

Bacterial Symbionts of Reef's Invertebrates as a Sustainable Source of Marine Natural Products

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Abstract: Marine invertebrates are mainly accumulating within coral reef ecosystems such as soft corals, sponges, tunicates and bryozoans have long been recognized as the prolific sources of structurally unique and diverse natural products since they provide a large proportion of bioactive compounds with different biological activities. Unfortunately, the supply of these bioactive natural products is usually insufficient to meet the ultimate development of most marine natural products. The concentrations of many highly active compounds in reef's invertebrates are often minute, accounting for less than 10⁻⁶% of the wet weight. This problem has been viewed as the most significant threat regarding the development of pharmaceutical from reef's invertebrates. The secondary metabolites from bacterial symbionts, on the other hand, are a rapidly growing field, due to the suspicion that bioactive metabolites obtained from invertebrates may be produced by their bacterial symbionts. In particular, from sustainability point of view, isolating bioactive-producing bacteria is obviously offers a much better approach than cultivating and harvest invertebrates, which are in most cases extremely difficult. Bacteria isolated from living surfaces, in particular from reef's invertebrates, are a promising source of natural products. It is expected that still quite a few parts of unexplored culturable bacterial symbionts exists in the reefs. Such information might be desirable, as these bacterial symbionts may serve beneficial purposes as the source of secondary metabolites including novel marine natural products.

Key words: Bacterial symbionts, marine natural products, reef's invertebrates

INTRODUCTION

The oceans are the source of a large group of structurally unique natural products that are mainly accumulated in invertebrates that are common to coral reef ecosystems, such as sponges, tunicates, bryozoans, soft corals and molluscs. This diversity has been the source of unique chemical compounds with the potential for industrial development as pharmaceuticals, cosmetics, nutritional supplements, molecular probes, enzymes and agrichemicals. Thus, coral reef represents a virtually unexploited resource for discovery of even more novel compounds with useful applications.

There are several limitations have been recognized in the utility of marine natural products. Serious obstacle to the ultimate development of most marine natural products that are currently undergoing evaluation and trials is the problem of supply due their low concentrations. The concentrations of many highly active compounds in marine invertebrates are often minute, sometimes accounting for less than 10⁻⁶% of the wet weight (Procksch *et al.*, 2002). The problem of supply has been viewed as the most significant threat regarding the development of pharmaceutical from reef's invertebrates. Providing sufficient amounts of these biologically active substances, hence, may be a