Biological Potential of Chitinolytic Marine Bacteria

Chitinolytic microorganisms secrete a range of chitin modifying enzymes, which can be exploited for production of chitin derived products or as fungal or pest control agents. Here, we explored the potential of 11 marine bacteria (Pseudoalteromonadaceae, Vibrionaceae) for chitin degradation using in silico and phenotypic assays. Of 10 chitinolytic strains, three strains, Photobacterium galatheae S2753, Pseudoalteromonas piscicida S2040 and S2724, produced large clearing zones on chitin plates. All strains were antifungal, but against different fungal targets. One strain, Pseudoalteromonas piscicida S2040, had a pronounced antifungal activity against all seven fungal strains. There was no correlation between the number of chitin modifying enzymes as found by genome mining and the chitin degrading activity as measured by size of clearing zones on chitin agar. Based on in silico and in vitro analyses, we cloned and expressed two ChiA-like chitinases from the two most potent candidates to exemplify the industrial potential.

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