

PRECLINICAL ANTIPYRETIC ACTIVITY TEST OF AQUEOUS EXTRACT OF AFRICAN LEAF (*Vernonia amygdalina* Del)

Debi Meilani and Nadroh Sitepu

Department of Pharmacy, Muslim Nusantara Al Washliyah University, Jl. Garu II No. 93, Medan, 20147, Indonesia

E-mail: deb1me1lan1.dm@gmail.com

Abstract

One of plants that can be used as a drug is African leaf (*Vernonia amygdalina* Del). The purpose of this study was to investigate the antipyretic activity of aqueous extracts of African leaf which grew up in Indonesia against pigeon's (*Columba livia*) fever which induced by vaccine DPT-HB. The design of this research consisted of sampling African leaf using purposive method, characterization of African leaf simplicia powders, preparation of aqueous extracts of African leaf (AEAL) using percolation method, phytochemical screening simplicia powders and AEAL, and preclinical testing antipyretic activity of AEAL. Preclinical testing using 18 pigeons which was divided into three groups, each group consisted of 6 animals. Group 1 was given AEAL dose of 150 mg/kgBW, group 2 was given paracetamol as a positive comparison and group 3 was untreated group as a negative comparison. The independent variable in preclinical testing is dose of AEAL and dependent variable is pigeon's body temperature. Data was analyzed statistically using One Way ANOVA with 95% significant level, continued with Duncan test to see significant differences between treatments. The result of characterization simplicia powders showed good quality African leaf botanical powders. Phytochemical screening results showed that both botanical powders and AEAL contain saponin, flavonoid and steroid/triterpenoid. Results of preclinical trials showed antipyretic activity AEAL dose of 150 mg/kgBW group was not significantly different with paracetamol group and significantly different with untreated group.

Keywords: *Vernonia amygdalina*, Indonesia, *Columba livia*, antipyretic activity

A. INTRODUCTION

Antipyretics are drugs that lower the body temperature by rearranging the hypothalamic set point, also suppresses the accompanying constitutional symptoms like fever myalgia, chills, headache, and others (Harrison, 1999). There are many antipyretic drugs in the community, but still cannot be separated from side effects, so it is still important to do antipyretic drug discovery from natural materials. Paracetamol, one of the most common antipyretic drugs have side effects hepatotoxic in the single dose more than 10 g. One of plants that can be used as medicine are African leaf (*Vernonia amygdalina* Del) which grew up in Indonesia. This plant is commonly found in Africa and began to be used in Indonesia since 2008 (Anonymous^a, 2013). Ibrahim *et al* (2011) found that the ethanol extract of African leaf has analgesic effects and usually analgesic effects in plants accompanied with antipyretic effect, while Ijeh dan Ejike (2011) showed that *Vernonia amygdalina* Del contain saponin and flavonoid that wellknown have antipyretic activity.

B. METHOD

This research used experimental method involves collecting samples, characterization of botanical powder, phytochemical screening, preparation extracts from African leaf, and testing antipyretic effect on male pigeon (*Columba livia*).

Collecting sample.

The samples used were fresh African leaf (*Vernonia amygdalina* Del.), taken from Medan, North Sumatra, Indonesia. Sampling was done purposively. Samples were dried, crushed and powdered until got simplicia powder. Then simplicia powder stored in a sealed container.

Characerization of simplicia Powder.

Examination of the characteristic simplicia powder used Materia Medica Indonesia method (Depkes RI, 1995). The examination consist of macroscopic examination, microscopic examination, determination of moisture content, assay of soluble extract in water, assay of soluble extract in ethanol, determination of total ash, and assay of ash insoluble in acid.

Phytochemical screening.

Phytochemical screening used Materia Medica Indonesia method (Depkes RI, 1995). The screening consist of alkaloid examination, saponin examination, flavonoid examination, tannin examination, steroid/triterpenoid examination, glycoside examination and anthraquinone examination .

Preparation of aqueous extract of african leaf.

African leaf was extracted by percolation using water as solvent, then was evaporated by a rotary evaporator until got viscous extract. Viscous extract then dried with a freeze dryer at a temperature of -40°C , a pressure of 2 atm for 24 hours, then weighed until dry extract was obtained. Dry extract was made as suspension with carboxymethylcellulose (CMC), then the suspension was tested antipyretic effect on healthy male pigeons (*Columba livia*).

Antipyretic activity Test.

