Introduction of Styrofoam-Degrading Bacteria Derived from Mealworm into Intestine of Goldfish

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Plastic and styrofoam, which occupy a large proportion in marine wastes, are not degraded with ease, resulting fatal problems in aquatic ecosystem; they are frequently ingested by aquatic organisms but not excreted, so they remain in their gut causing various physiological disability. To solve this problem, it is necessary to search not only a method of reducing newborn plastic wastes, but also a method of degrading it. But the latter has not been studied well relatively. Therefore, this study was designed to isolate bacteria that is able to degrade polystyrene(PS) and introduce it into intestine of fish. As mealworm is well known for consumer of styrofoam, its intestinal microbiota has been identified. Sequencing result showed that Pseudomonas spp. take up a large proportion in it. Moreover, the isolates which has grown significantly in restricted environment with PS as a sole carbon source were identified as Pseudomonas aeruginosa. This result supports the PS-biodegradability of P. aeruginosa. To see the possibility of introduction into fish, P. aeruginosa encapsulated in alginate were fed to goldfish for 3 times in 18 hours and microorganisms in feces were checked. P. aeruginosa was detected in feces until about 6 days after introduction. Based on these results, this study suggests that the introduction of PS-degrading bacteria using encapsulation is possible but longer-term introduction is required for stability. Also, P. aeruginosa, which was resulted to be PS-degradable, is expected to be valuable for studies about genes associated with plastic degradation since full genome of it has been decoded already.

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