

Tida Dethoup 2007: *Talaromyces* species: Diversity, Taxonomy, Phylogeny, Antagonistic Activity Against Plant Pathogenic Fungi and Secondary Metabolites. Doctor of Philosophy (Plant Pathology), Major Field: Plant Pathology, Department of Plant Pathology. Thesis Advisor: Associate Professor Leka Manoch, Ph.D. 218 pages.

Forty five soil samples were collected from 38 provinces in Thailand. Different isolation methods such as the alcohol and heat treatments, soil plate and dilution plate method, and Gochenaour's glucose ammonium nitrate agar were used. Identification of the fungal isolates was based on morphological features, as colony growth and color on different agar media. Microscopic characters were examined under stereo-, light- and scanning electron microscopes. A total of 342 isolates of *Talaromyces* were obtained comprising 11 species, 1 variety and 2 unidentified species including *Talaromyces austrocalifornicus*, *T. bacillisporus*, *T. flavus*, *T. macrospermus*, *T. helicus* var. *helicus*, *T. indigoticus*, *T. luteus*, *T. rotundus*, *T. stipitatus*, *T. trachyspermus*, *T. wortmannii*, *Talaromyces* sp. 1 (KUFC 3399) and *Talaromyces* sp. 2 (KUFC 3383). *Talaromyces austrocalifornicus* and *T. indigoticus* were new records for Thailand. *Talaromyces flavus* and *T. macrosporus* were the dominant species followed by *T. stipitatus*, *T. trachyspermus*, *T. wortmannii*, *T. bacillisporus*, *T. rotundus*, *T. indigoticus*, *T. helicus* var. *major*, *T. austrocalifornicus*, *T. luteus*, *Talaromyces* sp. 1 (KUFC 3399) and *Talaromyces* sp. 2 (KUFC 3383).

Phylogenetic analyses were conducted using polymorphic microsatellites of 21 fungi comprising 18 species of *Talaromyces* and 3 other Trichocomaceae (KUFC 3576, 5642, 5655) from Kasetsart University Fungal Culture Collection. The results showed that species of *Talaromyces* used in this study did not show any congruence to the division either done by Stolk and Samson, 1972 or Pitt, 1979. The unidentified species, *Talaromyces* sp. 1 (KUFC 3399) was found on same clade with *T. roduntus* which occupies a basal position to the main *Talaromyces* clade and both of them belong to the Series *Lutei*.

The antagonistic activity tests revealed that 20 isolates of *T. flavus* effectively inhibited mycelial growth of *Phytophthora palmivora*, *P. parasitica*, *Helminthosporium maydis*, *H. oryzae*, *Fusarium oxysporum*, *Colletotrichum capsici*, and *C. gloeosporioides*. However, little inhibition was observed for *Pythium aphanidermatum*, *Lasiodiplodia theobromae*, *Rhizoctonia solani* and *Sclerotium rolfsii* *in vitro*. The greenhouse experimental indicated that 20 isolates of *T. flavus* could control *Sclerotium rolfsii*, stem rot of mungbean 7 and 14 days inoculation. However only 6 isolates of *T. flavus* could inhibit *S. rolfsii* at 30 days after inoculation.

For secondary metabolites investigation, the oligophenalenone dimer duclauxin and two new analogues, bacillisporins D and E, were isolated from *Talaromyces bacillisporus* in addition to the previously reported bacillisporins A, B and C. Chemical study of *Talaromyces* sp. 1 (KUFC 3399) furnished the two new merodrimanes thailandolides A and B, an *O*-methylated derivative of the aromatic fragment incorporated in thailandolide B, and three known closely related 1(3*H*)-isobenzofuran derivatives, penisimplicissin, vermistatin, and hydroxydihydrovermistatin. Structures were established by spectroscopic measurements and confirmed by X-ray analyses of compounds thailandolides A and vermistatin. The unusual peptide analogue *N*-benzoylphenylalanyl-*N*-benzoylphenyl alaninate was also found.

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Thesis Advisor's signature