BIODIVERSITY OF HALOTOLERANT YEASTS IN THE DIFFERENT ECOSYSTEMS AND THEIR BIOLOGICAL ACTIVITIES

BY

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B.Sc. Agric. Sc. (Agric. Microbiology), Ain Shams University ٢٠٠١

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ABSTRACT

Rania Farouk Ahmed "Biodiversity of Halotolerant Yeasts in the Different Ecosystems and their Biological Activities", Unpublished Master of Science, University of Ain Shams, Faculty of Agriculture, Department of Microbiology, ٢٠٠٧.

The halotolerant yeasts are distributed in almost all environments of the plant, fruit, soil, fresh water, marine water and salted food. Yeast are an inexpensive source of biomass, is a by product of large scale fermentations, and can be used as an alternative technology to classical physiochemical methods in the detoxification of effluents loaded with heavy metals. Moreover, killer yeasts or their toxin used as a novel biological control agents in protecting plants from various fungal diseases.

In the present study, a number of ٣٠ samples were collected from ٥ different ecosystems and tested for yeast count at different NaCl concentrations. The biodiversity of halotolerant yeasts highly varied from one Egyptian ecosystem to another and depending on salt concentration in culture media. Four hundred and thirty three yeast cultures were isolated and classified as non halotolerant, moderate halotolerant and extreme halotolerant yeast. Only eight yeast isolates were selected and completely identified. The effect of different sodium chloride osmotic potential on the growth behavior and sugar consumption of these strains using shake flasks as a batch culture technique was evaluated.

Killer toxin (mycocin) was produced from killer yeast strains (mycocinogenic yeast) which detected by cross-reaction test on assay medium. NaCl may enlarge the activity spectra of some killer yeast against the target strains. The maximum toxin production was noticed during the stationary phase growth of different strains. The activities of these toxins as antifungal mycocin were higher than antibacterial mycocin. *Pichia silvicola* ٢٦T and *Pichia*

anomala ١٧S toxins recorded the widest spectrum as antifungal activity.

Different concentrations of heavy metals up to ١٥ppm affected on growth behavior, growth parameters and ions removal efficiency of yeast strains. Both *Pichia silvicola* ٢٦T and *Pichia anomala* ١٧S recorded the highest removal efficiency for Co and Pb at initial concentration of ١٠ppm and also took up Ni and Zn at initial concentration of ٥ppm, in NaCl free medium. Increasing the NaCl osmotic potential of medium to ٤,٢٥ MPa reduced the ions removal efficiency at ١٠ppm initial concentrations.

Key words: Egyptian ecosystems, Halotolerant yeasts, Growth parameters, killer toxin, Antimicrobial activity, Heavy metals, Metal adsorbent, Ion uptake, Bioremoval, *Rhodotorula minuta*, *Pichia anomala*, *Pichia silvicola*, *Kluyveromyces bacillisporus*.

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التنوع الحيوي للخمائر المتحمله للملوحة في النظم البيئية المختلفة و انشطتها الحيوية

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