This study used thirty healthy pigeons (*Columba livia*) male which had weight 250-350 gram, divided into 5 (five) groups, each group consist of 6 (six) pigeons. Before the treatment, pigeons acclimatized for two weeks. Pigeons were weighed, their rectal temperature were measured with 10 minutes interval 3 times and the average body temperature was calculated. Then the DTP-HB vaccine was injected intramuscularly in the area of the chest muscles with a dose of 0.5 ml / animal. The body temperature was measured at 12 hours. interval Then aqueous extract of african leaf was given to pigeons at a dose of 150 mg/kgBW / animal orally. Measurement of body temperature continued with intervals of 30 minutes for 3 hours to arrive. The same procedure is performed on Paracetamol dose of 2.14 mg / kg administered orally as a control and the CMC 0.5% as placebo Each dose experiments be repeated 6 times. Data obtained from body temperature were statistically analyzed using one-way ANOVA (One Way ANOVA) SPSS with 95% confidence level. Then continued with Duncan test to see whether there were significant differences between treatments.

C. RESULT AND DISCUSSION

Characterization examination of simplicia powder

Result of macroscopic examination results showed that african leaves was oval, 15-28 cm long, 6-8 cm wide, the stalk ± 2 cm long, green color, no smell and taste slightly bitter as shown in figure 1.



Figure 1. Result of macroscopic examination of African leaf.

The results of microscopic examination showed that cross section of African leaf consists of one layer upper epidermal cell unicellular that covered hair without glandular, vascular bundle, very much anomositik stoma as shown in Figure 2.

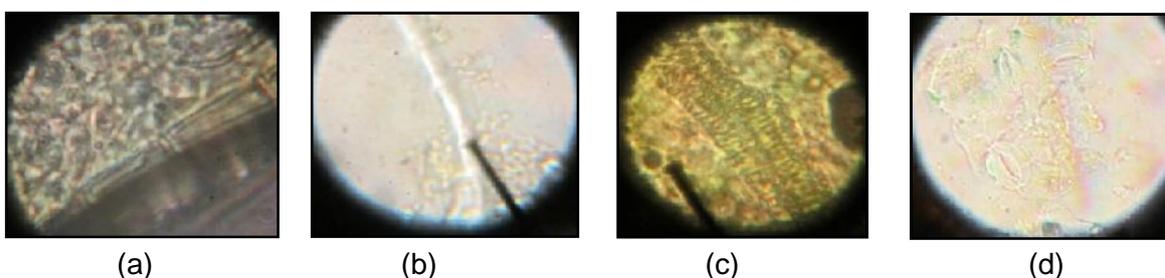


Figure 2. Microscopic Leaf Africa (*Vernonia amygdalina* Del.); (a) Network epidermis, (b) Hair coverings without glandular unicellular, (c) File Tubes, (d) the type Stoma anomositik

Result of characteristic of simplicia powder can be seen on table 1.

Table 1. Results of characterization of simplicia examination

No	Name of test	Result	MMI Standard
1	Determination of moisture content	7.99%	<10%
2	Determination of substance soluble in water content	31.61%	>20%
3	Determination of substance soluble in ethanol content	17.72%	>12%
4	Determination of ash content	11.05%	<12%
5	Determination of ash soluble acid content	1.29%	< 1.5%

Simplicia characterization results showed that simplicia of african leaf had good quality and fulfill the requirements of the quality standard of bulbs, so it can be used for preclinical testing antipyretic activity.

Phytochemistry screening examination.

Result of phytochemistry screening examination showed that both simplicia powder and aqueous extract of african leaf contained saponin, flavonoid and steroid/triterpenoid as been shown as table 2.

Table 2. Results of phytochemistry screening examination

No	Name of test	Simplicia Powder	Extract
1	Alkaloid	-	-
2	Saponin	+	+
3	Tannin	-	-
4	Flavonoid	+	+
5	Steroid/Triterpenoid	+	+
6	Glycoside	-	-
7	Anthraquinone	-	-

This result indicated' that the active substances contained in the simplicia powder of African leaf may be extracted by a percolation method using water as solvent. The content of secondary metabolites in extracts also reinforce the hypothesis that aqueous extract of African leaf may had antipyretic activity.

Antipyretic activity examination

Result of antipyretic activity examination as shown as table 3 and figure 3.

