



## Effect of IBA and Growing Media on Growth and Survival of Stem Cutting in Kagzi Lime (*Citrus aurantifolia*)

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Kagzi lime belongs to family Rutaceae, is one of the most important citrus fruit as a major source of Vitamin C and acidic acid (Souci et al.2000) grown throughout the world (Babu, 2001). It is planted on a total of 125457.00 ha in the Indian states of Andhra Pradesh, Karnataka, Maharashtra, Punjab, Rajasthan, and Uttarakhand, from which 1617783.00 tons of production are obtained each year (Salaria, 2006; FAO, 2008). There are a few isolated kagzi lime orchards in Uttarakhand's Pauri, Chamoli, Rudra Prayag, and Dehradun districts in the Garhwal mountain range, as well as in select areas of the Kumaon region. In addition to being highly nutritious and being used for tables, kagzi lime is frequently utilised as a rootstock for malta and santra. Kagzi lime is often regenerated through seeds, although this method has the drawbacks of nonuniform offspring and a high risk of viral disease contamination (Babu, 2001). The only practical and frequently utilized solution for enhancing natural regeneration and for large-scale cultivation initiatives is vegetative multiplication through cutting. Because Kagzi-lime has a high level of polyembryony (90–100%) and little risk of viral disease contamination, stem cutting is an appropriate strategy for the species' regeneration. It is quick, easy, and cheap, and it doesn't call for the specialized skills that other vegetative approaches entail. It is well known that auxin treatment of stem cuttings stimulates the development of adventitious roots (Blazich, 1988). Additionally, it has been demonstrated that the root growth is enhanced when other chemicals are combined (Kling and Meyer 1983; Singh and Singh 2005). Phloroglucinol (1,3,5-trihydroxibenzene) was found to operate synergistically with IBA in the apple (James and Thurbon, 1981), rubus (James, 1979), and prunus (Jones and Hopgood, 1979) species. It was found to increase in vitro root development in apple root stocks. Even though a lot of research has been done on several aspects of citrus fruit propagation, it seems that little is known about how IBA under various growing conditions affects the stimulation of cutting roots. With these facts in mind, the current study examines the use of IBA in stem cuttings of kagzi lime. In Gujarati, it is referred to as "limbu," whereas in Hindi, it is known as "Neebu or Nimbu" (also known as "Pati lime," "Spur lime," "Acid lime," and "Mexican lime").

*Citrus aurantifolia*, also known as kagzi lime, is a crucial fruit crop in India due to the strong demand for its consumption, which is fueled by its nutritional and therapeutic benefits as well as its affordability. Lime is well-liked for its attractive look, tasty flavour, and good nutritional value. Kagzi lime juice relieves mosquito bite swelling and itchiness. The juice is consumed in some regions as atonic and to treat digestive issues. As a vermifuge, it is given when combined with oil. The pickled fruit is applied topically to the head in a poultice to relieve neuralgia. Consuming the pickled fruit can help with dyspepsia. The juice of the Kagzi lime is used as an astringent, antiscorbutic, tonic, diuretic, digestive stimulant, treatment for heart palpitations, headache, convulsive cough, rheumatism, arthritis, falling hair, bad breath, and as a disinfectant for all types of ulcers when applied topically. After

giving delivery, a new mother's belly is poulticed with the leaves to treat skin conditions. To treat a headache, apply the leaves or an infusion made from the crushed leaves. The leaf decoction can also be used as a mouthwash and gargle in cases of sore throat and thrush. It can also be used as eye drops and to bathe a patient who is contagious.

### **Impact of IBA on stem cuttings of Kagzi Lime**

In Kagzi Lime the juvenile branches with 1.00 to 2.00 cm in diameter were girdled and treated with rooting hormone Indole-3-butyric acid (IBA) @ (500 ppm, 1000 ppm and 1500 ppm), four levels of rooting media in different ratio viz., soil + sphagnum moss (2:1); soil + cocopeat + vermicompost (2:1:1) and soil + F.Y.M + sand (2:1:1) along with the control (soil) and their combinations were investigated. Callus was formed at the girdled portions on all air layers with or without the application of hormone. Results revealed that interaction effect of growth regulator and rooting media, IBA@1500 ppm + soil and sphagnum moss (2:1) proved significant in maximizing success percentage (%) of layered plants (95.99%), root parameters i.e. number of primary roots (30.67), number of secondary roots (40.00), maximum length of primary roots (10.70 cm), maximum length of secondary roots (10.27 cm) and survival percentage of air layered plants (98.68%) after planting.

### **Effect of Growth Media on stem cuttings of Kagzi Lime**

The success percentage per layers was affected by the use of growth regulator and rooting media at 45, 60 and 90 days after layering (DAL).

In addition to this, maximum (94.33%), (95.64%) and (96.99%) significant success percentage (%) was obtained in combination IBA@1500 ppm and soil + sphagnum moss over control and other combinations at 45, 60 and 90 days after layering (DAL). It is obviously might be due to fact that the application of auxin at right concentration helps in promoting success percentage in air layering of Acid lime. The superiority of IBA may be due to the fact that enhanced synthesis of food material and accumulation in the plants encourages quick healing and better callusing. The action of auxin in roots is similar to that of the stem, but the concentration of auxin is inhibitory to root growth. The roots are very much sensitive to the auxin as compared to the stem and the stimulation of root elongation may be achieved if it is applied in low concentration compared to the higher concentration used. Therefore, the findings indicate that an optimum concentration of IBA, resulted in the decline of amyloplast and cambium activities are stimulated and results in the mobilization of food material to the root promoting. The results obtained collaborate with the observation of in guava. It is obviously might be due to fact that the growing media, soil and sphagnum moss(2:1) performed best in promoting success percentage in air layering by providing good aeration, better water retaining capacity and resulted in higher success percentage in air layers.

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