*Available online at* www.pelagiaresearchlibrary.com

Pelagia Research Library

European Journal of Experimental Biology, 2014, 4(4):156-163

ISSN: 2248 –9215
CODEN (USA): EJEBAU

# EMS-induced mutagenesis and DNA polymorphism assessment through ISSR markers in *Neolamarckia cadamba* (kelampayan)and *Leucaena leucocephala* (petai belalang)

**Mohamed ZakyZayed[1], Wei-Seng Ho[1*], Shek-Ling Pang[2] and Fasihuddin Badruddin Ahmad[3]**

[1]*Forest Genomics and Informatics Laboratory (fGiL), Department of Molecular Biology, Faculty of Resource Science and Technology, Universiti Malaysia Sarawak, Kota Samarahan, Sarawak*
[2]*Applied Forest Science and Industry Development (AFSID), Sarawak Forestry Corporation, Kuching, Sarawak*
[3]*Department of Chemistry, Faculty of Resource Science and Technology, Universiti Malaysia Sarawak, Kota Samarahan, Sarawak*

---

**ABSTRACT**

*This study was conducted to determine the effects of ethyl methanesulphonate (EMS) treatments on seed germination and the genetic diversity of EMS-induced Neolamarckia cadamba and Leucaena leucocephala seedlings using ISSR markers.The effects of soaking duration in 100$^{o}$C water on seed germination were also determined forN. cadambaand L. leucocephala by using the following treatments: (1) untreated (control); (2) soaking in 100$^{o}$C water for 20seconds followed by soaking in water for 24 hours and 48 hours, respectively at room temperature.Results showed that soaking in 100$^{o}$C water for 20 seconds and subsequently in water at room temperature for 48 hours had the highest seed germination rate, higher cumulative germination (CGP) and shortened the period of complete dormancy (CDP) over soaking duration of 24 hours or untreated seeds before planting. A total of 120 seeds for each treatment and three different EMS doses (0.1%, 0.3% and 0.6%) were used in the EMS-induced mutagenesis studiesof N. cadamba and L. leucocephala. The results showed that the germination percentage, survivability and seedling height were decreased, whereas lethality increased with the increasing of EMS doses. Among the N. cadamba and L. leucocephala seedlings investigated, 0.6% EMS treated samples exhibited the highest level of variability in comparison to 0.1% EMS treated samplesas revealed by using ISSR markers. This indicates that 0.6% EMS treatment is much more beneficial as compared to other EMS treatments. Further, EMS has been successfully used to produce a range of novel traits and broaden thegenetic diversityof N. cadamba and L. leucocephalaas observed in the present study.*

**Key words:** EMS, mutagenesis, genetic diversity, *Neolamarckia cadamba*, kelampayan, *L. leucocephala*, petai belalang, ISSR

---

## INTRODUCTION

Mutation is the ultimate source of all genetic variation. Spontaneous mutations occur at very low frequency meanwhile induced mutations facilitate the development of improved varieties at a swifter rate as these mutations typically occur at much higher frequencies than spontaneous mutations do [39]. Besides the vital role in plant breeding programmes, a new role of induced mutations in releasing of gene silencing in transgenic plants has also been reported [7]. Induced mutations have been successfully used to generate genetic variability and to improve yield components of various crops like *Oryza sativa* [4, 56], *Hordeum vulgare* [51], *Triticum durum* [54], *Sesame indicum L.* [41] and others.