TISTR Culture Collection
Bioscience Department
Thailand Institute of Scientific and Technological Research (TISTR)

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OUTLINE

• TISTR organization
• TISTR Culture Collection
• Future plan
Thailand Institute of Scientific and Technological Research (TISTR)
Background

• Established in 1963
• Non-profit state enterprise
• Under Ministry of Science and Technology
• Responsible to initiate and conduct research works as well as to provide scientific and technological services for industries
**Location**

**Pathumthani**
- R & D
- Material Properties Analysis and Development Centre
- Microbes Centre (Bangkok MIRCEN, UNESCO)

**Chiangmai**
- R&D at Doi Pui

**Nakhon Ratchasima**
- Sakaerat Environment Research Station (UNESCO-Biosphere Reserve)
- Lam Takhong Research Station

**Bangkok (Bangkhaen)**
- Thai Packaging Centre

**Samutprakarn**
- Industrial Metrology and Testing Service Centre
Direction of TISTR’s Research Area

- Food
- Health Product
- Energy
- Environment
TISTR Culture Collection
The TISTR Culture Collection or Bangkok MIRCEN is one of the main service collections in Thailand. It was established in 1976 with funding support by UNESCO, UNEP, and the Royal Thai government.

- Focus on agricultural and industrial useful microbial strains.
History

1976: Establishment of Bangkok MIRCEN

1981: Affiliation with World Federation of Culture Collection (WFCC) : number 383

1995: Asian Network of Microbial Research

2000: ISO 9001 Certification

2000: Member of Thailand Network on Culture Collection (TNCC)

2003: Relocation of TISTR to Khlong Ha Technopolis
TISTR Culture Collection activities

- Culture collection
- Research
- Other services
Culture Collection

- Supply of microbial cultures
- Long-term preservation of microorganisms e.g. bacteria, yeast, fungi and microalgae
- Safe deposit and patent deposit for academic and industry to ensure safety of microbial strains
- Training on preservation methods
TISTR Culture Collection collected more than 5,000 strains of bacteria, yeast, fungi and microalgae. The microorganisms are useful in various researches and industrial applications.
Total 2,617 strains

LIST OF CULTURES

7th Edition
2013

Out of catalogue 2,383 strains
User distribution (2011-2013)

- Private companies:
  - 2011: 105
  - 2012: 110
  - 2013: 81

- Government agencies:
  - 2011: 31
  - 2012: 31
  - 2013: 25

- Schools:
  - 2011: 8
  - 2012: 9
  - 2013: 12

- Universities:
  - 2011: 297
  - 2012: 266
  - 2013: 281
Distribution of microorganisms in 2013

- Bacteria: 67%
- Yeast: 12%
- Fungi: 14%
- Microalgae: 7%
Back up places

A: Headquater

B: Nakhon Ratchasima

C: Samut Prakarn

D: Chiang Mai
Research

- Probiotics and prebiotics
- Product from Yeast
- Gliding bacteria
- 2nd metabolite substances from microbial strains
- Biofuel from microalgae
Probiotic for Human
Probiotic for Livestock
Utilization of Microorganism

Vaccines and Infection Prevention Products
2nd Metabolites from microbial strains
Yeast Product
Biofuel from Algae

High oil producing strains
*Botryococcus* sp. 30-70% oil production
Products from Algae

- **Food**
  - Nostoc commune

- **Agriculture**
  - Fertilizer, soil conditioner
Signing ceremony between TISTR and Siam Nostoc & Microalgae Co., Ltd. “Exclusively technology transfer on production of Mook Yok”
Soil Conditioner

Polysaccharides-produing BGA

• Soil conditioner
• Cosmetic
• Food additive → binding/thickening
• Drug → anticancer

Signing ceremony between TISTR and Algotech Co., Ltd.
“Exclusively technology transfer on production of soil conditioner”
2nd phase is under negotiation
Mushroom and Vanilla cultivation under Royal Project Foundation
Publication on new species

