

# The Anti-hyperuricemic Effect of Torbangun (*Coleus amboinicus* Lour) Aqueous Extract

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**Abstract-**The study aimed to analyze the effect of Torbangun to reduction uric acid in woman with hypercholesterolemia. Design experiment used in this study was pre and post test controlled group design. The first step of this study was analyzed bioactive compound of torbangun aqueous extract. The next step was administered orally of Torbangun extract to control and woman with hypercholesterolemia for 30 days, with 30 subjects placed in two groups, viz, experimental (CC group) and placebo (PC group). The first group received one capsules of CC (each capsule contains 500 mg extract) while the second group received one capsules of PC (comprised of 500 mg fillers) one times daily for both groups. Uric acid (UA) and total cholesterol (TC) were measured in the first and the end of intervention. Oral administered of Torbangun extract exhibited reduce of hyper uric acid and hyper total cholesterol in woman with hypercholesterolemia. Data were analyzed with paired sample t test with 95% significance level. The results show that there was significant decrease in UA and TC on day 30, compared to control (PC group). In CC group, the capsules significant reduction in UA levels ( $p=0.001$ ) and TC levels ( $p=0.000$ ). Studies clearly demonstrated that Torbangun (*Coleus amboinicus* Lour) aqueous extract possesses antihyperuricemic activity in woman with hypercholesterolemia.

**Index Terms-** uric acid, antihyperuricemic, torbangun extract

## I. INTRODUCTION

Hyperuricemia is abnormal high level of uric acid, it is a common metabolic disorder with a worldwide distribution. It has been considered as an important risk factor for gout [1]. Hyperuricemia, a concentration of urate in serum above the limit of solubility ( $\leq 7.0$  mg/dL), is the most important risk factor of increased uric acid production, impaired renal uric acid excretion, or a combination of these mechanisms [2]. Clinically reported, the key factor uric acid is related not only to an increased risk of gout, but also to an increased risk of cardiovascular disorder, nephrolithiasis, diabetes, obesity, and dyslipidemia [3]. The mammals and birds will store their excess fat not only in their adipose tissue, but also in their liver and serum (triglycerides), often in association with the development of insulin resistance and elevated blood pressure [4]. The recent studies suggest a role for nucleic acid metabolism, in which stimulation of adenosine monophosphate (AMP) deaminase promotes fat storage and insulin resistance, whereas activation of AMP activated protein kinase stimulates fat degradation and decreases gluconeogenesis [5]. A key factor that appears to promote fat storage is the AMP deaminase product, uric acid [6]. Here we will briefly discuss the studies incriminating uric acid in these conditions.

Medicinal plants are believed to be an important sources of new chemical substances with potential therapeutic effect. Plant based medicines are gaining prominence in treatment of metabolic disease. Many flavonoid containing plants serve as a hidden wealth of diabetes and dyslipidemia control. Torbangun is an aromatic shrub widely distributed in Indonesia. The literature survey revealed torbangun leaf extract to have an antioxidant property. The leaves of torbangun have been used in Indonesian traditional medicine for treatments of antihyperglycemia and antihyperlipidemia [7]. The hyperuricemia is present in 5–30% of the general population and seems to be increasing worldwide. Therefore, there is an obvious need for therapeutic strategies that could act on the physiological regulation of uric acid levels and prevention of uric acid-related diseases. Herein, we reported the hypouricemic effect of torbangun in woman with hypercholesterolemia.

## II. IDENTIFY, RESEARCH AND COLLECT IDEA

### 2.1. Plant materials.

Torbangun (*Coleus amboinicus* Lour) were collected from a traditional market in Jakarta Indonesia, in the months of Desember 2017. The leaf separated, cleaned, air-dried, coarsely powdered, and subjected for Soxhlet-extraction by using aqueous. Powder weighing 70 g was extracted with 600 ml of aqueous for 72 h for each batch. The solvent was recovered using rotovapor. The semisolid mass obtained was concentrated under reduced pressure and stored in an air tight container[8]. Each 500 mg *Coleus amboinicus* Lour capsule (CC) containing 90 % dry extract of CC plant and 10 % filler and was registered for sale in Indonesia

## 2.2. Design study

This study was conducted between Oktober 2017 – Oktober 2018, and was a double-blind design, randomized controlled clinical trial, conducted in woman with hypercholesterolemia in Cawang East Jakarta, Indonesia. The Ethics Committee of the Faculty of Medicine, Christian University of Indonesia, East Jakarta, Indonesia reviewed the research protocol used and approved it (Reg. no. 127/PT02. FK/ETIK/2012).

Inclusion criteria for all woman was long-term treatment by Torbangun (*Coleus amboinicus* Lour) leaf aqueous extract in woman with hypercholesterolemia with an increased TC > 200 mg/dL, aged over 30 years and willing to give informed consent. Exclusion criteria were suffering from other confounding diseases, including chronic inflammatory diseases, acute infections.

