

## ABSTRAK

Purnomo, Athaya Febriantyo. 2015. **Pengaruh Ekstrak Kulit Manggis (*Garcinia mangostana*) terhadap Daya Tahan Hidup, Laju Penetasan, dan Kecacatan pada Embrio Ikan Zebra (*Danio rerio*)**. Tugas Akhir, Fakultas Kedokteran Universitas Brawijaya. Pembimbing: (1) Prof. Dr. Moch. Aris Widodo, MS, Sp. FK, Ph.D (2) Husnul Khotimah, S.Si, M.Kes

*Garcinia mangostana* (manggis) memiliki berbagai manfaat, oleh karena berbagai bahan aktif di dalamnya. *Garcinia mangostana* dipercaya sebagai raja antioksidan di Indonesia, namun sebagaimana yang diketahui bahwa obat memiliki ambang batas dan efek toksik. Ketika terlalu banyak mengkonsumsinya, bisa menciptakan gangguan dalam metabolisme tubuh antara lain hemolisis, peningkatan limfosit, penurunan massa liver dan ginjal. *Danio rerio* (Ikan zebra) memiliki 70% kesamaan terhadap manusia dan digunakan sebagai hewan coba untuk uji toksisitas. Penelitian ini bertujuan untuk mengamati daya tahan hidup, laju penetasan, dan kecacatan pada embrio ikan zebra yang diberi ekstrak kulit manggis.

Studi eksperimental menggunakan embrio ikan zebra ditempatkan di 6-Well *plate*, setiap Well diisi dengan 30 embrio dengan tiga macam konsentrasi ekstrak kulit manggis 1250, 1000, dan 750  $\mu\text{g}/\text{mL}$  yang diamati tiap 24 jam selama 3 hari. Penelitian dilakukan triplikasi.

Hasil penelitian menunjukkan bahwa pada konsentrasi 1250  $\mu\text{g}/\text{mL}$  (ekstrak kulit manggis), daya tahan hidup embrio ikan zebra pada triplikasi 0% pada 24 *hpf* (*hour post fertilization*). Pada konsentrasi 1000  $\mu\text{g}/\text{mL}$ , didapatkan rerata tingkat daya tahan hidup embrio  $31,33 \pm 5,13\%$ . Pada konsentrasi 750  $\mu\text{g}/\text{mL}$  didapatkan rerata tingkat daya tahan hidup sebesar  $77,33 \pm 10\%$ .

Laju penetasan hanya dapat diamati pada kelompok kontrol. Konsentrasi lethal ekstrak kulit manggis dicapai pada 716,651  $\mu\text{g}/\text{mL}$  dengan dasar penentuan konsentrasi menggunakan analisis Probit. Kecacatan ditemukan mulai konsentrasi 750  $\mu\text{g}/\text{mL}$  pada pengamatan 72 *hpf*, kecacatan yang teramati berupa bentuk *curve-shaped*, perikardium robek, detak jantung tidak terdeteksi meskipun pigmentasi telah terbentuk pada sebagian kulit embrio, perikardium membesar, dan denyut jantung tidak terdeteksi karena rongga perikardium keruh.

Kata kunci : Ekstrak etanolik kulit manggis, antioksidan, toksisitas, *Danio rerio*.

## ABSTRACT

Purnomo, Athaya Febriantyo. 2015. **Mangosteen (*Garcinia mangostana*) Pericarp Ethanolic Extract Acute Effect of Zebrafish (*Danio rerio*) Survival Rate, Hatching Rate, and Defect.**

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*Garcinia mangostana* (Mangosteen) has a wide range of benefits, perhaps most result from xanthone phytochemicals/antioxidants. *Garcinia mangostana* perceived in Indonesia as the king of the antioxidant, however we already know that every potent medication has a limitation on use and toxic level. The toxic level perceived to be the effect of other phytochemical compound, named mangostin, that responsible for the mortality and morbidity mechanism of the animal model. Reported effect of the overconsuming mangosteen pericarp extract such as metabolic disorders, hemolysis, lymphocytosis, and decrease of liver and kidney masses. The purpose of this study is to know the acute toxicity level in terms of mortality rate, lethal concentration, and the teratogenic effect of mangosteen pericarp ethanolic extract toward zebrafish embryos.

Experimental study used zebrafish embryos placed in 6-Well, each well contained 30 embryos divided in 4 groups, there were three groups were given standardized mangosteen pericarp ethanolic extract (1250, 1000, 750  $\mu\text{g/mL}$ ) and one control group was given with physiological embryonic medium which observed every 24 hours for 3 days and the study repeated three times. Zebrafish (*Danio rerio*) has 70% autologous toward human, therefore zebrafish also being used for toxicity test toward natural compound. The extract was given on 2 hpf (hour post-fertilization).

The results show that on 1250  $\mu\text{g/mL}$  concentration of mangosteen pericarp ethanolic extract, survival rate reaches 0% at three times repetition of the study since 24 hpf. At 1000  $\mu\text{g/mL}$  concentration, the average of survival rates reach  $31,33 \pm 5,13\%$ . At 750  $\mu\text{g/mL}$  concentration, the average of survival rates reach  $77,33 \pm 10\%$ . We were using SPSS Ver.22 program for Probit Analysis, the lethal concentration for half population ( $\text{LC}_{50}$ ) of mangosteen pericarp ethanolic extract was reached at 716,651  $\mu\text{g/mL}$ .

Heart rate can observed only in control group. Lethal concentration 50 ( $\text{LC}_{50}$ ) reach at 716,651  $\mu\text{g/mL}$ . Defects were found at 750  $\mu\text{g/mL}$  concentration at 72 hpf observation, in the forms of curved-shape body, broken or enlarged pericardium, and undetected heart rate because the pericardium cavity was murky although pigment has been formed in several skin parts of embryos.

**Keywords** : mangosteen pericarp ethanolic extract; antioxidant; toxicity level, *Danio rerio*.

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