

## Daun Jamblang (*Syzygium cumini*) sebagai penghambat potensial SARS-CoV-2 3-Chymotrypsine-Like Protease (3CLpro) = Java plum (*Syzygium Cumini*) leaves as a potential inhibitor of SARS-CoV-2 3-Chymotrypsine-Like Protease (3CLpro)

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### Abstrak

3-Chymotrypsine-Like Protease (3CLpro) adalah enzim yang memiliki fungsi utama dalam siklus hidup Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). Enzim ini dapat digunakan sebagai target protein untuk mencari obat baru. Tanaman herbal diharapkan memiliki kontribusi besar dalam pencegahan dan pengobatan Corona Virus Disease 2019 (COVID-19), karena banyak tanaman herbal mungkin memiliki afinitas yang kuat terhadap 3CLpro dalam pengobatan COVID-19. Tujuan dari penelitian ini adalah untuk menguji aktivitas penghambatan, komponen fitokimia, dan antioksidan ekstrak sembilan tanaman herbal yang diekstraksi dengan metode Ultrasound Assisted Extraction (UAE) yang berpotensi menghambat rekombinan SARS-CoV-2 3CLpro secara in vitro. Sebagai hasilnya, dapat digunakan untuk menemukan kandidat obat baru untuk terapi COVID-19. Penentuan aktivitas antioksidan menggunakan metode DPPH dan ABTS, total polifenol dan total flavonoid menggunakan metode Folin Ciocalteu dan quercetin. Dari sembilan tanaman herbal yang diuji, daun Jamblang (*Syzygium cumini*) memiliki aktivitas penghambatan paling aktif dengan nilai penghambatan 3CLpro ( $IC_{50} = 226$  g/ml) dengan total polifenol  $413 \pm 1,83$  mg GAE/g ekstrak dan total flavonoid sebesar  $12,09 \pm 0,03$  mg QE/g ekstrak. Pengukuran aktivitas antioksidan dengan DPPH diperoleh nilai  $IC_{50}$  sebesar  $3,75 \pm 0,01$  g/ml, dan dengan ABTS diperoleh nilai  $IC_{50}$   $4,43 \pm 0,06$  g/ml. Hal ini menunjukkan bahwa daun Jamblang bisa menjadi sumber potensial anti-COVID.

.....The 3-chymotrypsin-like protease (3CLpro) is an enzyme that has a major function in the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) life cycle. It has the potential to be used as a protein target in the search for novel medications. Herbal plants contribute to the prevention and treatment of the 2019 coronavirus disease (COVID-19), as many of them might have a strong affinity for 3CLpro in the treatment of COVID-19. This study was aimed at screening nine herbal plant extracts for their potential in inhibiting recombinant SARS-CoV-2's 3CLpro, as well as determining the phytochemical components and antioxidant activity of the most effective extract. Extracts were prepared from *Phyllanthus niruri*, *Sonchus arvensis*, *Clitoria ternatea*, *Caesalpinia sappan*, *Syzygium polyanthum*, *Psidium guajava*, *Averrhoa carambola*, *Andrographis paniculata*, and *Syzygium cumini*. The extracts were used to perform the 3CLpro enzyme inhibition assay. The total phenolic content (TPC) and total flavonoid content (TFC) were determined from the extract with the most inhibitory activity. The DPPH (1,1-diphenyl-2-picrylhydrazyl) and ABTS (2,2'-azinobis [3-ethylbenzothiazoline-6-sulphonic acid]) methods were utilized for estimating the antioxidant activity of the extract. From the nine herbal plants screened, *Syzygium cumini* had the most effective inhibitory activity with a value of 3CLpro ( $IC_{50} = 226$  g/ml). The TPC and TFC were  $413 \pm 1.83$  mgGAE/g extract and  $12.091 \pm 0.037$  mgQE/g extract, respectively. The  $IC_{50}$  values for the antioxidant activity recorded for the DPPH and ABTS methods were  $3.75 \pm 0.0149$  and  $4.43 \pm 0.06$  g/ml, respectively. The findings of this study suggest that *Syzygium cumini* leaves could be a potential source of COVID-19

medication.