Table 3. Average body temperature of 6 pigeons male for each treatment after injection of DTP-HB vaccine dose of 0.5 ml / animal and the provision of test materials

Treatment	Initial temperature	The measurement of the temperature of the body temperature of pigeons						
		12 Hour	30 min	60 min	90 min	120 min	150 min	180 min
CMC 0,5 %	41.40	42,32	42.90	42.77	42.55	42.43	42.33	42.15
Paracetamol	41.55	42,36	42.23	42.13	41.96	41.86	41.75	41.58
EEDA 150 mg/kgBB	41.57	42,53	42.39	42.17	42.07	41.86	4.,77	41.69

Result of preclinical antipyretic activity test showed that antipyretic activity aqueous extract of African leaf did not differ significantly with paracetamol, and this was confirmed by the results of a one-way ANOVA test program with confidence level of 95% followed by Duncan test.

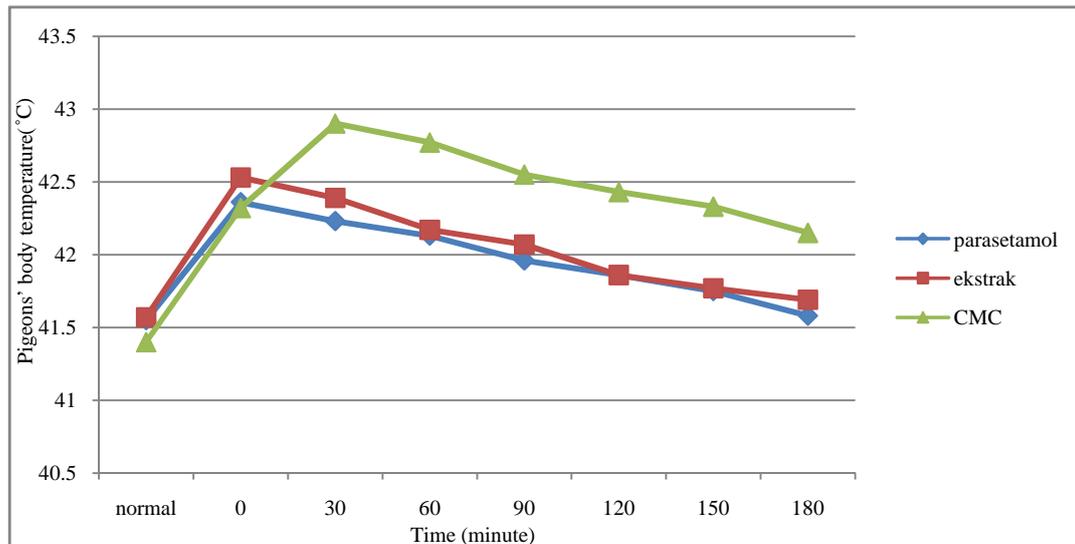


Figure 3. Data graph of the average change in body temperature doves (pigeons male 6 for each treatment) after injection of DTP-HB vaccine dose of 0.5 ml / animal and the provision of test materials

D. CONCLUSIONS

The body temperature of male pigeon that had been induced by the vaccine DTP-HB can be reduced by aqueous extract of african leaf. There was no significancy difference between the aqueous extract of african leaf with a suspension of paracetamol in lowering body temperature

E. ACKNOWLEDGMENT

We would like to thank Muslim Nusantara Al Washliyah University for donating this experiment.

F. REFERENCES

- Anonymous^a.(2013). [Online]. Available <http://naturindonesia.com/diabetes-melitus/daun-afrika-selatan.html>. May, 19, 2013.
- Depkes RI (1995). *Materia Medika Indonesia*. Jilid VI. Jakarta: Departemen Kesehatan RI. : 300,303,333-337
- Depkes RI (1995). *Farmakope Indonesia*. Edisi IV. Jakarta: Departemen Kesehatan RI.: 7.
- Harrison, T. R. (1999). *Prinsip-prinsip Ilmu Penyakit Dalam*. Volume I. Editor: Isselbacher. Jakarta: EGC :7
- Ibrahim, G., Abdurahman, E. M., dan Ibrahim, H., Ibrahim, N. D. G., Magaji, M. G (2011). *Toxicity and Analgesic Effect of Vernonia amygdalina Del. Leaf (Asteraceae) Extract on Mice*. Int. J.Adv.Pharm.Biol.Sci. 1(1): 1-4.
- Ijeh, I. L., dan Ejike, C.E.C.C. (2011). *Current Perspectives on the Medicinal Potentials of Vernonia amygdalina Del. J.of Med.Plant Research*. 5(7): 1051-1061