Madagascar periwinkle is often grown as ornamental plant, however, it also has a number of other economic uses. This plant is in traditional medical use for thousands of years. The usage is specific to the area and culture in which it is cultivated. It been used

traditionally to cure diarrhoea, blood pressure and diabetes. The paste prepared from the leaves is an excellent wound healer and also relieve the wasp sting pain. Tradition also buttress that periwinkle is useful in bringing relief from depression, headaches and fatigue. In modern medicine, chemotherapeutic agents and alkaloids from *C. roseus* shown their anti-cancer and analgesic properties.

The main active principles in plants are phenolic acids, flavonoids and alkaloids. These active substances are involved in important anti-oxidative, anti-allergic, antibiotic, hypoglycaemic and anticarcinogen activities^{3,4,5}. *Catharanthus roseus* has more than 100 monoterpenoids indole alkaloids in different parts and the leaves known to contain 150 alkaloids among other active pharmacological compounds⁶. The principal component include vindoline; vincalokoblastine (vinblastine), 22-oxovincalokoblastine (vincristine), reserpine, vincamine, alstonine, leurocristine, ajmalicine, vinine, vinomine, vinoxine, vintsine, leurosine⁷. The alkaloids possess hypotensive, sedative and tranquillising properties.

Therapeutic properties

Anti cancer property

The anticancer alkaloids Vinblastine and Vincristine named after the plant are derived

from stem and leaf of *Catharanthus roseus*⁴. Methanolic crude extracts of *Catharanthus* reported to manifest the significant anticancer activity in vitro condition⁹ (Ueda et al., 2002) and against the multidrug resistant tumor types¹⁰. These are also used for treatment of leukemias, lymphomas, and testicular cancer¹¹. Methanol extracts of aerial and roots of plant impeded the proliferation of the human ductal breast epithelial tumour cell lines¹², whereas aqueous extract of leaves induced cell death of human leukemic T-cells¹³.

Anti diabetic property

In animal studies its aqueous extract lowered the blood glucose. The hypoglycemic effects have appeared due to the result of the increased glucose utilization in the liver. Alkaloids viz., vindoline, vindolidine, vindolicine and vindolinine induced relatively high glucose uptake in pancreatic cells, and also demonstrated good protein tyrosine phosphatase- 1B inhibition activity, prompting curative prospect against type 2 diabetes¹⁴.

Anti microbial property

The antimicrobial activity of the leaf extracts of the plant against *Pseudomonas aeruginosa*, *Salmonella typhimurium* and *Staphylococcus aureus* pointed towards use of the extract as the prophylactic agent in the treatment of many of the diseases¹⁵.

Anti oxidant property

The ethanolic extracts of the roots of pink and white Periwinkle varieties exhibited satisfactory scavenging effect in radical scavenging assays *Catharanthus rosea* having more potent antioxidant activity compared to *Catharanthus alba*¹⁶.

Antihelminthic property

Catharanthus roseus is being used as traditionally as an anti helminthic agent. The ethanolic extract demonstrated the significant anti helminthic activity in experiment¹⁷.

Anti ulcer property-

Vincamine and Vindoline alkaloids manifested anti ulcer property. In animal studies leaves have depicted anti ulcer

property¹⁸. Vincamine also manifest cerebrovasodilatory and neuroprotective activity¹⁹.

Hypotensive property

Alkaloids extracts of *C. roseus* are found to be hypotensive, sedative and tranquilising. Antihyperglycemic and hypotensive activity of the leaf extracts have been reported in laboratory animals²⁰. The leaves extract of *Catharanthus roseus* demonstrated Atenolol comparable results in animal studies with significant changes in each cardiovascular parameter²¹.

Hypolipidemic effect

Patel et al., 2011²² reported noteworthy anti atherosclerotic activity manifested by reduction in the serum levels of total lipids and histology of aorta, liver and kidney with the leaf juice.

Anti-diarrheal property

Ethanolic leaf extracts demonstrated anti diarrheal effect in castor oil induced diarrhea in rats²³.

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