

Guangdong Microbial Culture Collection Center

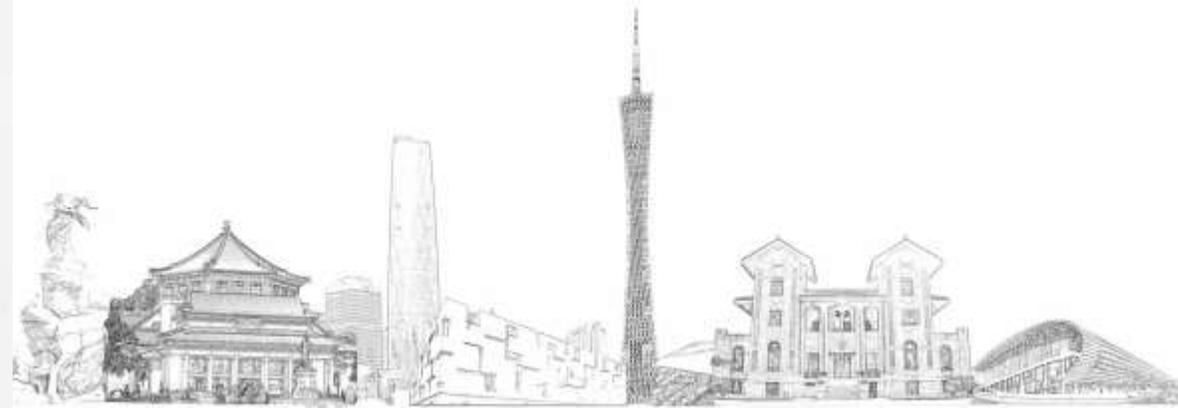
On the topic 6 “Deposit of biological material: technology trends and emerging practices in IDAs



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<https://www.gdmcc.net/>



Outline

- I Introduction of GDMCC**

- II Researches of GDMCC**

- III Practices of GDMCC**

- IV 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/>



Researches of GDMCC

- 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

2

- *Sphaerotilaceae*
- *Rhodocytophagaceae*

Novel genera

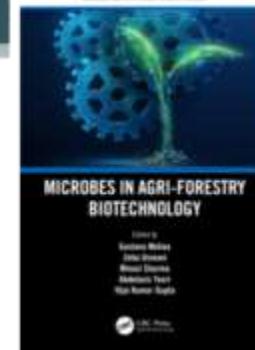
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- *Paracidovorax*
- *Paenacidovorax*
- *Pseudochryseolinea*
- *Parachryseolinea*
- *Citreicoccus*
- *Antarcticibacterium*
- *Deminuibacter*
- *Chakrabartia*
- *Parasphingorhabdus*
- *Novosphingopyxis*
- *Xanthocytophaga*

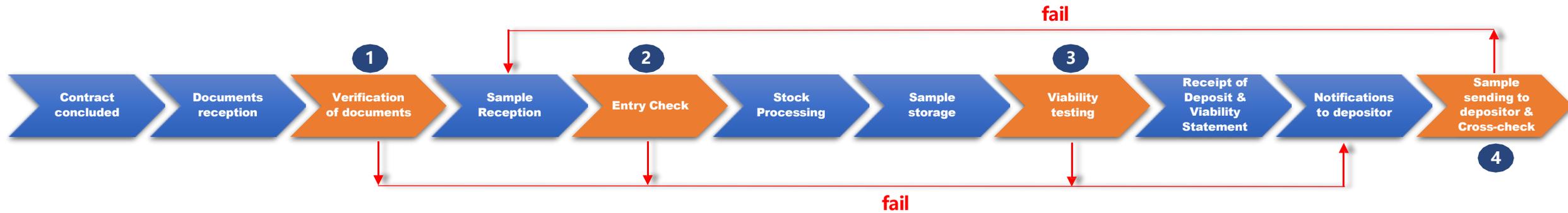
Novel species

112

- *Corallococcus silvisoli*
- *Qipengyuania aerophile*
- *Ruegeria alba*
- *Gimibacter soli*
- *Salipiger mangrovisoli*
- *Tsuneonella litorea*
- *Inhella proteolytica*
- *Chitinilyticum piscinae*
- *Ideonella aquatica*
- *Croceicoccus gelatinilyticus*
-



