

## The Effect of God's Crown Fruit Extract and Cinnamon Extract On Decrease Total Cholesterol Levels In Rats White Male

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### ABSTRACT

*God's Crown contains chemicals that can cure various diseases including detoxification, anti-bacterial, anti-viral, lowering sugar levels, blood clotting in the body, anti-inflammatory, anti-oxidant, reducing fat deposits and cholesterol content in blood vessel walls. Cinnamon bark can lower blood glucose levels, total cholesterol, and triglyceride levels, and on the other hand can increase HDL levels. The purpose of this study was to determine the effect of giving God's Crown Fruit Extract (Phaleria macrocarpa (Scheff.) Boerl) and Cinnamon Extract (Cinnamomum burmanii) on the reduction of total cholesterol levels in male white rats (Rattus norvegicus). The research method was Experimental Laboratory which was carried out at the Pharmacology and Phytochemical Laboratory, Faculty of Mathematics and Natural Sciences, Pancasakti University. The method used was propylthiouracil induction and high fat administration by measuring total cholesterol levels in male white rats using a glucometer. 15 male rats used were divided into 5 groups, namely negative control (CMC.Na 1% w/v), God's Crown Fruit Extract and Cinnamon Extract, God's Crown Fruit Extract 0.6% w/v, Wood Extract Sweet 1.2% w/v, positive control (Atorvastatin). Observations on the decrease in total cholesterol levels were carried out 1 day after treatment. Based on the results of the analysis using ANOVA with SPSS 25, the percentage reduction in total cholesterol levels showed that the administration of God's Crown fruit extract and cinnamon extract, God's Crown fruit extract 0.6% w/v, cinnamon extract 1.2% w/v, and atorvastatin showed the effect of reducing total cholesterol levels in male white rats and the administration of the fruit extract of God's Crown and cinnamon extract which showed the best effect on reducing total cholesterol levels in male white rats.*

**Keywords:** Cholesterol, cinnamon, god's crown fruit

### INTRODUCTION

Cholesterol is a lipid derivative belonging to steroids. In the blood there are two forms, namely two-thirds in the form of esterified with fatty acids and one third in the form of free cholesterol. Cholesterol levels in the body depend on the balance of intake from food, synthesis in tissues and excretion in the liver. The bad effect of cholesterol is to accelerate the process of atherosclerosis in the blood vessels so that the blood vessels will be thickened, stiff and easily clogged (Zilva and Pannall, 2015). Atherosclerosis is a disease that can cause myocardial infarction and stroke. The main factor in atherosclerosis is an increase in plasma/serum cholesterol levels, and more specifically the LDL:HDL cholesterol ratio. Reduction or treatment in order to maintain a normal cholesterol level by using chemical drug therapy that is consumed in the long term will cause more dangerous effects. For this

reason, it is very necessary to look for alternative drugs that are relatively safe (Ganiswara, S., 2016).

God's Crown is one of the traditional plants originating from Papua but currently there are many in Yogyakarta and Solo, because the people of Solo and Yogyakarta have maintained it as a plant that is considered an heirloom of the God's because the fruit of the crown of the god can cure various diseases (Dewanti, Wulan and Nur, 2005).

The crown of the God's (Phaleria Macrocarpa (scheff.) Boerl) is a source of flavonoids that have the potential to lower total cholesterol levels. It is also known that this god's crown fruit is rich in other chemical compounds such as saponins, polyphenols, tannins, and essential oils. (Ning, 2004).

Previously conducted research by (Rochmah, 2008) with the title "The potential of extracts of the crown of the God's (Phaleria macrocarpa)

as an antioxidant in regulating the blood lipid profile of mice". The results showed that with a dose of 100 mg/kg BW, it can reduce total cholesterol levels, so it can be used as a reference in research.

Cinnamon (*Cinnamomum burmanii*) is also one of the plants used as a spice, apart from being a spice, cinnamon is also a plant that has a variety of active substances to lower high cholesterol levels. According to Soemardini et al (2011), cinnamon (*Cinnamomum burmanii*) has been studied several times to reduce blood glucose levels, total cholesterol, and triglycerides, on the other hand it can increase HDL levels. Cinnamon bark contains flavonoids, alkaloids, essential oils and tannins consisting of benzaldehyde, polyphenols, camphor, eugenol, cefrol, terpene cinnamaldehyde, cinamylacetate, sincol, citral, citronellal, (Pratiwi, 2011). Previously, a cinnamon extract research conducted by Azima (2004) stated that a dose of 200 mg/kg BW could reduce total cholesterol levels, so the researchers used this dose as a reference in this study.

