

**LAPORAN PENELITIAN
HIBAH PENELITIAN STRATEGIS NASIONAL
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Judul : Karakterisasi metabolit bioaktif rumput laut
Sargassum sp (Phaeophyta) yang berpotensi
sebagai senyawa antitumor.

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Dibiayai Oleh Direktorat Jenderal Pendidikan Tinggi, Departemen Pendidikan Nasional, Sesuai Dengan Surat Perjanjian Pelaksanaan Hibah Penelitian Strategis Nasional, Nomor : 0174.0/023-04.2/XV/2009, tanggal 31 Desember 2008 dan berdasarkan SK Rektor Nomor : 160/SK/2009, tanggal 7 Mei 2009.

**Universitas Brawijaya
Malang, November 2009
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**HALAMAN PENGESAHAN
LAPORAN PENELITIAN
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1. Judul Penelitian : Karakterisasi metabolit bioaktif rumput laut *Sargassum sp* (Phacophyta) yang berpotensi sebagai senyawa antitumor

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3. Pendanaan dan jangka waktu penelitian

- a. Jangka waktu penelitian yang diusulkan : 1 tahun
- b. Biaya total yang diusulkan : Rp. 100.000.000,-
- c. Biaya yang disetujui tahun 2009 : Rp. 90.000.000,-

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RINGKASAN

Studi tentang metabolit bioaktif algae coklat *Sargassum sp.* (Phaeophyta) dilakukan untuk melakukan skrining terhadap senyawa yang berpotensi memiliki aktifitas antitumor. Rumput laut memiliki metabolit primer dan sekunder yang bersifat bioaktif. Dengan menggunakan 3 pelarut yang memiliki karakteristik berdasarkan polaritasnya, studi ini akan melihat pelarut yang paling efektif digunakan untuk mengekstrak komponen bioaktif pada rumput laut; fraksi eluen yang memiliki daya antitumor atau pereaksi yang positif terhadap antitumor; serta karakterisasi golongan senyawa kimia dari fraksi yang positif terhadap antitumor tersebut.

Penelitian dimulai dengan pengambilan sampel rumput laut, ekstraksi sampel, uji pelarut dengan bahan yang bersifat polar, semi polar dan non polar. Selanjutnya uji genotoksisitas dimulai dengan persiapan kultur larva *Artemia salina* hingga uji lethalitasnya pada LC₅₀ untuk setiap konsentrasi yaitu: 1, 5, 10, 50, 100, 500 ppm dengan tiga kali ulangan. Analisis dilanjutkan dengan prescreening menggunakan H₂SO₄ untuk uji Flavonoid atau flavon, Uji Mayer dan Dragendorf untuk alkaloid dan uji Salkowski untuk terpenoid dan steroid. Kemudian studi diperkuat dengan melakukan determinasi menggunakan TLC untuk melihat golongan senyawa kimianya atas dasar genotoksisitas untuk menentukan fraksi yang positif. Antitumor test dilakukan menggunakan sel embrio awal dari *sea urchin Themnopleurus*, sp. untuk memastikan adanya sifat antitumor tersebut dengan cara proliferasi.

Berdasarkan uji toksisitas dengan *Artemia salina* dan uji *pre-screening* diketahui bahwa ekstrak Sargassum dengan metanol merupakan ekstrak yang mempunyai daya toksisitas yang tinggi serta mengandung beberapa senyawa diantaranya flavonoid, flavon, alkaloid, terpenoid dan steroid.

Berdasarkan uji antitumor dengan cara proliferasi, pada perlakuan konsentrasi dibawah 50 ppm ekstrak metanol berpotensi sebagai penghambat proliferasi atau perkembangan embrio sedangkan pada perlakuan di atas 50 ppm ekstrak metanol menyebabkan kerusakan sel pada embrio. Berdasarkan prescreening dan studi literatur, golongan senyawa pada ekstrak *Sargassum cristaefolium* adalah dari golongan Flavonoid. Sehingga studi lanjut tentang senyawa ini diperlukan guna menemukan senyawa anti tumor secara murni.

SUMMARY

Studies on brown algae bioactivity metabolite of *Sargassum sp.* (Phaeophyta) has been done to screen the potential chemical compound for antitumor activity. Seaweeds have primary and secondary metabolite which has bioactive characteristic. With using 3 solvents having its own characteristic: methanol (polar), acetone (non polar) and chloroform, (semi polar), this study searched the effective solvent that used for extraction of a bioactive component in seaweed, the positive eluent which has antitumor source, and the chemical group of the positive fraction for those antitumor.

The study has initiated from brown algae sampling, extraction, and solvents screening based on its polarity. Genotoxicity test has been carried out, started on *Artemia salina* larvae culture on laboratory condition, then the larvae were treated using several concentration of different extracts for toxicity test. Genotoxicity test was performed by searching LC50 of larvae lethality for each extract concentration at 1, 5, 10, 50, 100, 500 ppm on triplicate. Prescreening has been done using H₂SO₄ test for Flavon or flavonoid; Mayer and Dragendorf tests for alkaloid, and Salkowski test for terpenoid or sterol. This study was done to know the chemical substance group of the positive fractions shown from genotoxicity test using *Artemia*, then the test was assured using TLC. Antitumor test was performed using early sea urchin embryo of *Themnopleorus*, sp by observing its proliferation under the microscope.

This study showed that: based on toxicity and prescreening test, *Sargassum* extract with methanol was the solvent that had a higher toxicity test containing flavonoid, flavon, alkaloid, terpenoid dan steroid substances. Based on antitumor test by proliferation of sea urchin eggs, the concentration of methanol less than 50 ppm *Sargassum* extract inhibited cellular proliferation and for the concentration above 50 ppm exhibited cellular destruction. This study has targeted Flavonoid to be screened for further study to get an anti-tumor substance.

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