

# Acut Toxicity Test of ImperataCylindrica L. (Beauv) Root Methanol Extract on Mice an a Antihypertention

Ruslin<sup>1</sup>, Diah Dhianawaty<sup>2</sup>

<sup>1</sup>Faculty of Pharmacy, Halu Oleo University, Kendari, South East Sulawesi, Indonesia

<sup>2</sup>Biochemistry and Molecular Biology Department, Faculty of Medicine, UniversitasPadjadjaran, Bandung, Indonesia

**Abstract:** *Purpose:* The aim of this study was to evaluate the acut toxicity of methanol extract of Imperatacylindricaroot that at the doses 60 and 90 mg/kg-bw had anti-hypertension effect on rat. *Method:* OECD guidelines, three groups of mice received oral administration of control solution and methanol extract of Imperatacylindricaroot at the doses 285.7; and 714.3mg/kg-bw, respectively. The body weight and the signs of toxicity including mortality and duration of effects were observed. *Result:* The signs of toxicity which were observed at: 0; ½, 1; and 2 hours, respectively, did not appear from all groups. Then in the further observations for 14 days did not show the toxic effect and mortality. The body weight of all group increased. Statistically, the difference of weight increased was not significant. *Conclusion:* The methanol extract of Imperatacylindrica root till at the dose 714.3 mg/kg-bw did not cause the toxic effect on mice, and LD<sub>50</sub> value suggested higher than 714.3 mg/kg-bw.

**Keywords:** Acut toxicity, Imperatacylindricaroot methanol extract, Imperatacylindrica

## 1. Introduction

Prevalence of Hypertension is high in Indonesia. Many adverse effects were caused by hypertension, and the effects became the problem for public health [1]. The Basic of health research (Riskesmas) in 2013, showed that 49% of Indonesian society used herbal medicine to maintain health and to treat the disease [2]. The data shows that jamu as a part of traditional medicine has been accepted by the Indonesian society [3]. It as a traditional medicine is a part of pharmaceutical group, and a part of the resources needed to succeed The Long Term of Development Plan for the Health (in 2005 – 2025) [4].

Traditional medicine (jamu) still needed the sufficient scientific evidence to be used by health professionals. Decree of the Minister of Health Number 760/Menkes/Per/IX/1992 on phytopharmaca, and Number 761/Menkes/SK/IX/1992 on guidelines of phytopharmaca, and Regulation of the Minister of Health number 003/Menkes/Per/2010 on herbs saintification, are some government regulations in an effort to develop of herbal medicine in the formal used together with chemical-based drugs, which provide the scientific evidence related to quality, safety, and the benefits of traditional medicine (herbal medicine) [4-8].

*Imperatacylindrica* root has been used as a traditional medicine to lower of high blood pressure by society in South-East Sulawesi. Ruslin et al. reported the methanol extract of *Imperatacylindrica* root at doses 60 and 90 mg/kg-bw had anti-hypertensi effect on Wistar rat which was measured by Tailcuff MP100 Pulse Transducer method [9]. The other used in traditional medicine were for fever, jaundice, edema [10]. Parvathy et al. have published that the methanol extract of *Imperatacylindrica* root had anti-anthelmintic activity [11].

Three classes of herbal medicine these are Traditional Medicine, Standardized Herbal Medicine and Phytopharmaca. To promote of using of *Imperatacylindrica* extract as Standardized Herbal Medicine is needed the other tests, one of it toxicity test [12].

The next step which must be done for the safety and efficacy of the use of herbal medicine in human is the toxicity test of the extract using the experimental animals, e.g mice to determine the LD<sub>50</sub> and acute toxicity, rat to determine the subchronic and chronic toxicities [12,13].

## 2. Material and Methods

**Object:** 6 adult female mice DDY strain, weight 29 – 31 g. from School of Pharmacy, Institut Teknologi Bandung.

### Sample:

- 1) The maximum dose for rat is 5000 mg/kg-rat. The tested extract for mice =  $\frac{1}{7} \times 5000$  mg/kg-bw mice = 714.3 mg/kg-bw mice. It extract was made a suspension/emulsion in 20 ml 0.5% of carboxy methyl cellulose solution
- 2) The control solution is 0.5% CMC solution at the dose 20 ml/kg-bw of mice.

**Equipment:** the balances are Sartorius 2442, Scaltec 51.

### Procedure [14]

The method of the study was approved by the Committee of Animal Ethics of Faculty of Medicine, Universitas Kristen Maranatha – R.S. Immanuel No. 169/KEP/V/2014 on 22 May 2014.

Six mice were divided into two groups, which were 3 mice as control and 3 mice as tested groups, and kept in cages for 5 days for acclimatisation to the laboratory condition.

- 1) Mice was fasted from food but not water for 4 hours, after that to the control and the tested groups were given (p.o) with a single dose of control and tested solutions, respectively. The signs of toxicity and duration of effects: motor activity, catalepsy, ptosis, lacrimation, straub tail, piloerection, pinna reflex, and corneal reflex were observed at: 0; ½, 1; 2 hours, respectively.
- 2) Then the signs of toxicity including mortality; nature, severity were observed daily for 14 days.
- 3) The individual weights of mice were observed at the day of dosing, in weekly intervals thereafter, and at day 14.

