Guangdong Microbial Culture Collection Center

On the topic 6 “Deposit of biological material: technology trends and emerging practices in IDAs

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https://www.gdmcc.net/
Outline

一 Introduction of GDMCC
二 Researches of GDMCC
三 Practices of GDMCC
四 Challenges for patent deposit
Introduction of GDMCC: History of GDMCC

1987 • GDMCC was established as a supporting unit of the Institute of Microbiology, Guangdong Academy of Sciences, China;

1990 • GDMCC started to provide public services;

2002 • GDMCC became a core member of the Committee of Guangdong Biological Germplasm Resources Banks (CGBGRB)

2005 • GDMCC participated in the project of National Infrastructure for Microbial Resources

2009 • GDMCC was registered in WFCC (No.953)

2016 • GDMCC was recognized as an International Depository Authority by WIPO

2019 • GDMCC established a quality management according to ISO 9001:2015
Introduction of GDMCC: Services of GDMCC

**Preservation & distribution**
- Public, non-public and patent deposit
- Customized lyophilization processing
- Sharing and distribution of strains

**Characterization & identification**
- Biochemical analysis, including cellular fatty acids, metabolic activities, respiratory quinones, peptidoglycan structure, polar lipids and etc..
- Identification of bacteria, yeast and fungi

**Bioinformatic analysis**
- Bacterial phylogenomics
- Microbial diversity analysis
- Microbiomics

**Safety assessment**
- To determine the microbial strains’ potential risks to the environment and human health, including identification, toxicity test, genetic stability and environmental adaptability
- Evaluation of products with microorganisms or their metabolites

**Technical training**
- Techniques of isolation, cultivation, preservation, detection, and identification as well as bioinformatics
Introduction of GDMCC: Services of GDMCC

On line catalogue
https://www.gdmcc.net/
GDMCC has been committed to the research field of microbial diversity and systematics for over 30 years

- GDMCC has published more than 300 research papers and validly designated 125 novel taxa.
- GDMCC members have participated in the publication of several books as editors or authors.

**Novel families**
- Sphaerotilaceae
- Rhodocytophagaceae

**Novel genera**
- Paracidovorax
- Paenacidovorax
- Pseudochryseolina
- Parachryseolina
- Citreicoccus
- Antarccticibacterium
- Deminuibacter
- Chakrabartia
- Parasphingorhabdus
- Novosphingopyxis
- Xanthocytophaga

**Novel species**
- Corallococcus silvisoli
- Qipengyuania aerophile
- Ruegeria alba
- Gimibacter soli Salipiger mangrovisoli
- Tsuneonella litorea Inhella proteolytica
- Chitinilyticum piscinae
- Ideonella aquatica
- Croceicoccus gelatinskylicus
- ……
Practices of GDMCC: Routine procedure for patent deposit

1. Contract concluded
2. Documents reception
3. Verification of documents
4. Sample Reception
5. Sample Entry Check
6. Stock Processing
7. Sample storage
8. Viability testing
9. Receipt of Deposit & Viability Statement
10. Notifications to depositor
11. Sample sending to depositor & Cross-check

fail
fail
Practices of GDMCC: Routine procedure for patent deposit

Checkpoint 1  Verification of documents

- We request the depositor to provide GDMCC with an ID sequence, such as rDNA, ITS, etc.
- If the ID sequence provided is not consistent with the claimed scientific name at the genus level filled in the application form, we will assume that there is an error and ask the depositor to check or explain.
- In some case, we advise the depositor to claim a suitable name for their deposit strain.
• Upon receipt of the depositor’s sample, we perform the following steps to identify the strain and check its purity:
  
a) Plate streaking: inoculate the sample onto a plate containing the appropriate medium by streaking to separate the colonies individually.
  
b) Purity check: observe the characteristics and morphology of the plate culture to determine whether it is a pure culture, and if necessary, perform microscopic examination.
  
c) Molecular sequencing: the sequencing result of the rDNA/ITS of the culture can basically tell us two facts: purity and identity. If the sequencing result is inconsistent with the sequence provided by the depositor, we request the depositor to resend the sample.
Checkpoints:

3. After passing the entry check, we usually prepare the stock in three different ways: lyophilization, cryopreservation & ultra-low temperature.

- Slant or plate culture is used for the stock viability testing.
Checkpoints

• After passing the stock viability testing, we usually send three sample stocks made by GDMCC to the depositors for the purpose of cross check by them.

• We expect a confirmation statement from the depositor.

• If we do not receive a confirmation statement back within one month, we assume that the depositor acknowledges that the strain contained in our stock sample is the same as their original strain. (*This item is included in the deposit contract.*)
Straw mushroom (*Volvariella volvacea*) is a popular edible mushroom in South China.

Low temperature can damage its mycelial growth, affecting the formation of fruiting bodies.

In practice, subculturing is the main preservation method. However, this method is laborious and the mycelial growth degenerates as the number of subculturing increases.

We use a 5% trehalose solution as a protectant to preserve mycelial culture of straw mushroom at 4 °C.

Preservation of one year using this method had no significant impact on its growth vigor.
Arbuscular Mycorrhizal Fungi (AMF) are soil microorganisms able to form mutualistic symbiosis with most terrestrial plant roots.

Spores that are present in soil germinate, infect the root system, and form arbuscule structures inside the cells.

Benefits of AMF: Improved nutrient acquisition and stress tolerance. Therefore, AMF have important application values in agricultural production and ecosystem.

AMF are unculturable. They are obligate symbionts that depend on living host plants to complete their life cycle.

• Transformed root cultures (TRC) — \textit{in vitro} dual culture system: root + AMF, are practically used to mass produce AMF propagules \textit{in vitro}, which can be used in research, agriculture, and ecological restoration.

• Compared with room temperature storage, cold storage of TRC can significantly enhance the germination rate of AMF spores.

The germination rate of different AMF inoculums with different treatments.

The germination status of different AMF inoculums.
Challenges for patent deposit

• With the development of isolation and cultivation techniques, more and more uncultured microorganisms have become culturable, and their potential application value is constantly being discovered. However, they are still "fragile", and the long-term preservation remains a challenging task.

• On the other hand, with the continuous development of microbiomics, synthetic microbial communities or synthetic microbiota are also being increasingly applied in human health, agricultural production, and environmental protection. How to achieve the preservation of complex composite cultures also faces great challenges.
Canton welcomes you!
China welcomes you!

Thank you!