

# Micro Propagation in Catharanthusroseus

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**Abstract** -The main objective of this study was the development of root (Rhizogenesis) and shoot (caulogenesis) development in Catharanthusroseus. The nodal segments are sterilized with distilled water and autoclaved distilled water. Then surface sterilized with mercuric chloride for 1min. later these explants were inoculated in MS medium containing tubes. After 7- 10days we observe the development of shoot in Catharanthusroseus. We observed the growth in medium which contains the combination of two growth hormones i.e IAA (Indoleacetic acid) + BA (Benzyl adinine). IAA is an auxin which promotes the development of roots in the medium where as BA is ancytokinin which promotes the development of shoot. We tried with different combinations of growth hormones at different quantities but finally got the result for the combination of IAA +BA.

**Keywords**- IAA+BA

## I. INTRODUCTION

*Catharanthusroseus* (Madagascar Periwinkle) is a species of Catharanthus nativeandendemic toMadagascar. It is also called as Vincarosea, Ammocallisrosea, and Lochnerarosea; other English names include Cape Periwinkl, Rose Periwinkle, Rosy Periwinkle, and "Old-maid". It is an endangered plant. It is widely cultivated and is naturalized in subtropical and tropical areas of the world.

### Taxonomical Classification

- Kingdom – Plantae
- Phylum - Magnoliophyta
- Class - Magnoliopsida
- Order - Gentianales
- Family - Apocynaceae
- Genus - Catharanthus
- Species – roseus

## II. HABITAT

The periwinkle is a perennial plant that very prevalent in areas that are Tropical to subtropical. In moderate areas the periwinkle is considered an annual, due to the frosty conditions of the fall. It tolerates the hot temperatures in summer and it is also able to bear the extremes of drought and heavy rainfall.

## III. ADAPTATIONS

The periwinkle is a vascular seed plant that has xylem and phloem. It prefers a warm tropical climate but has adapted to a mild climate as well. Thus it has adapted to a variety of soil, including soils of high moisture, to that soils are slightly acidic. It has thick glossy leaves.

The significant information regarding periwinkle is that, they contains substantial amounts of alkaloids that are potent to animals but when extracted have great medicinal value for humans. The alkaloids produced by periwinkles are the reason why they aid in the cure of Hodgkin's disease and leukemia because they contain high amounts of vincristine and vinblastine

## IV. NUTRITION

Periwinkle is an autotrophic plant that means it acquires nutrients on its own. Plants contain special structures that allow for photosynthesis to occur. Plants have a cellular wall that is made up of cellulose, which also give plants their structure. The leaves of the plant contain chloroplast, which are used to capture the light energy from the sun.



## V. PHYSIOLOGY

It is an evergreen sub shrub or herbaceous plant growing to 1 m tall. The leaves are oval to oblong, broad, glossy green, hairless, with a pale midrib and a short petiole and they are arranged in opposite pairs. The flowers are white to dark pink with a darker red centre, with a basal tube and a corolla with five petal-like lobes. The fruit is a pair of follicles.



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### VI. CULTIVATION

The species has long been cultivated for herbal medicine and as an ornamental plant.



### VII. REPRODUCTION

Periwinkle is a very unique species within its family because of its self-compatibility meaning that they are able to pollinate themselves! So which type of reproduction is correct? Typically, intraflower self-pollination does not occur due to the physical separation of the stigma; the sticky part of a flower's carpel which traps pollen grains, and the anthers; a terminal pollen sac of stamen. However, some periwinkles contain elongated ovaries or styles, thus allowing for intraflower self-pollination. But in all reality, both types of pollination occur in the Madagascar periwinkle.



### VIII. PROCEDURE

Procedure includes two steps in which one is the preparation of MS medium and the other one is surface sterilization and inoculation of nodal segments of Catharanthusroseus.