### 3. Result

- 1) The signs of toxicity and duration of effects

**Table 1:** The signs of toxicity and duration of effects after oral administration of single dose of *Imperatacylindrica* root methanol extract

Observation	Dose (mg/kg bw) and time of observation (hour)											
	Control 0				Tested							
					285.7				714.3			
	0	½	1	2	0	½	1	2	0	½	1	2
Motor activity	N	N	N	N	N	N	N	N	N	N	N	N
Catalepsy	-	-	-	-	-	-	-	-	-	-	-	-
Ptosis	-	-	-	-	-	-	-	-	-	-	-	-
Lacrimation	-	-	-	-	-	-	-	-	-	-	-	-
Straub tail	-	-	-	-	-	-	-	-	-	-	-	-
Piloerection	-	-	-	-	-	-	-	-	-	-	-	-
Pinna reflex	+	+	+	+	+	+	+	+	+	+	+	+
Corneal reflex	+	+	+	+	+	+	+	+	+	+	+	+

Note: N = Normal

- = has not effect

+ = has effect

- 2) The observation of signs of toxicity including mortality; nature, severity which were observed daily for 14 days.

**Table 2:** The percentage of mortality of mice during 14 days after oral administration of single dose of *Imperatacylindrica* root methanol extract

Groups	The mortality observation during 14 days (%)	
	1 - 14	1 - 14
Control (0 mg/kg-bw)	0	0
Tested (285.7mg/kg-bw)	0	0
Tested (714.3 mg/kg-bw)	0	0

- 3) The observation of individual weights of mice which were observed at the day of dosing, in weekly intervals thereafter, and at day 14.

**Table 3:** The Body weight at days 0 (dosing), 7 and 14 after oral administration of single dose of *Imperatacylindrica* root methanol extract

No. of mice	Body weight of mice (g) at day								t test between both weight increase
	Control group (0 mg/kg-bw)				Tested group (714.3 mg/kg-bw)				
	0	7	14	weight increase	0	7	14	Weight increase	
1	29.70	32.58	33.30	3.60	29.35	31.72	32.51	3.16	NS
2	30.22	32.01	33.61	3.39	29.41	31.29	33.84	4.43	
3	30.35	31.56	33.58	3.23	29.30	31.72	32.51	3.21	
Average	30.09 ± 0.26	32.05 ± 0.35	33.50 ± 0.13	3.41 ± 0.13	29.35 ± 0.04	31.58 ± 0.19	32.95 ± 0.59	3.60 ± 0.55	

Note: NS = Not significant

### 4. Discussion

The observation fact of the signs of toxicity and duration of effects showed the all signs of poisoning effect did not appear from all groups. Thus the dose given was not toxic to the groups. Then from the further observations, the facts of the both groups did not show the toxic effect and dead.

The body weight the both groups were increase. Statistically of the differences of the both increase were not significant.

Result: The signs of toxicity which were observed at: 0; ½, 1; and 2 hours, respectively, did not appear from all groups. Then in the further observations for 14 days did not show the toxic effect and mortality. The body weight of all group increased. Statistically, the difference of weight increased was not significant.

Conclusion: The methanol extract of *Imperatacylindrica* root till at the dose 714.3 mg/kg-bw did not cause the toxic effect on mice, and LD<sub>50</sub> value suggested higher than 714.3 mg/kg-bw.

## 5. Conclusion

The methanol extract of *Imperatacylindrica* root at the dose 714.3 mg/kg-bw did not cause the toxic effect on mice, and the LD<sub>50</sub> we suggest higher than the dose.

## References

- [1] Aditama TY. Hypertesion problem in Indonesia. Director General of Disease Control and Environmental Health, Ministry of Health of Republic of Indonesia. Home: News release 2012
- [2] Soendoro T, et al. Basic Health Research 2007. The Agency of Research and Development of Health, Ministry of Health of Republic of Indonesia 2008; vi, xiii, 112.
- [3] Trihono, et al. Basic Health Research 2013. The Agency of Research and Development of Health, Ministry of Health of Republic of Indonesia 2013; v, 88, 40-47.
- [4] Department of Health. Long-Term Development Plan of Health in 2005-2025. Department of Health of Republic of Indonesia 2009.
- [5] The Minister of Health. Decree of the Minister of Health Number 760/MENKES/per/IX/1992, Phytopharmaca Guidelines, Department of Health of Republic of Indonesia 1992.
- [6] The Minister of Health. Decree of the Minister of Health Number 761/MENKES/SK/IX/1992, Phytopharmaca Guidelines, Department of Health of Republic of Indonesia 1992.
- [7] The Minister of Health. Decree of the Minister of Health Number 003/MENKES/PER/I/2010, Scientification of jamu in the research-based health services, Department of Health of Republic of Indonesia 2010.
- [8] The Agency of Research and Development of Health. Research and Scientification of Jamu. Ministry of Health of Republic of Indonesia 2014.
- [9] Ruslin, Asmawi MZ, Rianse U, Sahidin I, Dhianawaty D, Soemardji AA, et al. Antihypertensive activity of Alang – Alang (*Imperatacylindrica*(L.) Beauv. root methanolic extract on male Wistar rat. Int J Res PharmSci 2013; 4(4): 537-42.
- [10] Dalimarta S. Atlas of Indonesia medicinal plants. In: Aby N, penyunting. Alang-alang [*Imperatacylindrica* (L.) P. Beauv]. 4<sup>th</sup> ed. Jakarta: Puspa Swara; 2006. p.1–3.
- [11] Parvathy NG, Padma R, Renjith V. Phytochemical screening and anthelmintic activity of methanolic extract of *Imperatacylindrica*. Int J. Pharm PharmSci 2012; 4 (Supp.1):232-34.
- [12] Agency of training and development of Health ethical code of the health research. Department of Health of Republic of Indonesia 2009.
- [13] Kumar VK, Lalitha KG. Acute oral toxicity studies of Anacyclus pyrethrum DC root in Albino rats. Int J. Pharm PharmSci 2013; 5 (4):675-78.
- [14] OECD Guidelines for the Testing of Chemical 423