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Research Article

## Acute Toxicity of Ethanolic Extract of *Leucaena leucocephala* (Lam) de Wit Seeds in Wistar Rats

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### ABSTRACT

**Objective:** This study was conducted to investigate the toxic effect of ethanol extract of *Leucaena leucocephala*(Lam) de Wit seeds(EELLS) in rats.

**Method:** simplicia powder of *L.leucocephala* seeds extracted by maceration with 80% of ethanol. Evaluation of toxicity effect used the fixed dose method which refer to OECD (Organization of Economic Cooperation and Development)420.

**Result:** Acute toxicity evaluation in this experiment using different doses varying from 50-2000mg/kgbw, did not result in the death of any animals until 14 days of observation in the experimental evaluation period and there was no change in behavior towards rats.

**Conclusion:** These results have shown that oral administration of *L. leucocephala* did not produce any significant toxic effect in rats. Hence, *L. leucocephala* could be regarded as a safe natural product for therapeutic use

**Keyword :** *L.leucocephala*, acute toxicity, ethanolic extract

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### INTRODUCTION

The use of medicinal plants as an enhancer in health care has long been known to the public and herbal medicine has been preserved from generation to generation in treating various diseases which are also believed to have less side effects than synthetic drugs. The use of medicines derived from plants and commonly known as herbal medicines according to WHO has been used by 80% of the world's population for health care <sup>1,2</sup>.

Indonesia is a country that has biodiversity that is widely used in traditional medicine. Nowadays, although traditional medicine is widely used by people as self-medication. however, professionals Health/doctors are

generally still hesitant to prescribe or use drugs. It is different in several countries such as China, Korea, and India which apply herbal medicines to the formal health service system. the reluctance of professionals health to use traditional medicines in the treatment of diseases due to limited scientific evidence on the safety of medicines in humans<sup>3</sup>.

One of the Indonesian plants that has been used as traditional medicine is *Leucaena leucocephala* (Lam) de Wit seeds. According to previous research, *Leucaena leucocephala* (Lam.) de Wit has various activities in the world of health, such as antidiabetic, antioxidant, antibacterial, and cancer prevention <sup>4,5</sup>. the leaves and seeds of *L. leucocephala* are used to treat diarrhea<sup>6</sup>. The leaves of

*L. leucocephala* are used as animal feed to increase milk production for livestock. The bark and flowers of *L. leucocephala* were used as an antiseptic<sup>7</sup>. Controlling abdominal pain from contraception and abortion and *L. leucocephala* chewing gum have been reported to be useful as a binder in tablet formulations<sup>8,9</sup>.

Consumption of medicinal plants without evaluating their efficacy and safety profile may result in toxic effects that can affect multiple organs<sup>10</sup>. This study was conducted to provide information about the acute toxicity of *L. leucocephala* seeds so as to evaluate their safety for clinical use.

## Method Material

### Plant materials

*L. leucocephala* seeds were collected from Deli Serdang district, Province of Sumatera Utara, Indonesia. The plant specimen was identified and authenticated by the Indonesian Institute of Sciences (LIPI) Jl. Raya Jakarta - Bogor Km 46 Cibinong 16911 Bogor - Indonesia.

### Extract Preparation

An amount of 1200 g of *Simplicia* seeds powder were macerated by ethanol of 80% in the first 6 h of immersion, stirred occasionally, then left for 18 hours. The results of maceration are collected then covered with sedimentation, then filtered. This maceration process is repeated twice. The liquid extracts are collected and evaporated<sup>11</sup>.

### Ethical clearence

This study was approved by the animal research Ethics Committee of Department of Biology of Faculty of Mathematics and Natural Sciences, University of Sumatera Utara, Medan Indonesia. (No.0324/KEPH-FMIPA/2019)

### Experimental Animal

The experimental animal used was a whiteratstrain Wistar weighing 150-200 grams. Rats were divided into 5 groups and each group contained 5 rats. Before use, the rats were acclimatized for 7-14 days at room temperature and 12 hours in light and 12 hours in dark. The rats were fed on a standard pellet diet and provided access to water ad libitum.