The use of a combination of the crown of the God's and cinnamon will have a better impact, which will strengthen its properties in reducing cholesterol levels. The high prevalence of the disease due to the consumption pattern of people who are high in fat and the discovery of medicinal plants that have many health benefits have made this research want to know the effect of giving extracts of the crown of the God's (*Phaleria macrocarpa* (Scheff.) Boerl) and cinnamon extract (*Cinnamomum burmanii*) on the decrease in blood sugar levels. cholesterol.

## OBJECTIVE

The purpose of this study was to determine the effect of the extract of the fruit of the crown of the god's (*Phaleria macrocarpa* (Scheff) Boerl) and the extract of cinnamon (*Cinnamomum burmanii*) on total cholesterol levels in male white rats.

## METODE

This study was a laboratory experimental study, to determine the effect of giving extracts of the crown of the God's (*Phaleria macrocarpa*

(Scheff) Boerl) and cinnamon extract (*Cinnamomum burmanii*) on total cholesterol levels in male white rats. God's Crown fruit extract was made into a suspension with a dose of 0.6% w/v. The way of making the suspension is that the dried extract of the crown of the god fruit is weighed as much as 600 mg, crushed in a mortar while adding 1% w/v Na.CMC suspension little by little to 100 ml. In the same way, a suspension of cinnamon extract was made at a dose of 1.2% w/v by weighing 1200 mg of cinnamon extract.

15 male white rats (*Rattus norvegicus*) were divided into 5 groups (each group consisted of 3 animals placed in cages. Before being treated, male white rats were fasted for 3-4 hours, then their body weights were weighed, cholesterol levels were measured). total blood initially using a glucometer. Blood was taken through the tail vein. Male white rats were given a cholesterol diet with high fat and drinking water containing propylthiouracil for 2 days to get a hypercholesterolemic condition. Then blood samples were taken to determine cholesterol levels, then examined the levels of cholesterol cholesterol on day 3 for all groups, (Hypercholesterolemia). In group 1 were given the treatment of 1% w/v Na.CMC as a negative control, group 2 was given fruit extract of God's Crown and cinnamon extract, group 3 was given treatment with fruit extract Dewa's crown 0.6%w/v, group 4 was given treatment Cinnamon extract 1.2% w/v, group 5 as a positive control was treated with atorvastatin. Cholesterol levels were checked using cholesterol strips.

The data obtained from the observations will be processed using SPSS software with the Analysis of Variance (ANOVA) test.

This research was carried out in March 2021 at the Pharmacognosy-Phytochemical Laboratory Department of Pharmacy Pancasakti University and Pharmacy Biology Laboratory of the Pharmacy Department of the Sandi Karsa Polytechnic.

## RESULTS

Based on the results of the study, the effect of giving extracts of the crown of the God's (*Phaleria macrocarpa*) and cinnamon extract

(*Cinnamomum burmanii*) on the reduction of total cholesterol levels in male white rats (*Rattus norvegicus*) was obtained as follows:

