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Medicinal Role of *Aloe Vera* *Barbadensis* (L.) in our Life and their Multiple Copies Developed by Micro Propagation Techniques

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ABSTRACT: Aloe-Vera is a very beneficial and important role play in our life it is have many medicinal properties and mostly used for scientific study. Its scientific name is *Aloe Vera* *Barbadensis* (L.) belong to liliaceae family. Its play a dominant role in our life its gel is very useful for skin and also its leaf use for treatment is many diseases like skin disease, burning, diabetes, diarrhea, piles, indigestion, rheumatic fever etc. also have Anti-fungal, Anti-cancer, Anti inflammation activities. It is widely used. We can quickly grow aloe vera by micro propagation techniques. Micro propagation process done in aseptic condition in lab and after some time be get several copies of Aloe Vera. Aloe Vera were cultured on Ms Medium and Gambarg 5 medium with supplement with different combination and concentration of growth hormones such as BAP,KN and IAA.

KEYWORDS: Micro propagation, Ms Medium, Kinetin, Aloe Vera.

I. INTRODUCTION

Since times immemorial human beings have endeavoured for good health and immunity. Yoga (techniques to elevate the physical and mental status of an individual), and Ayurveda (use of medicaments to maintain health, longevity and vitality) have played a pivotal role. Plants have been used as an important source of medicine since ancient times and their products are being used for different purposes such as medicine, food, health care, agriculture, agrochemicals, pharmaceutical, etc. Initially practiced as ethno medicine than transformed into organized systems such as Ayurveda, Unani, Siddha, etc¹.

Aloe vera L. belongs to the *Liliaceae* family and is an important medicinal plant. Aloe has been used for pharmaceutical, food, and cosmetic industries^{5, 6}. Although *A. vera* L. is propagated vegetative in its natural state, but propagation rate is too low for commercial production (Meyer and Staden, 1991). One of the major applications of plant tissue culture is micro propagation or rapid multiplication. It is cultivated throughout in the world, both as a household and for its medicinal quantities. *Aloe* genus comprises about 200 species, indigenous to East and South Africa. Many species are cultivated throughout the India. Scientific researchers have determined that *Aloe vera* is an amazing mixture of more than 200 constituents, including polysaccharides (a complex carbohydrate), enzymes (complex proteins), glycoproteins, amino acids, vitamins and minerals. Detailed studies explored Aloe's several other characteristics, including that of antibacterial, antiinflammatory, and antiseptic properties of *Aloe vera*. *Aloe* may penetrate injured tissue, relieve pain, dilate capillaries, and work as an anti-inflammatory agent.

Micro propagation is the process of vegetative growth and multiplication from plants tissues or seeds. It is carried out in aseptic and favorable conditions on growth media, using various plant tissue culture techniques⁷. Tissue culture is based on concept of totipotency; the ability of plant cells and tissues to develop into whole new plant⁸. Micro propagation insures a good regular supply of medicinal plants, using minimum space and time⁹. The advantages of In vitro micro propagation of medicinal plant are listed below:

- a) Higher rate of multiplication.
- b) Environment can be controlled or altered to meet specific needs of the plant.
- c) Plant available all year round (independent of regional or seasonal variation).
- d) Identification and production of clones with desired characteristics.
- e) Production of secondary metabolites.

II. MATERIAL AND METHOD

Plant material: Healthy *Aloe vera* showing good biomass yield were collected for plant material from various nurseries. Shoots with young leaves were collected from the influential plants. The extra leaves were removed and shoots were trimmed to size of 2-3 cm for further procedure.

