In vitro strategies for the conservation of Indian medicinal climbers

Article *in* In Vitro Cellular & Developmental Biology - Plant · May 2020

DOI: 10.1007/s11627-020-10084-x

2 authors:

Deepa A V
Central University of Kerala
2 PUBLICATIONS **7** CITATIONS
SEE PROFILE

Dennis Thomas
Central University of Kerala
74 PUBLICATIONS **1,572** CITATIONS
SEE PROFILE

In Vitro Cellular & Developmental Biology - Plant
https://doi.org/10.1007/s11627-020-10084-x

MEDICINAL PLANTS

In vitro strategies for the conservation of Indian medicinal climbers

A. V. Deepa[1] · T. Dennis Thomas[1]

Received: 4 July 2018 / Accepted: 8 April 2020 / Editor: Praveen Saxena

Abstract
Climbers are plants with weak stems that require support to grow upright. This group of plants develops various climbing mechanisms, classified as tendrillar, twiners, scramblers, clinging, adhesive and woody climbers (lianas). Although climbers are predominantly angiosperms, some are ferns, and one gymnosperm member *Gnetum* is included in this category. The angiosperm families mainly composed of climbers include Cucurbitaceae, Convolvulaceae and Dioscoreaceae. India's biodiversity includes two regions, the Western Ghats and the Eastern Himalayas. According to the Botanical Survey of India, of approximately 18,000 species of angiosperms in India, 8000 of them are medicinal plants and several of them are climbers. Many climbers are medicinally important and used as herbal remedies in traditional systems of Indian medicine, including Ayurveda, Sidha and Unani. Several active phytochemicals from different parts of these plants are isolated and used as medicine either alone or in combination with other compounds. Unfortunately, many of these plants are under the threat of extinction due to habitat depletion and overexploitation and conservation efforts are required to ensure their long-term stability. In this review, we discuss *in vitro* propagation and conservation strategies for Indian medicinal climbers from diverse families including Fabaceae, Aristolochiaceae, Asparagaceae, Caesalpiniaceae, Sapindaceae, Asclepiadaceae, Vitaceae, Ranunculaceae, Menispermaceae, Colchicaceae, Apocynaceae, Rubiaceae, Passifloraceae, Stemonaceae, Euphorbiaceae and Cucurbitaceae due to their high medicinal value.

Keywords Micropropagation · Somatic embryogenesis · Callus · Organogenesis · *In vitro* rooting

Introduction

Plants are the primary producers of the world. Everything that animals and humans consume is derived directly or indirectly from plants. They regulate the oxygen-carbon dioxide balance in the atmosphere and maintain the water cycle through transpiration (Thalluri 2016). Plants have been playing an important role as a source of medicine from time immemorial. The last 50 yr have witnessed tremendous improvements in the area of novel phytochemical discovery from plants. Furthermore, the capacity to screen plants and identify lead compounds for drug development has increased significantly (Miller 2011). The research has reached a new dimension from limited number of plants with a history of traditional use as medicine to comprehensively screen plants for bioactive compounds and look to nature as an endless source of chemically diverse material for drug development (Newman and Cragg 2016).

India's biodiversity includes two regions, the Western Ghats and the Eastern Himalayas. The Western Ghats site is recognized as one of the eight 'hottest hotspots' of biodiversity in the world and is included in the UNESCO (United Nations Educational, Scientific and Cultural Organization) World Heritage Site list, 2012. According to the Botanical Survey of India (BSI), among 18,000 species of angiosperms in the country, approximately 8000 of them are medicinal plants (Singh and Dash 2014). Traditional Indian medical systems follow two streams, of which, one is the folk or tribal medicine, and the other is organized systems of medicine like Ayurveda, Sidha and Unani (Mazid *et al*. 2012). Ancient Indian texts such as Rigveda and Atharva veda mention several medicinal plants and their usage. Charaka Samhita (100 A.D) and Susruta Samhita are also important Indian

✉ T. Dennis Thomas
den_thuruthiyil@yahoo.com

[1] Department of Plant Science, Central University of Kerala, Tejaswini Hills, Periye, Kasaragod, Kerala 671316, India

Published online: 29 May 2020