Thirty woman were randomly assigned into two groups: CC group and the PC group. This study was a randomized double-blind placebo-controlled clinical trial, with 30 subjects placed in two groups, viz, experimental (CC group) and placebo (PC group). The first group received one capsules of CC (each capsule contains 500 mg extract) while the second group received one capsules of placebo (comprised of 500 mg fillers) one times daily, for 30 days for both groups. TC was measured by Autocheck, multi monitoring system. The body mass index, and compliance of all the subjects were assessed using a questionnaire at the end of study. Blood samples were collected twice at baseline and day 30 of study. The values of UA was determined from blood cholesterol. The UA was measured using methods by assays an automated chemistry analyzer.

## 2.5. Statistical analysis:

The collected data were analyzed using the statistical software SPSS, version 22. (SPSS Inc., Chicago, IL, USA) and the results were expressed as the mean  $\pm$  SD. The changes in anthropometric measurements and blood parameters of the participants between the beginning and end of the trial were compared by paired sample t test with 95% significance level. Differences between the data were considered significant at  $P < 0.05$ .

## III. RESULTS

All the woman with hypercholesterolemia (15 woman in CC group and 15 woman in PC group) completed the study (Fig.1). Compliance was good, with all the Torbangun leaf aqueous extract capsule prescribed being consumed during the study period. No side effects were reported from participants during the study period.

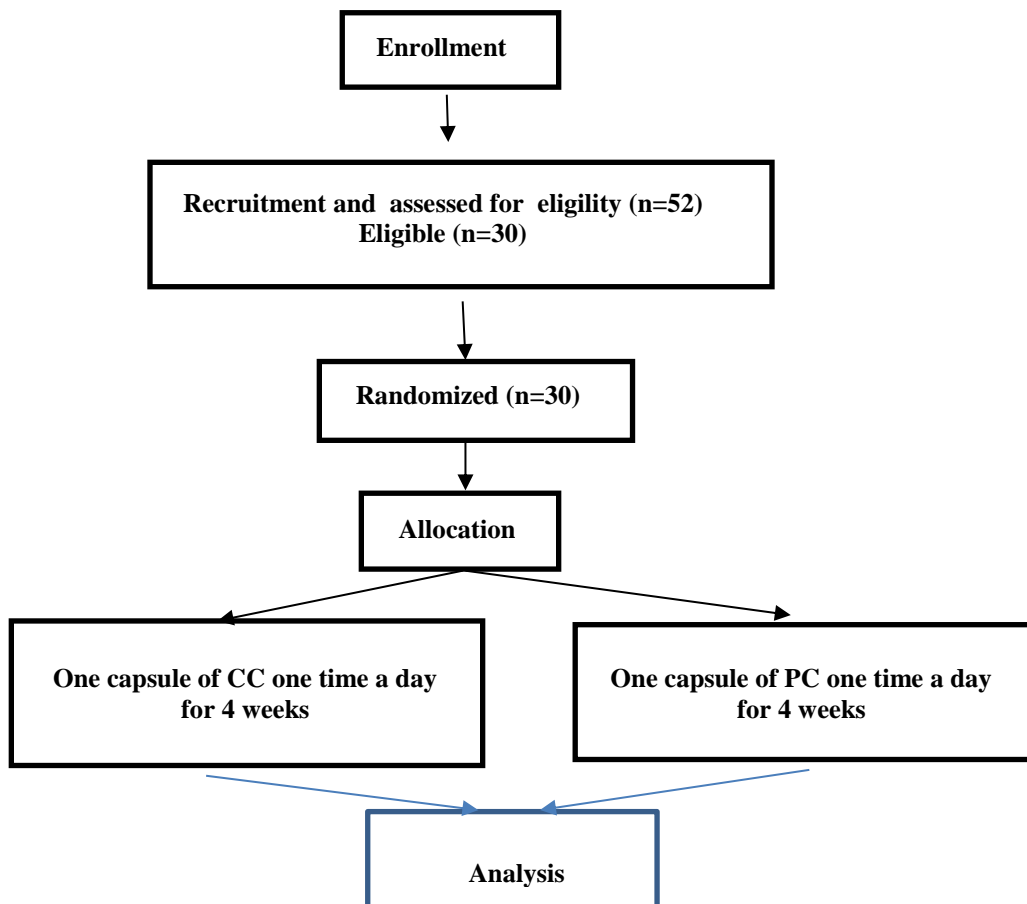


Figure 1. Participant’s flow diagram

Biochemical and general characteristics of participants at the beginning and end of the study are shown in Table 1. There were no significant differences between group in BMI and BP in the beginning of the study and after 4 weeks of intervention ( $p= 0.151$ ) and ( $p=0,989$  and  $p=0,675$ ). Uric acid and total cholesterol levels significantly change in CC group after intervention compared to their baseline value ( $p=0,001$  and  $p=0.000$ ), are shown in Table 2.

Table 1

BMI, TC, UA and BP Characteristics of the woman with hypercholesterolemia at baseline and after intervention

Variabel		Mean	N	Std. Deviation
BMI	Before	25.298	15	3.500
	After	24.612	15	3.805
UA	Before	6.267	15	1.222
	After	5.640	15	1.202
TC	Before	258.800	15	28.917
	After	224.333	15	35.361
BP Sistol	Before	137.133	15	16.221
	After	137.200	15	12.924
BP Diastole	Before	78.267	15	8.216
	After	79.533	15	8.114

BMI: body mass index; TC: Total Cholesterol, BP: Blood Pressure; SD: Standard Deviation

Base on results of BMI, UA and TC respondents there were decreased, but BP levels were slightly increased. The changes in BMI, BP, TC and UA between the beginning and end of the trial were compared by paired samples t test.

