ABSTRAK

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POTENSI DAUN PEPAYA (*Carica papaya* L.) SEBAGAI AGEN FIBRINOLITIK

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(xiii + 44 halaman; 13 gambar; 5 tabel; 6 lampiran)

Penyakit kardiovaskular merupakan salah satu penyebab kematian tertinggi di dunia. Penggunaan obat antikoagulan dan enzim fibrinolitik efektif dalam mengobati penyakit kardiovaskular, tetapi menimbulkan efek samping bagi kesehatan dan tergolong mahal. Oleh karena itu, perlu adanya studi mengenai agen fibrinolitik yang lebih murah, aman dan efektif. *Carica papaya* L. adalah tanaman berbuah yang banyak dikultivasi di daerah tropis termasuk Indonesia. Daun *C. papaya* mengandung empat protease sistein yang berkontribusi sebesar 69-89% dari total protein secara keseluruhan. Salah satu protease sistein yang diduga memiliki kemampuan fibrinolitik adalah Papain. Oleh karena itu, dilakukan studi lebih lanjut terkait potensi daun *C. papaya* sebagai agen fibrinolitik baik secara *in-vitro* maupun *in-silico*. Dalam penelitian ini, dilakukan uji degradasi gumpalan darah, dan *fibrin plate assay* untuk mengevaluasi aktivitas Fibrinolitik secara *in-vitro*. Hasil menunjukkan bahwa daun *C. papaya* berhasil mendegradasi fibrin secara langsung. Untuk mengevaluasi mekanisme katalitik dari Papain, maka dilakukan prediksi situs pemotongan rantai fibrin dan studi *molecular docking* secara *in-silico*. Papain terbukti dapat memotong ketiga rantai fibrin yaitu rantai , , dan . Dalam simulasi *molecular docking*, diketahui bahwa residu katalitik Cys25 dan His159 berperan penting dalam proses katalitik yang menyebabkan pemotongan ikatan peptida dari kompleks protein fibrin.

Kata kunci : *Carica papaya*, degradasi fibrin, fibrinolitik, studi *molecular docking*, residu katalitik

Referensi : 40 (1967-2020).

ABSTRACT

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POTENTIAL OF PAPAYA LEAVES (*Carica papaya* L.) AS FIBRINOLYTIC AGENTS

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Cardiovascular disease is one of the highest causes of death in the world. The use of anticoagulant drugs and fibrinolytic enzymes is effective in treating cardiovascular disease, but causes side effects for health and is quite expensive. Therefore, there needs to be a study of fibrinolytic agents that are cheaper, safer and effective. *Carica papaya* L. is a fruiting plant that is widely cultivated in tropical regions including Indonesia. *C. papaya* leaves contain four cysteine proteases that contribute 69-89% of the total protein. One of the cysteine proteases thought to have fibrinolytic abilities is Papain. Therefore, further studies were conducted regarding the potential of *C. papaya* leaves as fibrinolytic agents both in-vitro and in-silico. In this study, blood clot degradation tests, and fibrin plate assay were conducted to evaluate fibrinolytic activity in-vitro. The results showed that *C. papaya* leaves successfully degraded fibrin directly. To evaluate the catalytic mechanism of Papain, predictions of fibrin chain cleavage sites and molecular docking studies were carried out in-silico. Papain proved to be able to cut all three fibrin chains namely α, β, and γ chains. In molecular docking simulations, it is known that catalytic residues Cys25 and His159 play an important role in the catalytic process that causes the cleavage of peptide bonds from the fibrin protein complex.

Keywords : *Carica papaya*, catalytic residues, fibrin degradation, fibrinolytic, molecular docking study

Reference : 40 (1967-2020).