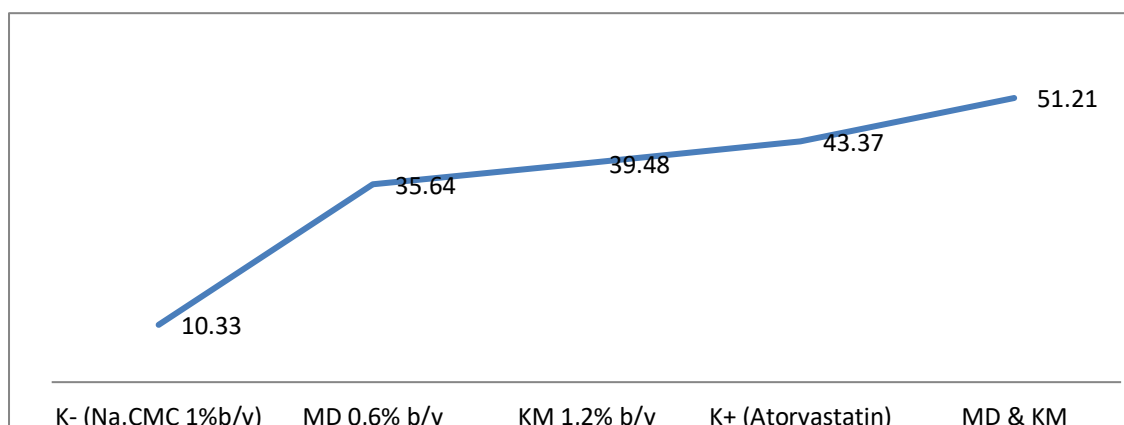
**Table 1.** The results of the effect of giving extracts of the crown of the god's (*Phaleria macrocarpa*) and cinnamon extract (*Cinnamomum burmanii*) on the reduction of total cholesterol levels in male white rats (*Rattus norvegicus*)

Treatment	Replication	Cholesterol levels in the blood mg/dl		
		Initial cholesterol measurement	Post-induction cholesterol measurement	Final cholesterol measurement
Negative control (CMC.Na 1% w/v)	1	127	252	236
	2	139	236	211
	3	136	221	190
Extract of God's Crown Fruit and Cinnamon	1	106	226	112
	2	134	250	111
	3	131	208	109
God's Crown fruit extract 0.6% w/v	1	103	220	150
	2	89	167	115
	3	85	182	102
Cinnamon extract 1.2% w/v	1	139	227	126
	2	136	180	119
	3	110	227	136
Positive control (Atorvastatin)	1	115	178	105
	2	121	186	111
	3	110	207	106

**Table 2.** Percentage of decrease in total cholesterol levels after treatment in white rats

Replication	Treatment				
	CMC.Na 1% w/v	Extract of God's Crown Fruit and Cinnamon	God's Crown fruit extract 0.6% w/v	Cinnamon extract 1.2% w/v	Atorvastatin
1	6.35	50.44	31.82	44.49	41.01
2	10.59	55.6	31.14	33.88	40.32
3	14.03	47.59	43.95	40.08	48.79
Total	30.97	153.63	106.91	118.45	130.12
Average	10.33	51.21	35.64	39.48	43.37

**Figure 1.** Graph of percentage reduction in total blood cholesterol levels of male white rats



MD (God's Crown), KM (Cinnamon)

## DISCUSSION

Hyperlipidemia is a high level of fat in the blood. Hyperlipidemia indicates a condition where there is an excess of fatty substances, namely lipids, mostly triglycerides and cholesterol in the blood. Hyperlipoproteinemia is an increase in the concentration of lipoprotein macromolecules that carry lipids in plasma, plasma lipid abnormalities can cause a very bad influence (predisposition) to peripheral arterial disease, coronary, cerebrovascular,

This study examines the effect of giving extracts of God's Crown Fruit (*Phaleria macrocarpa*) and Cinnamon Extract (*Cinnamomum burmanii*) on reducing total cholesterol levels in male white rats, using 15 rats as test animals which were given appropriate treatment and the volume of oral administration.

To see how big the effect of reducing total cholesterol levels for the God's Crown fruit and cinnamon, an oral hyperlipidemia drug, atorvastatin, was used as a comparison. Before treatment, white rats were fasted for 3-4 hours but drinking water was still given. This is so that there is no food intake that can affect the testing process, while the administration of PTU is intended as an inducer to raise the total blood cholesterol levels of white rats above normal values or are in a state of hyperlipidemia, PTU works to inhibit the synthesis of thyroid hormone (thyroxine). The thyroxine hormone has the effect of lowering cholesterol levels, so that the inhibition of the thyroxine hormone by PTU will cause an

increase in total cholesterol levels in the blood. Male rats were chosen because they have a small amount of the hormone estrogen and are more stable when compared to female rats that produce the hormone estrogen which can affect fat and cholesterol metabolism so that it will affect the lipid profile.

