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Environmental Engineering
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435 Min Kao

The microbial ecology of bacterial lignocellulose degradation in the ocean

Graduate Advisor: Governor's Chair Professor Terry Hazen, Ph.D.

In recent years, more research has investigated the biodegradability of lignocellulose for biofuel production. The components of the lignocellulosic plant cell wall are considered intrinsically recalcitrant due to their structure. However, we hypothesize that these components are not intrinsically recalcitrant but their biodegradation is contingent on the environmental conditions, particularly the bacterial diversity. We believe bacteria will become especially important in lignocellulose degradation in conditions that are unfavorable for white-rot fungi. Therefore, we investigated the potential for lignin degradation by bacteria in the ocean where fungi would likely be rare. This knowledge would gather insight into allochthonous terrestrial organic carbon cycling in the ocean, a basic science knowledge gap in the complex ocean carbon cycle. Also, our investigation into the microbial ecology of marine lignocellulolytic bacteria may find new hosts of stress-tolerant commercial enzymes for biofuels and lignin valorization.

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