

Sukanya Nitiyon 2010: Diversity of Xylose Utilizing Yeast and Selection of Xylose Fermenting Yeast Strains for Ethanol Production. Master of Science (Microbiology), Major Field: Microbiology, Department of Microbiology. Thesis Advisor: Professor Savitree Limtong, D.Eng. 170 pages.

Diversity of xylose-utilizing yeast was studied by isolation of yeast using enrichment technique in D-Xylose medium and identification of yeast isolates by sequences analysis of the D1/D2 domain of the LSU rRNA gene and phylogeny. A total of 133 xylose-utilizing yeast strains were obtained from 79 samples of soils, plants and decaying agricultural residues, and others collected in various areas of Thailand. A total of 108 isolates (81.2 %) were identified to be described species. Seventy-three isolates were assigned to 18 described species in eight genera of the phylum Ascomycota consisted of *Barnettozyma californica*, *Candida blankii*, *C. coipomoensis*, *C. maltosa*, *C. membranifaciens*, *C. pseudointermedia*, *C. pseudolambica*, *C. pyralidae*, *C. tropicalis*, *Debaryomyces fabryi*, *D. nepalensis*, *Geotrichum silvicola*, *Lindnera rhodanensis*, *L. saturnus*, *P. caribbica*, *P. kudriavzevii*, *Saturnispora saitoi* and *Zygoascus hellenicus*. Thirty-five isolates were assigned to nine described species in two genera of the phylum Basidiomycota consisted of *Cryptococcus heveanensis*, *Cryp. humicola*, *Cryp. laurentii*, *Cryp. terrestris*, *Trichosporon asahii*, *T. moniliiforme*, *T. mycotoxinivorans* and *T. terricola*. Eleven isolates (8.3 %) were similar to the undescribed species via three isolates were similar to three ascomycetous yeast species namely *Candida* sp. NRRL Y-27159, *Geotrichum* sp. LY16 and *Geotrichum* sp. LY5, and eight isolates were similar to two basidiomycetous yeast species namely *Cryptococcus* cf. *podzolicus* and *Trichosporon* sp. CBS 8686. Five isolates (3.8%) could be identified as known or new species, which were closest to *C. solani*, *G. silvicola*, *Sporopachydermia lactativora*, *Z. hellenicus* and *T. mycotoxinivorans*. Whereas the other nine isolates were identified to be seven new species i.e. *Candida* sp. A6-2, *Candida* sp. NT31, *Candida* sp. NT36, *Candida* sp. NT40, *Candida* sp. KU-Xs34, *Candida saraburiensis* sp. nov., and *Pichia* sp. NT29.

Selection for D-Xylose fermenting yeast was carried out and the results revealed that only eight isolates of three yeast species could ferment D-xylose to ethanol. They were *Candida blankii* (A6-1, A8-1 and A8-2), *Candida saraburiensis* sp. nov. (KU-Xs13^T, KU-Xs18 and KU-Xs20) and *Zygoascus hellenicus* (SN1-1 and SN1-4). These isolates produced ethanol at 0.98-1.78 g/l when cultivation in 4% D-Xylose-YP broth on a rotary shaker at 30°C for 96 h.

Student's signature

Thesis Advisor's signature