Sterilization of explants: Surface sterilization of was done in the following manner firstly the explants were washed thoroughly in running tap water for 5-10 minutes. After that they were washed with soap solution for 20 minutes with constantly shaking and then washed with distilled water to remove any trace of soap 2 times for 5 minutes and then kept in 1% solution of Bavistin (BASF India the Limited) for one hour after that explants were washed 3-4 times with distilled water and then were taken inside the laminar hood for further sterilization. Here 2-3 sterile water washings were given. After these washings, explants were taken out and dipped in 70% ethyl alcohol for 30 seconds. After alcohol dipped plants were washed 2-3 times with autoclaved distilled water and then surface sterilized with freshly prepared 0.1% aqueous solution of Mercuric chloride (HgCl_2) for 8-10 seconds. After Mercuric chloride treatment, explants were thoroughly washed for 3-4 times with sterile chilled distilled water to remove any traces of Mercuric chloride. After that we used used taxim 80 to sterilised of explant it is an antifungal treatment after sterilization of explants, they were inoculated in culture bottles containing MS medium and Gamborg 5 medium with different concentrations of BAP, KN and IAA. The cultures were maintained at 25 ± 2 °C with light intensity varied from 2000–3000 lux. The photoperiod was generally 14 hours light 10 hours dark.

Shoot proliferation: For shoot proliferation, BAP (1mg/L, 0.5mg/L, 2mg/L) and KN (1mg/L, 1.5mg/L, 2mg/L) at different concentrations in combination with IAA (1mg/L), and agar (0.8%) used. Daily observation was done regarding the growth and condition of explants. Data were recorded after 7-8 days of culture and only shoots greater than 2cm were considered for taking data. At this stage, the proliferating cultures were subculture again in the same initial medium in order to increase budding frequency. After another 3 weeks of incubation the proliferating cultures were transferred to different media for shoot elongation.

Rooting of micro-shoots: Newly formed shoots measuring 3-4cm in length were excised individually from the parent explant and transferred to rooting media. Ms basal medium was used with 1mg/L IAA, 0.5mg/L BAP and 1mg/L KN. Data were recorded after 15 days of culture.

III. RESULT AND DISCUSSION

The explants began to show the signs of shoot proliferation after two weeks of culturing. Plants were free from both fungal as well as bacterial contamination. After successful beginning of the culture {3-5 weeks }

Culturing, newly formed shoots were excised separately from the proliferated explants. Developments of shoots were found best on MS medium containing higher concentration of KIN (1.5mg/l). The proliferation of shoots took place in 3 weeks. This composition of media showed, the number of shoots per explants was 6-7, respectably length of the longest shoot was 5 cm which was maximum in MS medium comprising 1.5mg/l KIN as compared to the other media composition containing 2mg/l BAP and 1mg/l IAA. A range of Cytokinins BAP, Kinetin has been used in micropropagation research work¹⁰.

Shoots were successfully multiplied on MS medium containing higher concentration of KIN (1mg/l). Proliferating shoots obtained from explants of *Aloe* plants took maximum 6-7 weeks from the time of establishment to attain the size suitable for rooting (>2cm). The highest percentage of shoots that induced roots was observed as 80.25% in MS medium supplemented with NAA 0.2 mg/l, followed IBA 0.2 mg/l. Effect of IAA in rooting was very poor. The highest number of root per culture was found in MS medium containing IBA 0.2 mg/l. Similar results was also obtained. NAA and IBA are most commonly used for root induction¹¹.



Table-1 Effect of growth regulators on proliferation of shoots in Aloe vera.

S.NO.	Medium + Growth Hormones (mg/l)	Average no. of Shoots	Average shoot Lenth in cm
1.	MS+ 1.0 BAP	2	2-3
2.	MS+ 0.5 BAP	2-3	1-3
3.	MS+ 1BAP+ 1IAA	2-3	3-4
4.	MS+ 1 KN	3-5	2-4
5.	MS+ 1.5 KN	6-7	5-7
6.	MS+ 2 KN+ 1 IAA	3-4	4-5

Table-2 Effect of different concentrations of growth hormones on root induction in Aloe vera.

