Khamir asal tumbuhan saeh (broussonetia papyrifera L) l her ex vent dan potensinya sebagai agens biokontrol kapang pada buah tomat pascapanen = Yeast isolates from paper mulberry or saeh plant broussonetia papyrifera l l her ex vent and their potential as biocontrol agents against moulds from postharvest tomato

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Abstrak

Penelitian bertujuan mengisolasi dan mengidentifikasi khamir phylloplane Broussonetia papyrifera asal Bandung (Dago Pojok), Garut (Tunggilis dan Sukadanu), dan Trowulan, menguji kemampuan khamir antagonis dari daun B. papyrifera asal Desa Sukadanu dan Desa Tunggilis, Garut, Jawa Barat yang berpotensi sebagai agens biokontrol terhadap kapang-kapang penyebab kebusukan pada buah tomat pascapanen serta mengetahui viabilitas khamir setelah dipreservasi pada suhu -80 oC. Sebanyak 2.543 isolat khamir diperoleh dari empat wilayah sampling menggunakan metode washing dan membrane filter method. Pemilihan 82 isolat khamir representatif berdasarkan kemiripan morfologi koloni. Identifikasi khamir dilakukan berdasarkan sequence pada daerah internal transcribed spacer regions ribosomal DNA.
Hasil identifikasi menunjukkan bahwa isolat khamir tersebut terdiri atas 17 genera dan 32 spesies: sebanyak 11 genera termasuk ke dalam Ascomycota (Saccharomycetes dan Dothidiomycetes), dan sebanyak enam genera termasuk Basidiomycota (Tremellomycetes, Microbotryomycetes, dan Ustilaginomycetes). Tiga kapang representatif berdasarkan hasil isolasi dari buah tomat dan uji patogenitas dapat menyebabkan kebusukan pada buah tomat pascapanen, yaitu Alternaria alternata, Lasiodiplodia theobromae, dan Syncephalastrum racemosum. Enam spesies khamir antagonis dapat menghambat pertumbuhan dan sporulasi A. alternata, L. theobromae, dan Syn. racemosum yaitu Candida saopaulonensis UICC Y-492, Candida pseudojiufengensis UICC Y-475, Debaryomyces hansenii UICC Y-488, Geotrichum candidum UICC Y-495, Hyphopichia burtonii UICC Y-496, dan Rhodotorula mucilaginosa UICC Y-476. Khamir antagonis dari B. papyrifera memiliki kemampuan menghambat pertumbuhan kapang A. alternata dan L. theobromae penyebab kebusukan pada buah tomat pada suhu 26--28oC selama 15 hari inkubasi. Khamir C. pseudojiufengensis UICC Y-475 dapat menghambat pertumbuhan kapang dan gejala kebusukan pada buah tomat (100%) disebabkan kapang A. alternata. Khamir C. saopoulenensis UICC Y-492 dan Rh. mucilaginosa UICC Y-513 dapat menghambat pertumbuhan kapang dan gejala kebusukan pada buah tomat (67%) yang disebabkan L. theobromae.
Hasil pengujian viabilitas khamir setelah dipreservasi pada suhu -80oC selama 180 hari menunjukkan metode tersebut baik untuk preservasi jangka panjang empat spesies khamir potensial agens biokontrol pada buah tomat, yaitu khamir C. pseudojiutengensis UICC Y-475, C. saopoulenensis UICC Y-492, Hyp. burtonii UICC Y-496, dan Rh. mucilaginosa UICC Y-513. Seluruh strain yang diuji menunjukkan viabilitas yang tinggi (rerata CFU . 1x 108/ml). Jumlah sel khamir antara lain: C. pseudojiutengensis UICC Y-475 (1,08 x 108 CFU/ml), C. saopoulenensis UICC Y-492 (0,65 x 108 CFU/ml), Hyp. burtonii UICC Y-496 (1,76 x 108 CFU/ml), dan Rh. mucilaginosa UICC Y-513 (2,13 x 108 CFU/ml).
<hr><i>The study was aimed to isolate and identify phylloplane yeasts from Broussonetia papyrifera plants from Bandung (Dago Pojok), Garut (Tunggilis and Sukadanu), and Trowulan; to investigate the yeasts with

antagonistic abilities against moulds which attack post-harvest tomato fruits; and to observe the yeast viability after preservation at a temperature of -80 oC. Two thousand five hundred and forty-three yeast isolates were obtained using the washing method and the membrane filter method. Eighty-two representative yeast isolates were selected based on similarity of colony morphology. Identification was based on sequence data of internal transcribed spacer regions of ribosomal DNA (ITS rDNA).

The identification result showed that the 82 representative isolates were consisted of 17 genera and 32 species. Eleven of these genera are belong to Saccharomycetes and one genus belongs Dothidiomycetes (Ascomycota). Six genera are belong to Tremellomycetes, Microbotryomycetes, and Ustilaginomycetes (Basidiomycota). Three representative moulds obtained from the pathogenicity test were able to cause serious damage on post-harvest tomato fruits. These moulds were identified as, i.e. Alternaria alternata, Lasiodiplodia theobromae, and Syncephalastrum racemosum. Six antagonistic yeasts were able to inhibit growth and sporulation of post-harvest tomato moulds, i.e. Candida saopaulonensis UICC Y-492, Candida pseudojiufengensis UICC Y-475, Debaryomyces hansenii UICC Y-488, Geotrichum candidum UICC Y-495, Hyphopichia burtonii UICC Y-496, and Rhodotorula mucilaginosa UICC Y-476. The antagonistic yeasts were tested for their abilities to inhibit growth of A. alternata and L. theobromae which cause fruit rot on post-harvest tomatoes at 26--28oC for 15 days. Candida pseudojiufengensis UICC Y-475 was able to inhibit growth of A. alternata and reduce fruit rot symptoms in tomato fruit (100%). Candida saopoulenensis UICC Y-492 and Rh. mucilaginosa UICC Y-513 were able to inhibit growth of L. theobromae and reduce fruit rot symptoms in tomato fruit (67%).

The yeast viability was observed after being preserved at -80oC on day-1 (H1), day-7 (H7), day-14 (H14), day-30 (H-30), and day-180 (H-180). The results showed that all strains do not lose their viability after freezing at -80oC for 180 days. The number of cells for each strain after revival from preservation after 180 days were counted: C. pseudojiufengensis UICC Y-475 (1,08 x 108 CFU/ml), C. saopoulenensis UICC Y-492 (0,65 x 108 CFU/ml), Hyp. burtonii UICC Y-496 (1,76x 108 CFU/ml), and Rh. mucilaginosa UICC Y-513 (2,13 x 108 CFU/ml).</i>