

THE SPECIES DIVERSITY OF YEASTS IN SOME NATURAL HABITATS OF THAILAND

INTRODUCTION

It is well known that yeast is one of the most important microorganisms for human life. They have been used in many industrial processes such as production of alcoholic beverages and bread (Phaff *et al.*, 1978), enzymes, vitamins, organic acids and animal feed (Domain *et al.*, 1998; Spencer *et al.*, 2002). However yeast species used for these industries are limited. On the other hand, it is estimated that a vast number of yeasts are living in the natural environment and many of them belong to not yet described species. In Thailand, taxonomic and ecological study of yeasts started in the late 1970's mainly on yeasts associated with fermented foods and related substrates (Davahuti, 1978; Tummarat, 1978). Yeast species found in these substrates are limited and most of them belong to known species such as *Saccharomyces cerevisiae*, *S. bayanus*, *S. kluyveri*, *S. pastorianus*, *Kloeckera apiculata*, *Pichia membranifaciens*, *Candida krusei*, *C. parapsilosis*, *Zygosaccharomyces rouxii* and etc. (Davahuti, 1978; Tummarat, 1978; Suzuki *et al.*, 1987; Jindamorakot, 2000). However, in the study of yeasts from fermented foods and related substrates, 2 new species, *C. stellimalicola* and *Citeromyces siamensis* were described by Suzuki *et al.* (1994) and Nagasuka *et al.* (2002), respectively.

The study of yeasts living in the natural environment of Thailand was started in the late 1980's. The study of ballistoconidium-forming yeasts, a kind of basidiomycetous yeast producing ballistoconidium, started to elucidate the yeast flora in the phyllosphere in Thailand. In contrast to the result obtained from the study of yeasts in fermented foods and related substrates, ballistoconidium-forming yeasts in the phyllosphere were rich in biodiversity. Many undescribed species were found in these studies and 17 of them were described as new species so far (Nakase *et al.*, 1991; Prillinger *et al.*, 1997; Takashima *et al.*, 1995; Takashima *et al.*, 1998; Takashima and Nakase, 2000, 2001; Fungsin *et al.*, 2001, 2002, 2003)

Recently, Limtong and coworkers studied on the thermotolerant methylotrophic yeasts and found that these kinds of yeast were widely distributed in the natural environment in Thailand. Four new species of genera *Pichia* and *Candida*, *P. siamensis*, *P. thermomethanolica*, *C. krabiensis* and *C. sithepensis* were described (Limtong *et al.*, 2004, 2005). A new ascomycetous yeast from soils in Nam Nao national park, *Tetrapisispora namnaonensis*, was described (Sumpradit *et al.*, 2005).

These finding suggests that yeasts found in the natural environment are rich in biodiversity and a vast number of undescribed yeasts are living in the natural environment of Thailand. However, a little is known about yeasts living in Thailand. It should be emphasized that the studies of yeasts in the natural environment in Thailand are still in the early stage and further extensive studies are required for the progress of yeast systematics, biodiversity and for the effective utilization of Thai yeasts for human welfare.

The aims of the present studies are:

1. To collect and identify yeasts from some natural habitats of Thailand such as flowers, insect frass, mosses and mushrooms.
2. To obtain interesting yeast species from the taxonomic and phylogenetic viewpoints.
3. To obtain taxonomic data of collected yeasts.