S. NO.	Medium+Growth Hormones (mg/l)	Root length in cm	Root Morphology
1.	MS+ 1 IAA	2-3	Thin, short
2.	MS+ 1 IAA+ 0.5 BAP	4-5	Thin, long
3.	MS+ 1.5 IAA	2-3	Thin, short
4.	MS+ 2 IAA+ 1 KN	3-4	Thin, long

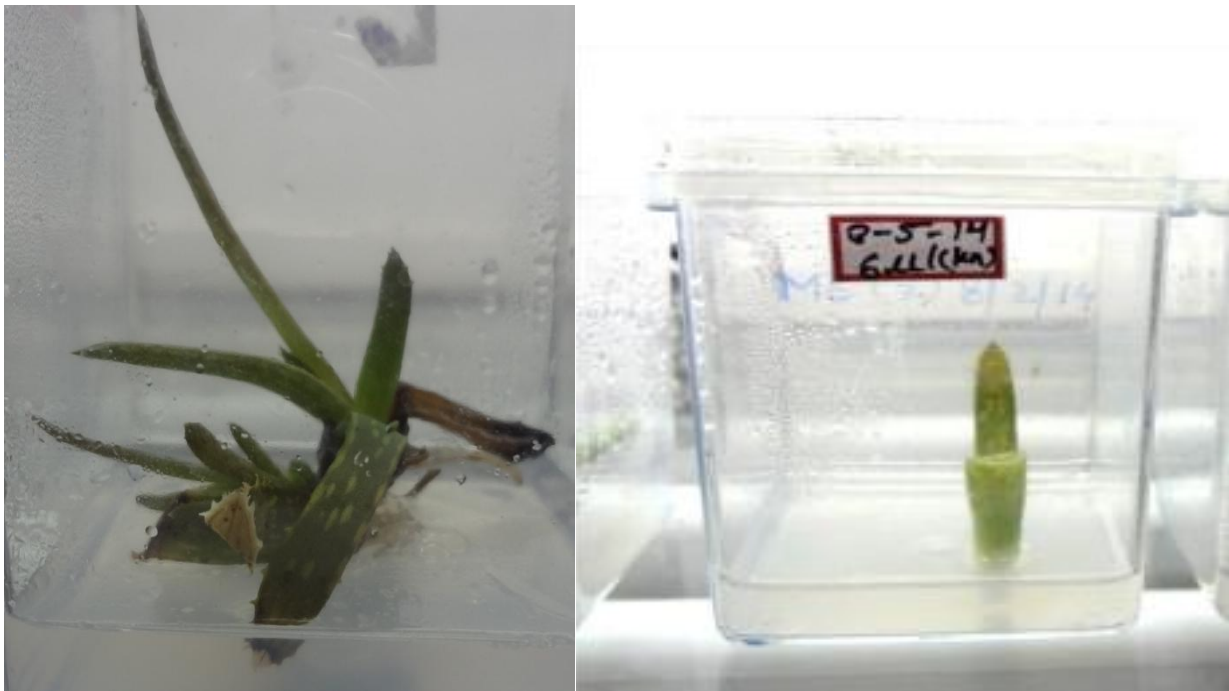


Figure 1: Showing inoculation of explant in MS media



Figure 2: Showing multiple shooting and rooting in MS media

IV. CONCLUSION

Aloe Vera is a medicinal plant and due to its extensive medicinal, nutraceutical and other uses it's enjoy a great demand in the market across the globe. *Aloe Vera* presents the finest commercial opportunity among the various medicinal plants. Micropropagation technique of *Aloe vera* has been briefly analyzed. During propagation the protocol efficiency revealed that 80-90% plant regeneration. It was apparent from the results that, the MS medium containing



concentration of 1.5 mg/l KN was more efficient for shoot regeneration and was standardized as the best media. The micropropagation technique is useful in the plant regeneration and transformation and production of the secondary metabolites in order to produce plants for medicinal use and further research efforts.

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