Based on the results of the study, it can be seen that when giving God's Crown Fruit Extract and Cinnamon Extract, God's Crown Fruit Extract 0.6% w/v, Cinnamon Extract 1.2% w/v, there was a percent decrease in the average total cholesterol level of each. - respectively 51.21%, 35.64%, 39.48%, while the administration of atorvastatin suspension decreased cholesterol by 43.37%, the most optimal decrease in total cholesterol levels was after administration of extracts of the fruit of the crown of God's and cinnamon although others are also efficacious as lowering total cholesterol but lower effect, when compared to other groups.

The flavonoids contained in the God's Crown fruit extract and cinnamon extract occur which are analogous to the substrate, namely HMG-CoA which is converted into mevalonic acid by the HMG-CoA reductase enzyme. This shows that flavonoids act as competitive inhibitors with HMG-CoA, so that HMG-CoA reductase enzymes are more likely to bind to flavonoids, and reduce the formation of mevalonic acid which acts as cholesterol biosynthesis.

The research data above was processed using the IBM SPSS 25 program. The first analysis was the Shapiro-wilk method to determine the normality of the data and the p/sing values were

0.885 (negative control), 0.685 (God's crown fruit extract and cinnamon extract), 0.090 (fruit extract and cinnamon extract). God's Crown 0.6%), 0.815 (Cinnamon Extract 1.2%), 0.140 (positive control) which means that if the p/sing value > 0.05 then the data is normally distributed. Then the homogeneity test of variance (Levene test) was carried out, the p/sing value obtained was 0.604, because the p/sing value > 0.05, the data was homogeneity. Because the data obtained are normally distributed and have homogeneity, they are eligible for parametric statistical analysis ANOVA (Analysis of Variance) from the analysis with ANOVA, the p/sing value obtained is 0.000, meaning that there is an effect of giving God's Crown fruit extract and cinnamon extract to decrease cholesterol levels. total against male white rats. Therefore, it was continued with a follow-up test (Post hoc test), namely the LSD test.

The further LSD test obtained showed that the co-administration of the God's Crown fruit extract with cinnamon extract and a positive control (atorvastatin) was non-significant (not significantly different), as well as a single extract of God's Crown fruit 0.6% w/v and extract Cinnamon single 1.2% w/v both groups were non-significant. However, on histograms and graphs, co-administration of the fruit extract of God's Crown with cinnamon extract showed an optimal decrease in total cholesterol levels compared to the positive control (atorvastatin).

## CONCLUSION

1. Administration of God's Crown fruit extract (*Phaleria macrocarpa*) and cinnamon extract (*Cinnamomum burmanii*), single extract of crown of god fruit (*Phaleria macrocarpa*) 0.6% w/v, single extract of cinnamon (*Cinnamomum burmanii*) 1.2% b /v and atorvastatin showed the effect of reducing total cholesterol levels in male white rats (*Rattus norvegicus*).
2. Co-administration of God's Crown fruit extract (*Phaleria macrocarpa*) with the extract of cinnamon (*Cinnamomum burmanii*) showed the effect of lowering total blood cholesterol levels was greater

than that of atorvastatin, namely 51.21% while atorvastatin was 43.37% in male white rats (*Rattus norvegicus*).

## REFERENCES

- Azima, F. 2004. *Potensi Anti-Hiperkolesterolemia Ekstrak Cassia vera (Cinnamomum burmanii)*". Fakultas teknologi pertanian IPB Darmaga Bogor.
- Agoes, G, 2012. *Sediaan Farmasi Liquidida-Semisolida (SFI-7)*, Penerbit ITB Bandung.
- Artayanti, P.R, 2014. Efektivitas Antibakteri Ekstrak Buah Mahkota Dewa (*Phaleria macrocarpa*) Sebagai Bahan Alternatif Sterilisasi Saluran Akar Gigi Terhadap Bakteri Mix Saluran Akar Gigi. Fakultas kedokteran Gigi Universitas Mahasaraswati, Denpasar.
- Anies, 2015. *Kolesterol & Penyakit Jantung Koroner*. Jogyakarta: Ar-Ruzz Media.
- Budhi akbar, 2010,"Tumbuhan dengan Kandungan Senyawa Aktif yang Berpotensi Sebagai Antifertilitas" Adabias Press: Jakarta.
- Dewanti, T,W, 2005, Aktivitas Antioksidan dan Antibakteri Produk kering, Istan dan Effervescet dari Buah Mahkota Dewa (*Phaleria macrocarpa*). Fakultas Teknologi Pertanian UNIBRAW, Malang.
- Departemen Kesehatan RI, 2011."Suplemen II Farmakope Herbal Indonesia, Edisi I". Departemen Kesehatan RI : Jakarta.
- Setiawan Dalimartha, 2009. *Tanaman Berkhasiat Obat di Indonesia*. Pustaka Bunda, Jakarta.
- Ganiswara , G, S., 2016."Farmakologi dan terapi, Edisi v."Penerbit Fakultas Kedokteran Universitas Indonesia, Jakarta.