- *Tistrella mobilis* gen. nov., sp. nov., a novel polyhydroxyalkanoate-producing bacterium belonging to \( \alpha \)-proteobacteria.
- *Bullera koratensis* sp. nov. and *Bullera lagerstroemiae* sp. nov. two new ballistoconidium-forming yeast species in the Trichosporonales clade isolated from plant leaves in Thailand.
- *Zimmermannella helvola* gen. nov., sp. nov., *Zimmermannella alba* sp. nov., *Zimmermannella faecalis* sp. nov. and *Leucobacter albus* sp. nov., novel members of the family *Microbacteriaceae*.
- *Bensingtonia thailandica* sp. nov., a novel basidiomycetous yeast species isolated from plant leaves in Thailand.
- *Kockovaella barringtoniae* sp. nov., a new basidiomycetous yeast species isolated from plant leaf collected in a tropical rain forest in Thailand.
- *Bullera panici* sp. nov. and *Bullera siamensis* sp. nov., two new yeasts in the *Bullera variabilis* cluster isolated in Thailand.
- *Bullera arundinariae* sp. nov., a new species of Ballistoconidium-forming yeast, isolated from a plant in Thailand.
- *Aureispira maritima* sp. nov., a novel gliding bacterium from marine habitats in Thailand.
- *Aureispira marina* sp. nov., a gliding arachidonic acid-containing bacterium isolated from the southern coastline of Thailand.
- *Rapidithrix thailandica* gen. nov., sp. nov., a marine gliding bacterium isolated from samples collected from the Andaman sea, along the southern coastline of Thailand.
- Etc.
Utilization of microbial strains

- Research and development for sustainable energy at TISTR
- Structural characterization of pellicle polysaccharide of *Acetobacter tropicalis*
- The *Arabidopsis* aminopeptidase LAP2 regulates plant growth, leaf longevity and stress response
- Probiotic for cows, screening of lactic acid bacteria isolated from cow dung
- Study on Bifidobacterium isolated from breast-fed infant faeces and their ability of vitamin production
- Study on fungi in their ability of fructooligosaccharide production for prebiotic purpose
- Bioreactor of agricultural chemicals contaminated in the ditch of orange orchard
- Study on lactic acid bacteria isolated from swine dung for their potential of probiotic
- Evaluation of potential fungal strains for prebiotic oligosaccharide production
- Mushroom developments in Royal Project Foundation
- Biodegradation of aromatic compounds, styrene by microorganisms.
- Screening of polymer degrading microorganisms from natural environment in Thailand.
- Identification and histamine formation of *Tetragenococcus* isolated from Thai fermented food products.
- Development of live attenuated vaccine to prevent Salmonella infection in broilers and layers.
- Development of polyunsaturated fatty acids (PUFAs) as dietary supplement and mariculture.
- Research and development of bioactive compounds from microorganisms as dietary supplement reducing alzheimer risk
- Secondary metabolites from novel marine gliding bacteria.
- Exploitation of marine gliding bacteria as the sources for pharmaceutically important compounds.
- New marine gliding bacteria; potential sources of cytotoxic compounds.
- Etc
Services

Identification

Analysis of Microbiological Quality

Anti-Microbial Assay

Monitoring of Internal Air Quality
Thailand Network on Culture Collection (TNCC)

TISTR = Thailand Institute of Scientific and Technological Research
DOA = Department of Agriculture
DMST = Department of Medical Sciences
BIOTEC = National Centre for Genetic Engineering and Biotechnology

TISTR Culture Collection

DOA Culture Collection

TNCC

DMST Culture Collection

BIOTEC Culture Collection
The TISTR Culture Collection at the Bangkok MIRCEN is the main service collection in Thailand. It was created with UNESCO/UNEP support in 1976 with the aim of establishing a holding center for agriculturally and industrially useful microbial strains. Since then, the Collection has been devoted to collection, preservation, and distribution of microorganisms. In the year 2000, the quality management system of TISTR culture collection services such as culture supply, preservation and deposition of microbial cultures have been conformed to the requirement of the quality standards ISO 9001 (ISO 9001:2008).
Future plan

• Increase the number of microorganisms
• Research on microbial diversity, application
• National and international collaboration on culture collection and research
Acknowledgement

Royal Thai Government

Ministry of Science and Technology

Thailand Institute of Scientific and Technological Research (TISTR)
Thank You