Isolasi dan penapisan kapang penghasil amilase serta khamir penghasil alkohol dari ragi tapai asal Jawa Tengah = Isolation and screening of amylase-producing moulds and alcohol-producing yeasts from ragi tapai of Central Java

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Abstrak

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Dua puluh satu isolat kapang dan tujuh isolat khamir telah diisolasi berdasarkan perwakilan morfologi koloni dari setiap jenis ragi tapai menggunakan metode tebar dan streak plate method. Beberapa sampel ragi tapai didapatkan dari lima daerah (Surakarta, Grobogan, Purwokerto, Klaten, dan Kalasan) di Jawa Tengah, Indonesia. Penapisan aktivitas amilase dilakukan secara kualitatif dengan metode iodin dan hasil diekspresikan sebagai diameter zona bening. Isolat terpilih kemudian diukur aktivitas amilasenya menggunakan metode DNS pada panjang gelombang 540 nm. Penapisan khamir toleran terhadap konsentrasi gula tinggi dan penghasil alkohol dilakukan pada medium PDB yang ditambahkan 5%, 10%, dan 15% glukosa. Penapisan didasarkan atas pertumbuhan sel dan dan gas CO2 terbentuk dalam tabung Durham. Berdasarkan hasil penapisan kapang, tiga isolat dipilih berdasarkan diameter zona bening terbesar yaitu ZSL3 (57,52 mm), ZN1 (54,96 mm), dan ZGN1 (54,47 mm). Hasil uji menunjukkan bahwa isolat ZGN1 memiliki aktivitas enzim amilase tertinggi (13,18 U/mL) dan isolat ZN1 memiliki aktivitas terendah (5,95 U/mL). Hasil penapisan khamir menunjukkan isolat YN1, YN2, dan YK1 merupakan tiga isolat khamir terpilih. Hasil tersebut juga menunjukkan bahwa YN1 adalah isolat terbaik berdasarkan pertumbuhan sel dan gas CO2 yang terbentuk pada medium uji dalam 24 jam. Berdasarkan karaktermorfologi makroskopis dan mikroskopis, Isolat kapang ZSL3 diduga merupakan genus Rhizopus, sedangkan isolat kapang ZGN1 dan ZN1 merupakan genus Mucor. Isolat khamir YN1, YN2, dan YK1 diduga merupakan filum Ascomycota berdasarkan karakter morfologi dan kemampuan memfermentasi gula untuk menghasilkan etanol dan CO2.
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ABSTRACT
Twenty one mould and seven yeast isolates have been isolated based on colony morphology that are representative from each ragi tapai sample using spread method and streak plate method. Ragi tapai samples were obtained from five regions (Surakarta, Grobogan, Purwokerto, Klaten, and Kalasan) in Central Java, Indonesia. Amylase enzyme activity was screened qualitatively using iodine method and the clear zone diameter was measured. Then, three isolates amylase activity was measured using DNS method on 540 nm wavelength. Sugar-tolerant and alcohol producing yeast screening was assayed in PDB + glucose (5%, 10%, and 15%). Screening was based on growth and gas produced in Durham tube. Based on the mould screening result, three isolates with the largest clear zone were selected. The selected isolates were ZSL3 (57,52 mm), ZN1 (54,96 mm), and ZGN1 (54,47 mm). The DNS assay resulted ZGN1 has the highest amylase enzyme activity (13,18 U/mL) and the ZN1 as the lowest (5,95 U/mL). The yeasts screening result showed that YN1, YN2, and YN3 were selected isolates. The result also showed that YN1 was the best isolate based on growth and gas produced in 24 hours. Isolate ZSL3 was assumed to belong to genus Rhizopus and isolate ZGN1

and ZN1 were assumed to belong to genus Mucor based on its morphological characters. Isolate YN1, YN2, and YK1 were assumed to belong to phylum Ascomycota based on its morphological characters and ability to ferment the sugar to produce ethanol and CO2.