### Evaluation of Acute Toxicity

Rats were grouped into 5 treatment groups, there are control group given 0.5% Na-CMC and treatment groups (5, 50, 300, 2000 mg/kg bw). Each group consisted of 5 male rats. The method used is the fixed dose method which refers to the OECD (Organization of Economic Cooperation and Development) 420. The dose given was a single dose given orally to experimental animals that have

been fasted for 4 h. Furthermore, the symptoms of toxicity were observed for the first 4 hours including standing hair, diarrhea, salivation, weakness, tremors, behavior (walking backwards, walking using the stomach) and the mortality rate was calculated after 24 h for 14 days<sup>12</sup>.

### Statistical Analysis

Data from observations of evaluation of acute toxicity were statistically analyzed by the One Way ANOVA method followed by Post Hoc Tukey HSD test using SPSS (Statistical Product and Service Solution) version 25.

## RESULT AND DISCUSSION

### Acute Toxicity

Evaluation of the toxic dose and lethal dose refers to the OECD 420 method which has the advantage of using a few experimental animals and easy testing techniques. Based on the observations, it can be seen that during the investigating period, no rat showed any symptoms of toxicity for 14 days. The results of the mean body weight of each group after given *L. leucocephala* also did not show a significant difference between the control and treatment groups where  $p > 0.05$ . The results of the graph of the average animal body weight can be seen in Figure 1.

Based on the data from the results of the toxicity test, there were no animals that died after giving *L. leucocephala*. If the maximum dose given did not cause animal death can be seen in Table 1, therefore, the approximate lethal dose (LD50) of EELLS was estimated to be higher than 2000 mg/kg bw<sup>13</sup>.

According to the researchers, if at the maximum dose there is no death in experimental animals, then the compound is included in the criteria for "practically non-toxic"<sup>12</sup>. based on this investigating the *L. leucocephala* has been safely administered to rats for 14 consecutive days.

**Table: 1** Observation data on the number of animal deaths

Group	Number of Early Rats	Number of dead Rats
Na- CMC 0,5%	5	0
EELLS 5mg/kg bw	5	0
EELLS 50mg/kg bw	5	0
EELLS 300mg/kg bw	5	0
EELLS 2000mg/kg bw	5	0

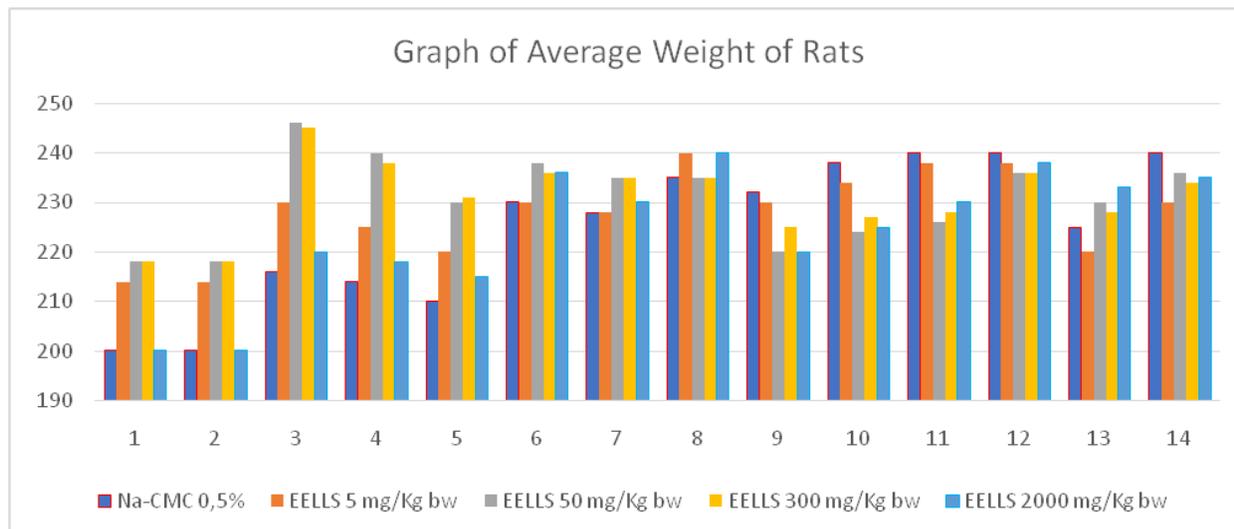


Figure: 1 Graph of the average weight of the experimental animals

## CONCLUSION

The acute toxicity of the 80% ethanol extract of *Leucaena leucocephala* (Lam) de Wit seeds was practically non toxic.

There is no significant change in body weight and clinical signs of toxicity.

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