Novel Approach to Improve Local Wisdom Using Termite Mounds in Treating Agricultural Waste

Techanitisawad, Atid (School: Bangkok Christian College)
Chanchalotorn, Siwakorn (School: Bangkok Christian College)
Tiarawut, Wasin (School: Bangkok Christian College)

After harvesting, rice stubble left in the fields become agriculture waste which is hard to removed. However, most farmers prefer the convenient way of burning the rice stubbles which eventually results in damaged of soil quality, ecosystem and air pollution. However, many farmers apply fermented termite combs to the agricultural waste, as a step to reduce rice stubble. We noticed that in paddy field, soil in the areas closer to termite mounds were more fertile than the area further away. We found that the mounds belonged to termites of the genus Microtermes that are different from most termites in other genera because they show mutualism with microorganisms in the termite combs rather than with gut protozoa. Thus, we believed that the microorganisms in the termite mounds could play important role in digesting cellulosic agricultural wastes, a concept underlining the farmers' local wisdom. We isolated microorganisms from termite combs in a selective medium and identified 2 positive isolates with high ability in digesting rice stubble both at laboratory level and in paddy field. We then designed simple treatment processes combining the farmers' local wisdom and our finding of the cellulose-digesting bacteria in the termite mounds. We established optimal carbon sources and conditions for efficient digestion of the rice stubble by the microorganisms and also increase nutrients in the soil in the paddy field.

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