Practices of GDMCC: Routine procedure for patent deposit

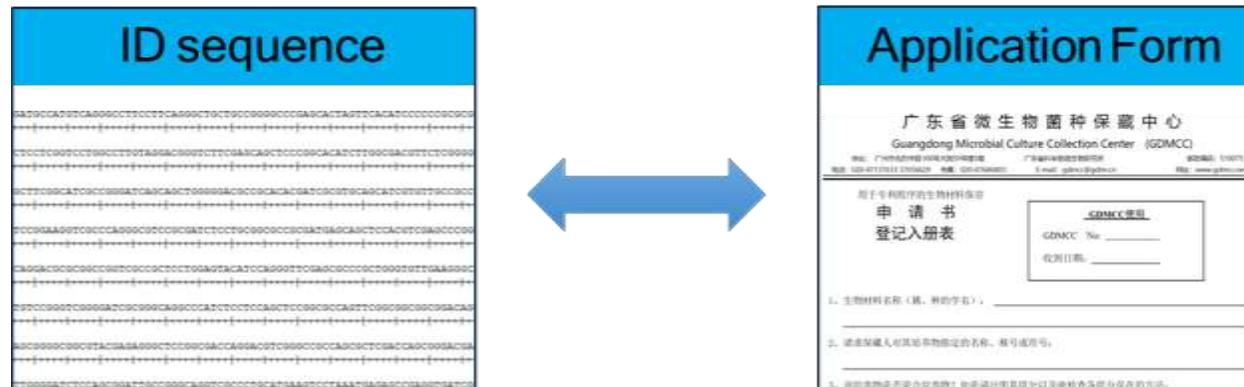


Practices of GDMCC: Routine procedure for patent deposit

Checkpoint 1



- 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.

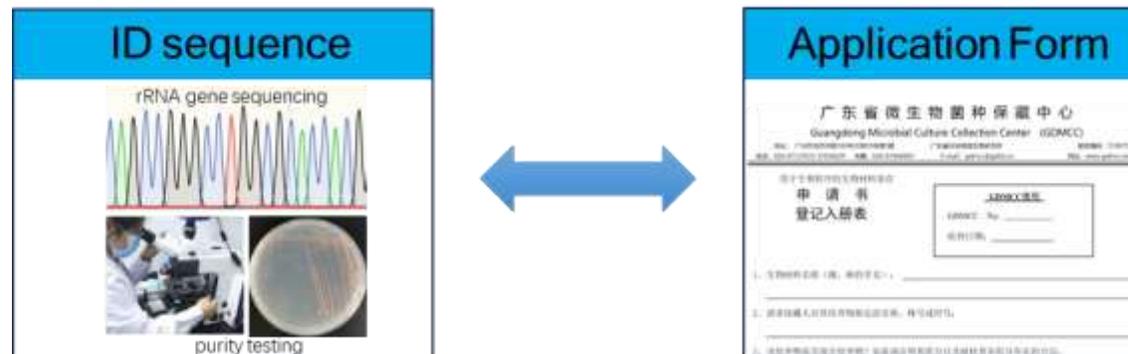


Practices of GDMCC: Routine procedure for patent deposit

Checkpoint 2



- 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.

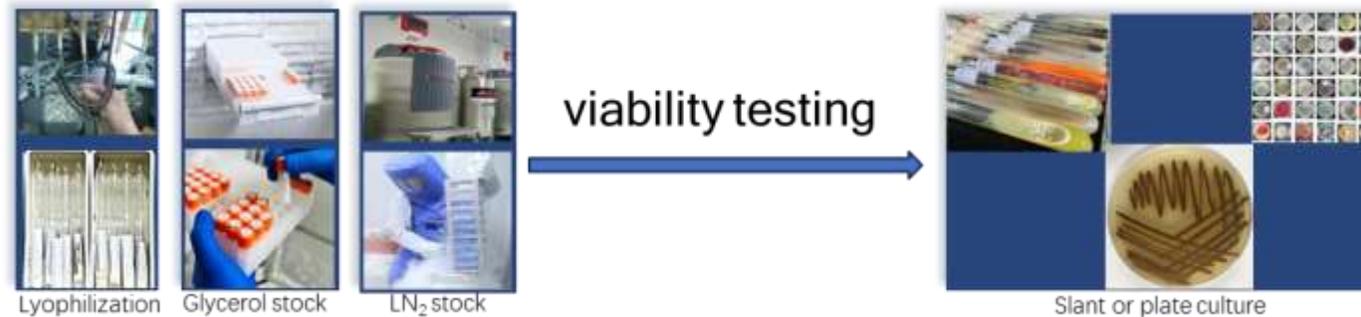


Practices of GDMCC: Routine procedure for patent deposit

Checkpoint 3

Viability testing

- 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.



