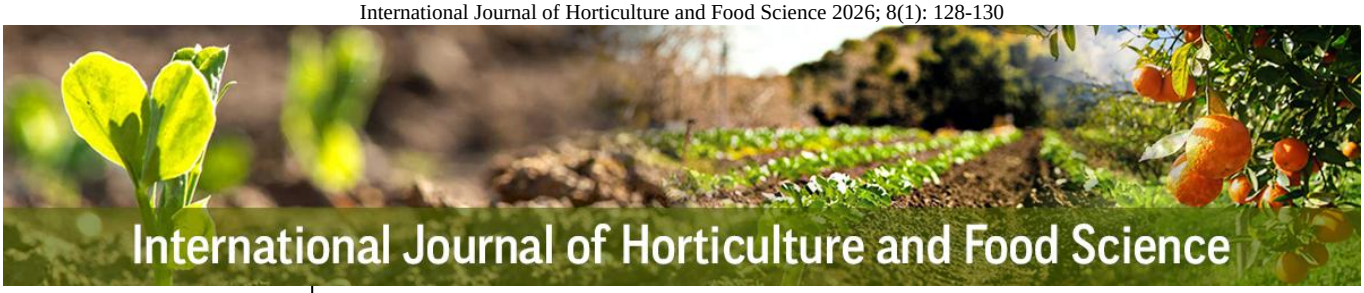

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Sunil D Gawali
Department of Botany, Dr Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhaji Nagar, Maharashtra, India

Arvind S Dhabe
Department of Botany, Dr Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhaji Nagar, Maharashtra, India

Corresponding Author:
Sunil D Gawali
Department of Botany, Dr Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhaji Nagar, Maharashtra, India

Effect of some natural growth stimulants on *Hemidesmus indicus* (L.) R. Br. ex-Schult

Sunil D Gawali and Arvind S Dhabe

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Abstract
Indian Sarsaparilla species *Hemidesmus indicus* (L.) R. Br. ex-Schult is a medicinal plant with various pharmacological properties. Some natural plant growth regulators, such as *Aloe vera* (L.) Brum.f. leaf extract, *Cocos nucifera* L. fruit milk (coconut milk), and humic acid, play a vital role in enhancing plant growth and development. This study examines the impact of *Aloe vera* leaf pulp, *Cocos nucifera* L. fruit milk, humic acid, and a combination of humic acid with coconut milk on the growth performance of *H. indicus*. *Aloe vera* leaf pulp treatment showed the highest growth rate (99%), followed by coconut milk (90%). Humic acid and its combination with coconut milk exhibited comparatively lower effect. These findings highlight the potential of Aloe vera extract as an effective natural phytohormone for promoting shoot and root growth in *Hemidesmus indicus*, suggesting its potential application in commercial cultivation.

Keywords: Indian sarsaparilla, *Hemidesmus indicus*, natural phyto-hormones, *Aloe vera*

Introduction
Indian Sarsaparilla *Hemidesmus indicus* (L.) R. Br. ex Schult (www.w.f.o., 2025) is a medicinal plant known for its therapeutic benefits, including anti-inflammatory, antimicrobial, and antioxidant properties (Bhattacharya & Jha, 2018) [1]. However, the propagation of *H. indicus* faces challenges due to slow growth and low germination rates (Kumar & Sharma, 2021) [6]. Phytohormones, such as those found in *Aloe vera* (L.) Brum. f. (www.w.f.o., 2025) leaf pulp, *Cocos nucifera* L. (www.w.f.o., 2025), fruit milk, and humic acid lead to desirable plant growth, enhancing growth and improving propagation efficiency (Singh & Verma, 2020) [7]. *Aloe vera* leaf pulp contains auxins and gibberellins, which promote root elongation and overall plant vigour, while coconut milk contains cytokinin that supports cell division and shoot growth (Gupta & Patel, 2019) [3]. This study aims to evaluate the effects of these phyto-hormones on the growth performance of Indian Sarsaparilla, focusing on their growth rate, root elongation, and shoot development.

Materials and Methods
Healthy stem cuttings of *Hemidesmus indicus* were collected from Gogababa Hills, Dr. Babasaheb Ambedkar Marathwada University campus. After collection, the cuttings were brought to the main Botanic Garden Laboratory, Dr. BAMU, Chhatrapati Sambhajinagar. All experiments were carried out under controlled conditions with stable temperature, humidity and soil moisture.

Preparation of Natural Growth Stimulants
Four treatments were prepared using commonly available natural materials:

1. **Aloe vera leaf pulp**: Fresh leaves were cleaned and the inner pulp was extracted. A volume of 100 ml of pulp was used for the treatment.
2. **Cocos nucifera milk**: About 100 g of fresh coconut flesh was blended with 100 ml of coconut water to prepare coconut milk.
3. **Humic acid:** A 1% humic acid solution was prepared.
4. **Control:** Distilled water was used as the control.

Treatment and Planting Procedure

The collected cuttings were trimmed to a uniform size and immersed in their respective treatment solutions for 24 hours. After treatment, the cuttings were planted in a nutrient-enriched growth medium.

All cuttings were maintained under the same laboratory conditions throughout the study. Soil moisture was kept consistent and the plants were observed regularly.

Observation and Data Recording

The experiment ran for 37 days. Growth parameters, including root length and overall survival rate, were recorded at two-week intervals. Any visible changes in rooting response or shoot development were also noted during the observation period.

