從活性污泥篩選自營性氨氧化菌

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Screening of autotrophic ammonium oxidizing bacteria from activated sludge

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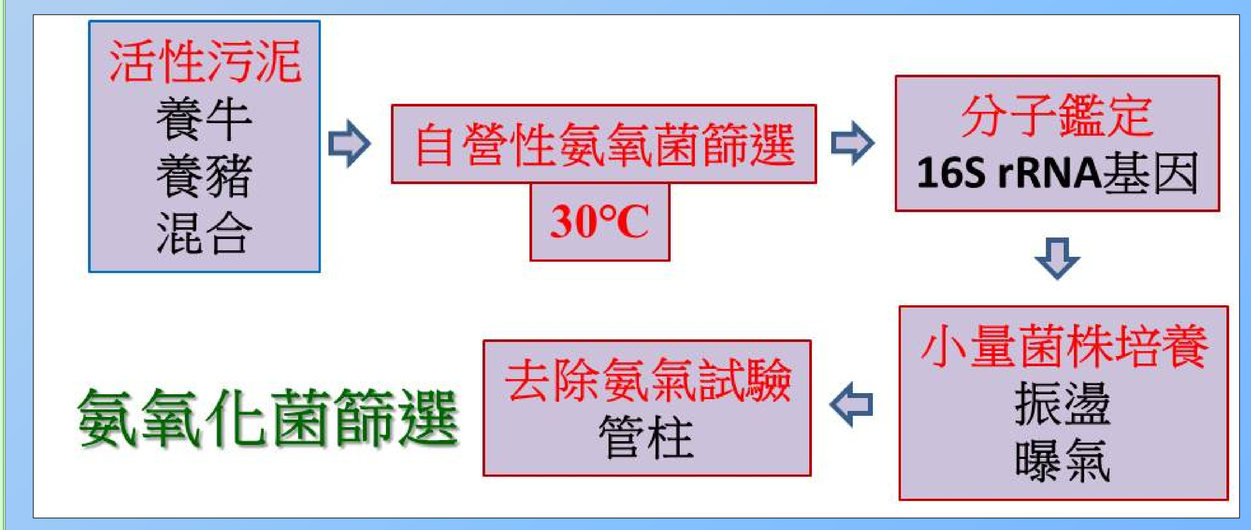
The purpose of this study was to screen autotrophic ammonia-oxidizing bacteria from the activated sludge samples of livestock wastewater treatment facilities for deodorizing bacteria. The activated sludge samples were inoculated into the special medium for autotrophic ammonium oxidizing bacteria, and cultured at 30˚C with shaking. When the color of medium turned yellow, it was titrated back to red with sodium carbonate. After four weeks of continuous shaking, the fresh medium was inoculated with 1% of the original bacterial culture. After four more weeks of culturing, the DNA of the microorganisms in the medium was extracted, and the 16S rRNA gene fragment was amplified for sequencing. The results showed that the ammonia-oxidizing isolate was not a single strain. Therefore, the 16S rRNA gene library was further constructed, and the clones were randomly selected for insert size analysis. The clones with insert size about 1.5 kb in accordance with the expected size were selected for sequence analysis. Among the 11 clones analyzed, 7 clones showed more than 95% identity to the NCBI nucleic acid sequence databank. The possible genera were *Hyphomicrobium*, *Terrimonas*, *Sphingobacterium* and *Achromobacter*. Therefore, it was likely that these strains might participate in ammonia oxidation. In the future, we will produce a large amount of culture and perform the ammonia removal test.

Key Words: Ammonium oxidizing bacteria, Activated sludge, Deodorizing bacteria

緒　言

畜禽飼養產生之臭味造成鄰近居民困擾，常遭陳情抗議，且惡臭異味本屬於民眾嗅覺不愉快之主觀判斷，因此畜殖場『鄰避(Not In My Back Yard, NIMBY)設施』臭味的防治技術具有迫切性。許多研究文獻指出，氨氧化菌如*Nitrosomonas*可用於臭味處理，且若利用具調濕設備生物濾床添加氨氧化細菌，可增進氨氣與臭味去除率，並可延長濾料使用期限，使用生物濾床較木屑脫臭槽具有較高經濟效益(程等，2010)。因此，本研究篩選自營性氨氧化細菌，先進行氨氧化能力測試，並測試菌體大量培養方式，期能進一步以草炭為生物濾床，用於降低畜禽舍或堆肥場臭味，協助改善畜禽舍臭味問題。

材料與方法



結果與討論

在分析的11個株系中，與現有NCBI核酸序列資料庫比對後，相同性≧95%的株系有7株，可能的菌屬有*Hyphomicrobium*、*Terrimonas*、*Sphingobacterium*及*Achromobacter*。

圖1.氨氧化能力測試。

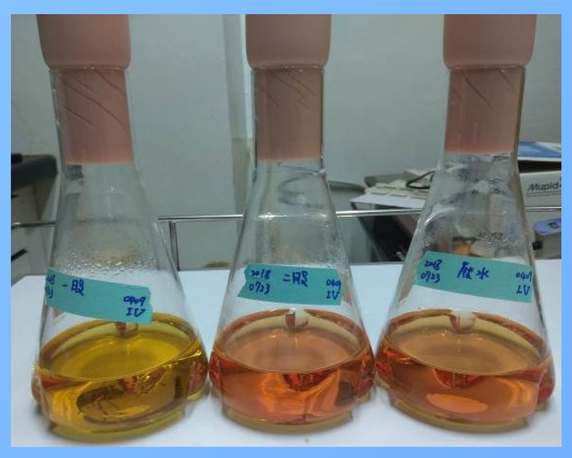


圖2.振盪培養。

圖3.曝氣培養。

結　論

自營性氨氧化菌已完成篩選與培養方式建立，可進一步進行除氨試驗。