#### Preparation of MS medium

Murashig and skoog medium (MS medium) is the most suitable and most commonly used basic tissue culture medium for plant regeneration from tissues and callus and tissues. Generally the MS medium consists of different components. They are

- 1) Macro nutrients
- 2) Micro nutrients
- 3) Calcium chloride (CaCl<sub>2</sub>)
- 4) Potassium iodide (KI)
- 5) Iron EDTA (Fe EDTA)
- 6) Myo-inositol
- 7) Vitamins - B1, B3, B6, B12
- 8) Aminoacids - Thymine, Glycine, Methionine
- 9) Growth regulators – IAA (Indole acetic acid), IBA (Indole butyric acid), BA (Benzyl adinine)
- 10) Agar

- 11) Sucrose
- 12) The PH is adjusted to 5.7 and make upto 100ml with distilled water.

Place the beaker in microwave oven to melt the agarose in the medium. Then this medium is subjected to autoclave for 15-20 min at 121C. Then the medium is poured into test tubes. These tubes are allowed to solidify in laminar airflow cabinet.

#### Sterilization and inoculation of explants

1. Collect the nodal explants from the plants in garden.
2. Wash the explants with detergents like labolin and then with distilled water for 3 to 5 times.
3. Later the explants are treated with fungicides like bavostine.
4. Now the explants again wash with distilled water for 3 times.
5. The sterilized explants were sent to laminar air flow cabinet.
6. In laminar air flow cabinet explants washed with autoclaved distilled water for three times.
7. Later the explants are treated with 0.1% mercuric chloride for 1-2 min.
8. Remove the ends of the nodal segments by using scalpels and inoculate the explants into the MS medium containing tubes.
9. The inoculated tubes are incubated at cold temperature and suggested photoperiod.
10. After 7-10 days we observe the rhizogenesis and shoot development.

### IX. MEDICINAL USES

Extracts from it have been used to treat numerous diseases, including Diabetes, Malaria and Hodgkin's disease. The substances vinblastine and vincristine extracted from the plant are used in the treatment of leukemia. It can be dangerous if consumed orally. It can be hallucinogenic



#### Brain Health

Daily supplements made with the active ingredients found in Vincarosea help to improve blood supply to the brain and increase the level of oxygen and glucose that the brain can effectively utilize. These supplements are also highly effective in preventing the abnormal coagulation of blood and in raising the levels of serotonin, the blood neurotransmitter, in the brain. Serotonins are bunches of neurons in the central nervous system that play a critical role in memory, sleep, appetite, heart function and muscle control. Deficiencies of serotonin are likely to cause schizophrenia, phobias, migraine and bulimia.



### Prevention of Dementia

The main alkaloid in Vincarosea is known as vincamine. Vincamine has blood thinning and memory-enhancing properties and is effective in the treatment of vascular dementia. The condition is caused when the arteries that supply blood to the brain develop plaques. Vascular dementia is the most common dementia after Alzheimer disease. Vascular dementia is not one disease but a number of syndromes related to numerous vascular mechanisms. This form of dementia is a preventable condition and can be corrected with early detection and diagnosis.

### Anti-Cancer Properties

Derivatives of Vinca rosea have shown efficacy in the treatment of leukemia and Hodgkin's Disease. Extracts of the plant have demonstrated significant anticancer properties against a number of different cell types. The highest level of efficacy is seen in the multi-drug resistant tumors. The Vinca rosea alkaloids that are used primarily for the treatment of cancer include vinblastin and vincristine

## X. RESULTS

The development of root (Rhizogenesis) and shoot (caulo - genesis) after 8days in first conical flask was



This was the other plant after 9days in second test tube



## XI. CONCLUSION

Till now I had done with root and shoot development from *Catharanthusroseus* by using nodal segments as explants. My intention was to extract the secondary metabolites from the *Catharanthusroseus*. For that primarily I had done with micro propagation now I'm going through the callus induction which was the most important step involved in the extraction of secondary metabolites from the

*Catharanthusroseus*. The secondary metabolites are also used for primary treatment of cancer

## REFERENCES

1. Flora of Madagascar: *Catharanthusroseus* "Germplasm Resources Information Network".
2. *Catharanthusroseus* "a b c Huxley, A., ed. (1992)".
3. New RHS Dictionary of Gardening. Macmillan "ISBN 0-333-47494-5. a b Flora of China".
4. *Catharanthusroseus* "College of Micronesia".
5. *Catharanthusroseus* "Jepson Flora".