Table 2. Paired samples t test

Hipotesis	Paired Differences		t	df	Sig. (2-tailed)	Result
	Mean	Std. Deviation				
BMI_before - BMI_After	.686	1.751	1.519	14	0.151	No Significant
UA_before - UA_After	.627	.555	4.375	14	0.001	Significant
TC_before - TC_After	34.467	20.815	6.413	14	0.000	Significant
BP sistole_Before – BP sistole_After	-.067	17.950	-.014	14	0.989	No Significant
BP diastole_Before – BPdiastole_After	-1.267	11.467	-.428	14	0.675	No Significant

BMI: body mass index; TC: Total Cholesterol, BP: Blood Pressure; SD: Standard Deviation

Table 2 illustrated changes in paired samples t test, the levels of BMI, UA, TC and BP of studied group and during 4-weeks period of study. No significant differences were in BMI and BP between two study groups. The results show that there were significant decrease in UA and TC on day 30, compared to control (P group). In CC group, the capsules strongly significant reduction in UA levels ( $p < 0.05$ ).

#### IV. DISCUSSION

The development of renal diseases may have a direct role of uric acid. Oxonate, a selectively competitive uricase inhibitor, blocks the effect of hepatic uricase, and produces hyperuricemia in rodents [9]. The aim of the present study is to investigate the hypouricemic effect of Torbangun aqueous extract on the uric acid level in women with hypercholesterolemia. This randomized, double-blind, placebo-controlled 4-week trial represents a uric acid comparison between women with hypercholesterolemia individuals taking a 500 mg/day of Torbangun leaf aqueous extract capsule (CC) versus a placebo group (PC). The biomarkers examined included uric acid, total cholesterol, and blood pressure. Body mass index was measured of body fat based on height and weight that applies to women. The present study was conducted to assess the antihyperuricemic activity of Torbangun leaf aqueous extract in women with hypercholesterolemia. However, of these 52 volunteers, 22 could not participate throughout the entire study period and were excluded from the study. The remaining 30 volunteers were assigned to either the control or trial group. The volunteers in both groups were also given information/educational intervention from the physicians and gave informed consent. None of the volunteers had either diabetes, hypertension, hepatic or renal diseases. All of the volunteers in both groups were educated on diet control and doing exercises. Therefore, it could be considered that there were similarities between the volunteers assigned to each group.

This work also indicates that the capsule extract, especially the dose of 500 mg after 4 weeks of intervention produced more alleviating effects. This observation confirms the fact that Torbangun leaf aqueous extract capsules of plants are generally known for their high contents in chemical compounds capable of producing biological activities [10]. With regard to the lowering of uric acid concentrations in women with hypercholesterolemia, it could be proposed that Torbangun may act by (1) stimulating biological activity by producing satiety and reducing food intake [11], (2) polyphenols and a water extract of these polyphenols exhibited cholesterol-lowering abilities *in vitro* and *in vivo* [12], (3) reduce the re-absorption of bile cholesterol [13], (4) reduce uric acid production. Based on results of body mass index, no significant decrease, and the blood pressure of systole and diastole levels were slightly increased, but the uric acid and total cholesterol level of respondents there were strongly significantly decreased.

Studies are warranted to evaluate the effect of Torbangun leaf aqueous extract on humans with hyperglycemia. Despite *in vitro* and *in vivo* evidence of the uric acid and cholesterol-lowering benefits of polyphenols, there is not enough clinical evidence to support these results. Therefore, it is important for additional studies to be conducted to detect the specific mechanisms of polyphenols for lowering uric acid and cholesterol. These alleviating effects clearly denote the antihyperuricemic and antihypercholesterolemic potential of Torbangun. It could also be suggested that the effect of Torbangun leaf aqueous extract capsules pass through a decrease in intestinal cholesterol absorption or a decrease in the biosynthesis of cholesterol specifically by decreasing the activity of HMG-CoA reductase inhibitors and the AMP deaminase product, uric acid [14]. Although Torbangun leaf aqueous extract revealing antihyperuricemic potential, further phytochemical investigations are needed to identify their active constituents.

#### V. CONCLUSION

In conclusion, the present study indicates treatment of women with hypercholesterolemia by administration of Torbangun (*Coleus amboinicus* Lour) leaf aqueous extract capsule, for four consecutive weeks could restore the biotransformation by shifting the balance of uric acid and cholesterol metabolism. The extract showed significant antihyperuricemic with very crucial effects on cholesterol levels.

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#### CONFLICTS OF INTEREST DISCLOSURE

None of the authors have any conflict of interests associated with the study. A conclusion section is not required. Although a conclusion may review the main points of the paper, do not replicate the abstract as the conclusion. A conclusion might elaborate on the importance of the work or suggest applications and extensions.

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