

Natural products from Actinobacteria associated with fungus-growing termites.

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Abstract

The chemical analysis of insect-associated Actinobacteria has attracted the interest of natural product chemists in the past years as bacterial-produced metabolites are sought to be crucial for sustaining and protecting the insect host. The objective of our study was to evaluate the phylogeny and bioprospecting of Actinobacteria associated with fungus-growing termites. We characterized 97 Actinobacteria from the gut, exoskeleton, and fungus garden (comb) of the fungus-growing termite *Macrotermes natalensis* and used two different bioassays to assess their general antimicrobial activity. We selected two strains for chemical analysis and investigated the culture broth of the axenic strains and fungus-actinobacterium co-cultures. From these studies, we identified the previously-reported PKS-derived barceloneic acid A and the PKS-derived rubterolones. Analysis of culture broth yielded a new dichlorinated diketopiperazine derivative and two new tetracyclic lanthipeptides, named rubrominins A and B. The discussed natural products highlight that insect-associated Actinobacteria are highly prolific natural product producers yielding

important chemical scaffolds urgently needed for future drug development programs.

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