

Aktivitas enzim fosfolipase biofilm candida albicans ATCC 10231 yang terhambat ekstrak etanol temulawak (*curcuma xanthorrhiza roxb.*) =
Phospholipase enzyme activities in candida albicans ATCC 10231 biofilm that has been inhibited by javanese turmeric ethanolic extract (*curcuma xanthorrhiza roxb.*)

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Abstrak

Latar Belakang: Temulawak (*Curcuma xanthorrhiza Roxb.*) merupakan salah satu tanaman obat unggul Indonesia yang memiliki potensi untuk menghambat pembentukan biofilm *C. albicans*. Faktor virulensi yang dapat menyebabkan *C. albicans* menjadi fungi patogen diantaranya adalah pembentukan biofilm dan sekresi enzim hidrolitik. Fosfolipase merupakan salah satu enzim hidrolitik yang dapat merusak membran sel inang.

Tujuan: Menganalisis aktivitas fosfolipase pada biofilm *C. albicans* ATCC 10231 fase awal, menengah, dan maturasi yang terhambat ekstrak etanol temulawak (*Curcuma xanthorrhiza Roxb.*).

Metode: Nilai Kadar Hambat Biofilm Minimal (KHB_{M50}) *C. albicans* ditentukan dengan uji MTT-assay.

Ekstrak etanol temulawak dengan konsentrasi sesuai KHB_{M50} dipaparkan pada biofilm fase awal, menengah, dan maturase. Kontrol negative tidak dipaparkan apapun, kontrol positif dipaparkan Nystatin 100.000 IU. Aktivitas fosfolipase biofilm *C. albicans* dianalisis dengan mengukur proporsi antara diameter zona presipitasi dengan diameter koloni *C. albicans* pada medium Egg Yolk Agar (EYA).

Hasil: Nilai KHB_{M50} ekstrak etanol temulawak terhadap biofilm *C. albicans* ATCC 10231 pada fase awal, fase menengah, dan fase maturasi berturut-turut adalah 25%, 30%, dan 35%. Pada kontrol positif, aktivitas fosfolipase biofilm *C. albicans* fase awal, fase menengah, dan fase maturasi bernilai 1. Aktivitas fosfolipase biofilm *C. albicans* fase awal, fase menengah, dan fase maturasi yang terhambat ekstrak etanol temulawak berturut-turut 0.84, 0.80, dan 0.83. Pada kontrol negatif, aktivitas enzim fosfolipase biofilm *C. albicans* fase awal, fase menengah, dan fase maturasi berturut-turut 0.59, 0.57, dan 0.57.

Kesimpulan: Terdapat kecenderungan penurunan aktivitas enzim fosfolipase pada biofilm *C. albicans* yang terhambat > 50% ekstrak etanol temulawak.

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Background: Javanese turmeric (*Curcuma xanthorrhiza Roxb.*) is one of medical plant from Indonesia that has potency to inhibit biofilm formation of *C. albicans*. Biofilm formation and hydrolytic enzymes are two among many virulence factors of *C. albicans*. Phospholipase is one of hydrolytic enzymes that could degrade the host cell membrane.

Objective: To observe the activities of phospholipase in early phase, intermediate phase, and maturation phase of biofilm *C. albicans* ATCC 10231 that has been inhibited by Javanese turmeric ethanolic extract.

Method: MTT-assay was used to measure the minimum biofilm inhibitory concentration (MBIC₅₀) of *C. albicans* ATCC 10231 in three phases of *C. albicans* biofilm. Those concentrations were used to observe phospholipase activities of biofilm in the relevant phases. The negative control were not exposed to anything, while the positive control were exposed to Nystatin 100.000 IU. Phospholipase activities were determined by measuring the proportion of precipitation zone diameter and *C. albicans* colony diameter on an

egg yolk-agar medium.

Results: The MBIC₅₀ of Javanese turmeric ethanolic extract towards formation of *C. albicans* biofilm ATCC 10231 in early phase, intermediate phase, and maturation phase were 25%, 30%, and 35%, respectively.

Phospholipase activities value in early phase, intermediate phase, and maturation phase of *C. albicans* biofilm exposed by Nystatin were 1. Phospholipase activities value in early phase, intermediate phase, and maturation phase of *C. albicans* biofilms exposed by Javanese turmeric ethanolic extract were 0.84, 0.80, and 0.83, respectively. Phospholipase activities value in early phase, intermediate phase, and maturation phase of unexposed *C. albicans* biofilm were 0.59, 0.57, and 0.57, respectively.

Conclusion: There is tendency of decreased phospholipase activity in early phase, intermediate phase, and maturation phase of biofilm *C. albicans* that has been inhibited by Javanese turmeric ethanolic extract.