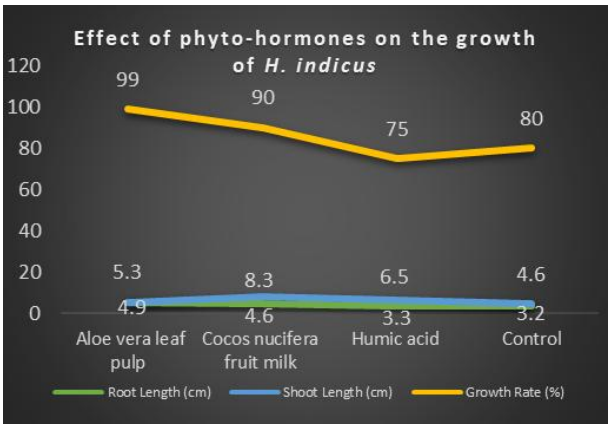
Results and Discussion

The study revealed significant differences in the growth performance of *H. indicus* treated with their natural plant growth regulators. *Aloe vera* pulp exhibited the highest growth rate (99%), promoting faster development of both roots and shoots.

The effectiveness of each treatment in enhancing plant growth can be attributed to its biochemical composition.

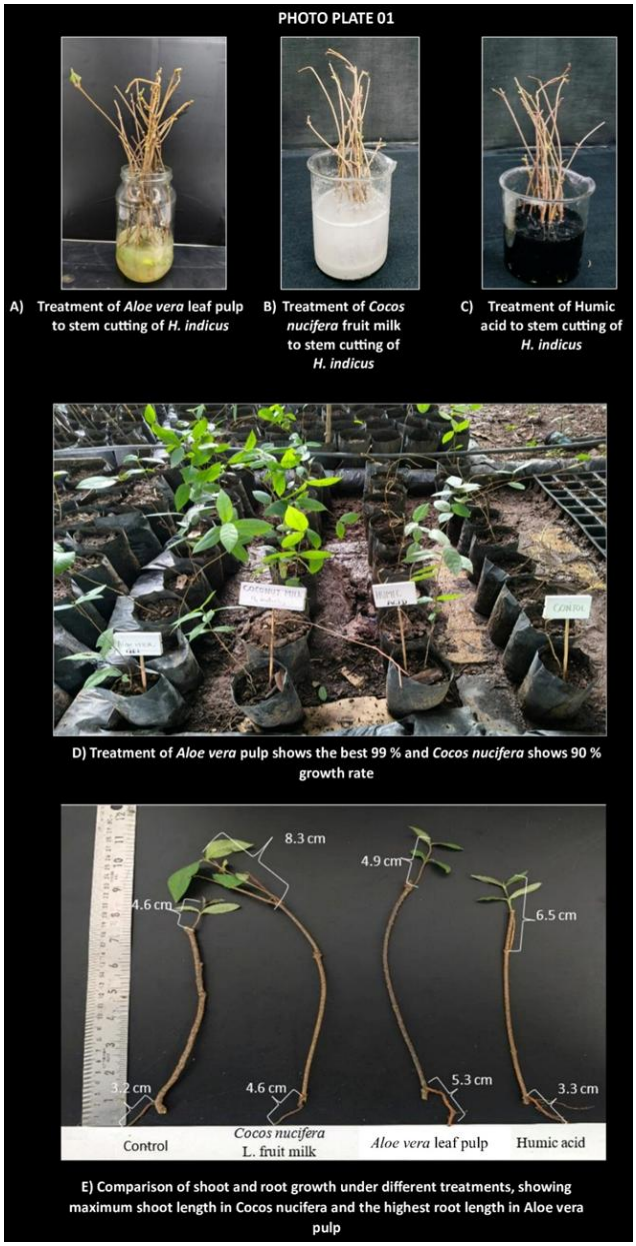
Table 1: Effect of phyto-hormones on the growth of *Hemidesmus indicus* (L.) R. Br. Ex Schult

Treatment	Root Length (cm)	Shoot Length (cm)	Growth Rate (%)
Aloe vera leaf pulp	5.3	4.9	99
Cocos nucifera fruit milk	4.6	8.3	90
Humic acid	3.3	6.5	75
Control	3.2	4.6	80



Aloe pulp has shown superior performance. It may be because of the contents of auxins and gibberellins that enhance root elongation and shoot growth (Surjushe *et al*., 2008; Kawai *et al*., 2010) [8, 5]. These plant hormones stimulate cell division and elongation, resulting in robust plant development. Coconut milk contains cytokinins that support cell division and overall plant vigour; however, its efficiency is slightly lower when compared to Aloe vera leaf pulp (George *et al*., 2008) [2].

The statistical analysis revealed that Aloe vera-treated plants exhibited significantly higher growth metrics compared to other treatments. The results align with previous studies highlighting *Aloe vera's* potential as a natural rooting phyto-hormone.



Conclusion

This study confirms the effectiveness of natural phyto-hormones and synthetic growth regulators in improving the growth performance of *Hemidesmus indicus* (L.) R. Br. ex-Schult. *Aloe vera* pulp demonstrated the highest potential, making it a promising natural plant growth regulator. The findings suggest that *Aloe vera* can be an eco-friendly and cost-effective alternative to synthetic growth regulators.

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