- Hidayat, S Dan Napitupulu, R., 2015. "Kitab Tumbuhan Obat." Agriflo. Jakarta
- IT IS Report, *Cinnamomum burmanii*., Taxonomic serial No:501525.
- Hasanah, A, 2013, Budidaya Mahkota Dewa. Fakultas Pertanian Universitas Brawijaya, Malang.
- Hanani, E, 2016. "Analisis Fitokimia" Penerbit Buku Kedokteran EGC; Jakarta
- Kurdi, A, 2010, "Tanaman Herbal Indonesia" Cara mengolah dan Manfaatnya bagi Kesehatan.
- Katzung, Bertram G. 2015. Farmakologi dasar dan klinik edisi 12 Vol 2. Penerbit Buku kedokteran EGC; Jakarta.
- Kemenkes, RI, 2014, Farmakope Indonesia Edisi V. Direktorat Jenderal Bina Kefarmasian Dan Alat Kesehatan. Jakarta.
- Malole, M. B. M dan Pramono. C. S. U. 1989. Penggunaan Hewan-Hewan Percobaan di Laboratorium. Penelaah : Masduki Partad Departemen P dan K. Direktorat Jenderal Pendidikan Tinggi, Pusat Antar Universitas bioteknologi, IPB, Bogor.
- Ning, Hermanto., 2004. "Mahkota Dewa Obat Pusaka Para Dewa." Jakarta :Ago Media Pustaka.
- Poedjiadi A. 2012. Dasar-Dasar Biokimia. Penerbit Universitas Indonesia. Jakarta.
- Pratiwi, I.Y. 2011."Pengaruh Variasi Maltodekstrin Terhadap Kualitas Minuman Serbuk Instan Kayu Manis (*Cinnamomum burmanii*).” Skripsi: Yogyakarta: UAJY.
- Rochmah.K.2008."Potensi Ekstrak Mahkota Dewa (*Phaleria macrocarpa*) Sebagai Antioksidan Dalam Pengetahuan Profil Lipid Darah mencit". Fakultas Kedokteran Hewan Universitas Erlangga. Surabaya.
- Soemardini, N.F.A. dari Heniawan.M. 2011."Pengaruh Bubuk Kayu Manis (*Cinnamomum burmanii*) Terhadap Kadar Kolesterol Rattus novergicus Strain Wistar Type 2- Diabetes." Artikel tugas akhir fakultas kedokteran Brawijaya 1(1) 1:8.
- Sriyuti, N., 2011. "Efek Air Perasan Daun Sambung Nyawa (*Gynura procumbens*) Terhadap Penurunan Kadar Kolesterol Darah Mencit."
- Tjay H. T. dan Kirana, R. 2013. Obat- obat penting Khasiat penggunaan dan Efek-efek Sampingnya. Edisi 6. PT. Elex Media Komputindo. Kelompok Gramedia Jakarta.
- Tjay, T. H dan Rahardja, K. 2012.Obat-obat Penting, Edisi ke V. PT. elex Media Komputindo. Jakarta.
- Van Steenis, C. G. G. J. 2008. Flora (Untuk Sekolah di Indonesia) Cetakan ke-12 Jakarta Pradnya Paramita.
- Wati, T,R, 2007, Uji Aktivitas Hasil Penyarian Biji Mahkota Dewa (*Phaleria macrocarpa*) Terhadap Beberapa Mikroba penyebab Infeksi Kulit. Fakultas Farmasi Universitas Padjajaran.
- Yulinah, 2013 "Iso Farmakoterapi" PT. ISFI Penerbitan; Jakarta.
- Zilfa, JF& Panall, PR., 2015. "Clinical Chemistry In Diagnosis And Treatment Third Edition, Year Book Publisher, Inc, Chicago."