Practices of GDMCC: Routine procedure for patent deposit

Checkpoint

4

Cross-check
&
confirmation

- 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.*)

Practices of GDMCC: Application of 'New Technologies' for the Preservation

- 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.



Volvariella volvacea

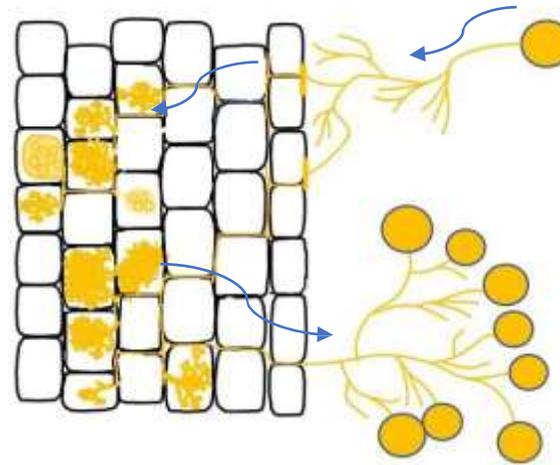


Stored at 4 °C
for one year

Fresh inoculum

Practices of GDMCC: Application of 'New Technologies' for the Preservation

- 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.

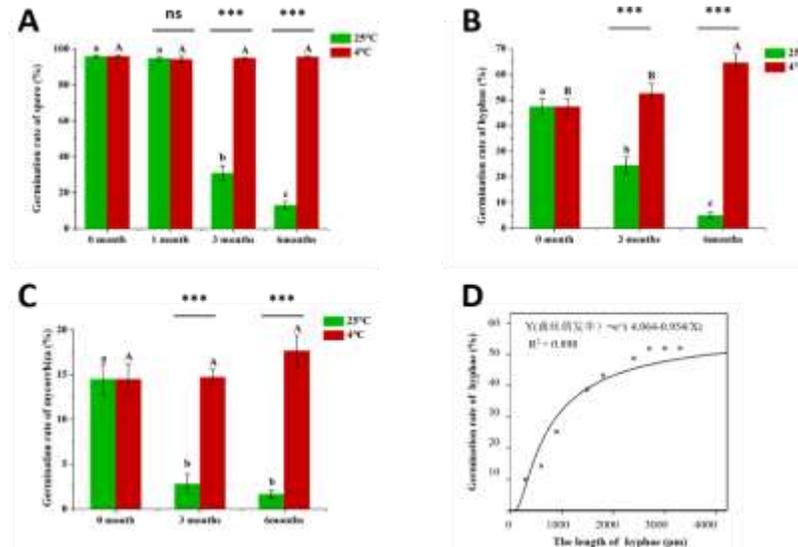


Practices of GDMCC: Application of 'New Technologies' for the Preservation

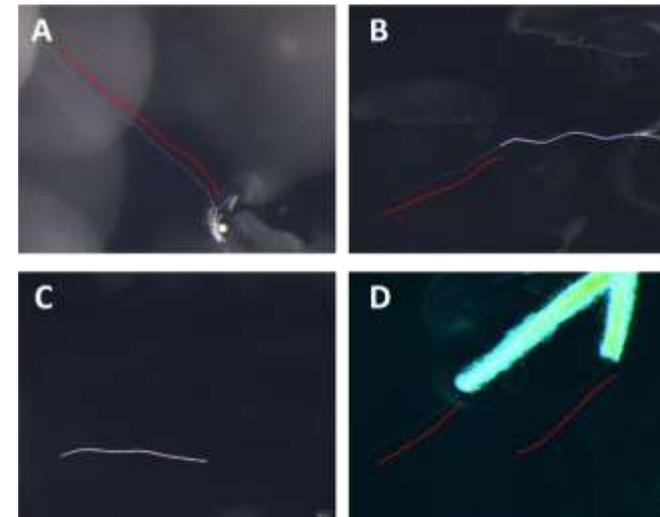
- Transformed root cultures (TRC) — *in vitro* dual culture system: root + AMF, are practically used to mass produce AMF propagules *in vitro*, which can be used in research, agriculture, and ecological restoration.
- Compared with room temperature storage, cold storage of TRC can significant enhance the germination rate of AMF spores.



TRC stored at 4 °C



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!

