

## Alternative Medicine 2017: Anti-cholesterol activity, in vivo test and the toxicity test of multifunction herbs- Dewi Tristantini- University of Indonesia

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Atherosclerosis is the hardening of the arteries due to cholesterol accumulation in the blood vessels. The occurrence of cardiovascular disease can be reduced by lowering cholesterol levels in the blood. But, using some pharmaceutical synthetic medicine for lowering the cholesterol has several side effects that are dangerous for physical body. There are three plants, tanjung leaf (*Mimusops elengi* L.), carambola leaf (*Averrhoa carambola* L.), and curcuma (*Curcuma xanthorrhiza* L.), which are combined empirically believed would function a multifunction herbs. According to Tristantini et al., 2015, tanjung leaf have antioxidant, anti-cholesterol and anti-platelet activity, also carambola leaf have anti-hyperglycemia activity. Furthermore, curcuma has been known as a hepatoprotector agent. In this study, the combination of all three will be used as anti-cholesterol. Anti-cholesterol activity test by in vivo method using mice (*Mus musculus* L.) leads to decreasing cholesterol the maximum amount as 46.5% for 250 mL dosage in 7 days. This performance equals to 73% of Simvastatin activity in decreasing cholesterol. The toxicity test by *Artemia salina* Lethality Test (BSLT) method shows that the herbs extract doesn't have toxic effect with LC50 3865,6 µg/mL. That means these herbs extract are often used as natural anti-cholesterol agent and safe to be consumed.

### Methods:

#### Collection & Preparation:

The fresh leaves of tanjung (*M. elengi*), and sweet star fruit (*A. carambola*) were collected from mature tree growing in Universitas Indonesia, Depok. The curcuma was collected from the vendor. These leaves were picked from the stalk; the leaves and rhizome were washed using water to clean the dirt, dust and soil. The curcuma rhizomes were thinly sliced. Then, they were dried by oven in 50°C. Finally, the dry leaves and rhizome was powdered using crusher and were separated using 10 mesh sieves. Each leaf was washed and dried separately. The fine powder was called as powdered simplicia and stored in an airtight glass container separately at room temperature.

#### Multifunction herb formulation:

Formulation of multifunction herbs was based on empirical experience that has proven efficacy (empirical) consisting of X\* grams of tanjung leaf powdered simplicia, Y\* leaf sweet star fruit powdered simplicia, and Z\* grams of curcuma powdered simplicia in 600 mL of water.

#### Extraction and spectrometry analysis:

A total of 600 mL of distilled water put into the boiling flask, and then the whole powdered simplicia put into the boiling flask. The extraction process using reflux method that uses the principle of condensation, the sample and solvent incorporated into three-neck flask which was heated, so that the solvent was condensed continuously due to the flow of refrigerant in the condenser. The extraction process was done with a temperature of about 80-85°C for drugs of crude drug extract. Furthermore, the herbal extracts were stored in the refrigerator for the next test. Spectrometry UV-Vis analysis was measured at wavelength 275 nm using filtrates with dilution factor the maximum amount as 10 levels. The result was compared with catechin as standard compound.

#### Anti-cholesterol test:

Experimental mice, acclimated for a week, were provided water ad libitum (for drink as usual). The mice divided in 6 groups containing 5 animals each group. Normal control group (NC) was given standard feed. Hyperlipidemia group as negative control (NeC) was given cholesterol inducing solution without anti-cholesterol. Positive control group (PC) was given cholesterol inducing solution and the multifunction herbs as herbal anti-cholesterol. The treated groups were given cholesterol inducing solution and multifunction herbs as herbal anti-cholesterol. The treated groups (TE) divided into three dosages. First treated group (TE1) was given 150 mL human dosage, and it was converted to mice dosage as much as 0.39 mL per day, per oral. Second treated group (TE2) was given 200mL human dosage, and it was converted to mice dosage as much as 0.53 mL per day, per oral. Third treated group (TE3) was given 250 mL human dosage, and it was converted to mice dosage as much as 0.65 mL per day, per oral. NeC, PC, and TE induced with 0.4 ml cholesterol per day for 2 weeks. After cholesterol induction, PC received simvastatin (0,45 MI/20-gram body weight, per oral) and TE received multifunction herbs extract 0.39, 0.53, 0.65 ml per oral once a day for 7 days. Determination of total cholesterol from mice blood was observed at day-0 (t0), day-14 (t14) or after cholesterol induction and day-21 (t21) or at the end of test.

#### Conclusion:

The catechin composition in multifunction herbs in 17, 78 mg/g simplicial, that greater than oolong tea, black tea, pu-erh tea, and tanjung leaf. Multifunction herbs extract at low and mid dosage hadn't effective yet to decreasing cholesterol. Multifunction herbs extract in high dosage as much as 250 mL hu-

man dosage, once per day (TE3) could decrease total cholesterol by 47% in 7 days, and it equals to 73% simvastatin performance in decreasing cholesterol. Based on this study, multifunction herbs that consists of tanjung (*Mimusops elengi* L.) leaf, star fruit ( *Averrhoa carambola* L.) , and curcuma (*Curcuma xanthorrhiza* L.) extract had efficacy to be a new medicine of cholesterol decreasing from natural source and minimal side effect.

For further study, we would elaborate this study with study about toxicity and safety herbs extract using brine shrimp lethality test (BSLT) and using the higher animal test such as rat, rabbit, or pig. We hope from this collaboration we can make the standardized herbal of multifunction herbs which can decrease cholesterol as well as statin groups.