

# Comparison Of Mimosine Content And Nutritive Values Of Neolamarckia Cadamba And Leucaena Leucocephala With Medicago Sativa As Forage Quality Index

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**Abstract:** A study was conducted to determine the mimosine content and the nutritive values of *Neolamarckia cadamba* and *Leucaena leucocephala* in comparison to *Medicago sativa* (alfalfa hay) as forage quality index. A total of 22 *N. cadamba* and 35 *L. leucocephala* seedlings were analyzed to determine the mimosine content after 6 months of planting. It was noted that the mimosine content was highest in *L. leucocephala* (1.6%) and lowest in *N. cadamba* (0.03%) in comparison to *M. sativa* which has no mimosine content. Crude protein content was 23.48%, 20.90% and 14.83% for *L. leucocephala*, *N. cadamba* and *M. sativa*, respectively. The crude fiber was maximum in *M. sativa* (27.23%) and minimum in *L. leucocephala* (18.77%). Crude protein, crude fat, gross energy, protein to energy (P/E) ratio, organic matter and total ash in *N. cadamba* was higher compared to *M. sativa*. *L. leucocephala* was lower in nitrogen free extract, crude fiber and total ash compared to *N. cadamba*. Results from this study clearly indicate that *N. cadamba* has high forage quality and comparable to the traditional *L. leucocephala* and *M. sativa* as forage for ruminant and non-ruminants.

**Index Terms:** Neolamarckia cadamba, Leucaena leucocephala, Medicago sativa, mimosine, nutritive value, forage quality index

## 1 INTRODUCTION

The need to develop cheap and readily available alternative feeding materials to support livestock growth has become imperative. Leaf protein sources obtained in leaf vegetables, legume trees, fodder trees and shrubs as feed resources to all classes of livestock offer tremendous potentials and received increasing attention [1], [2], [3]. Mimosine is a free amino-acid very often present in certain legume plants which include *Leucaena leucocephala*. Mimosine and its degradation product 3-hydroxy-4(1H)-pyridone (DHP) are both toxic when ingested by herbivores and therefore, its presence limits the use of the leaves and seeds in feed for mono-gastric animals since it affects thyroid function, leading to poor growth and ultimately death in both ruminants and non-ruminants [4].

*Leucaena leucocephala* or locally known as petai belalang belongs to family Leguminosae. It is valued as an excellent protein source for cattle fodder, consumed browsed or harvested, mature or immature, green or dry. The nutritive value is equal to or superior to *Medicago sativa* (alfalfa) [5] and therefore, it is often being described as the alfalfa of the tropics. All parts of *L. leucocephala* are edible to animals, including leaves, young stem, flowers, young and mature pods, and seeds [5]. *Leucaena* foliage (leaflets plus stems) contains both nutrients and roughage and makes a ruminant feed roughly comparable to alfalfa forage. It is a rich source of protein (15-38%), produce up to 20 metric tons of dry matter per ha and the foliage is highly digestible (60-70%) [6]. *Neolamarckia cadamba* or locally known as kelampayan belongs to family Rubiaceae. It is one of the most frequently planted trees in the tropics and suitable for ornamental use and agroforestry practices [7]. In fact, it has been selected as one of the plantation tree species in forest rehabilitation projects in Malaysia due to its short rotation period [8], [9], [10], [11]. Under normal conditions, it reaches a height of 17 m and a diameter of 25 cm at breast height (dbh) within 9 years. It is one of the best sources of raw material for the plywood industry, besides pulp and paper production. It can be used as a shade tree for dipterocarp line planting, whilst its leaves and barks have medical applications. The dried barks can be used to relieve fever and as a tonic, whereas a leaf extract can serve as a mouth wash [12]. Other than medical applications, its leaves have also been used as fodder to cattle [7], but so far no scientific study has been done which may support its use in traditional forage. Thus, the present study was carried out to determine the nutritive value of *N. cadamba* and *L. leucocephala* with *M. sativa* as forage quality index. The mimosine content was also determined by using high-pressure liquid chromatography (HPLC) for both species.

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