
Effects of colchicine treatment on morphological variations of *Neolamarckia cadamba*

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Abstract This study described the effects of colchicine application on the morphological characteristics of *Neolamarckia cadamba* plantlets. Surface-sterilised seeds and *in vitro*-grown nodal segments were treated with different concentrations of colchicine (0.1%, 0.3%, and 0.5%) and durations (24 h and 48 h). For both seeds and nodal segment explants, mortality rates correlated positively with colchicine concentration and treatment duration. In terms of morphological characteristics, the explants showed a decrease in shoot length, but an increase in the percentage of shoots with abnormal leaves and darker green leaves over the control when treated with more severe colchicine. For seeds treated with colchicine, multiple shoot seedlings were also observed. The number of shoots proliferated correlated positively with the severity of colchicine treatment. It showed that colchicine could exert plant development *in vitro*, which is similar to plant growth regulators. The stem diameter of seedlings was larger when seeds were treated with colchicine. A higher colchicine concentration with a longer period of treatment of explants induced higher variation. The various morphological characteristics observed in the treated explants indicated genetic changes which could be useful for the genetic improvement of *N. cadamba*.

Keywords: Kelampayan, *In vitro* mutagenesis, Phenotype variation, Tissue culture

Introduction

Neolamarckia cadamba (Roxb.) Bosser belongs to the Rubiaceae. Its local name varies between countries: Kelempayan (Malaysia), Krathum (Thailand) and Jabon (Indonesia) (Soerianegara and Lemmens, 1993). This rapid-growing semi-hardwood forest tree can reach 45 m in height and 1.6 m in diameter. The average leaf size is 50 cm × 25 cm, opposite-leaf arrangement, oval in shape, and broader leaves on young plants (Krisnawati *et al.*, 2011). *N. cadamba* has been used widely in Ayurvedic medicine to treat various types of ailments from mild to severe in India. This has led to prolific literature on the

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