

Review

Halogenated Metabolites from the Diet of *Aplysia dactylomela* Rang

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Abstract: Invertebrates are an important source of structurally-diverse and biologically-active halogenated metabolites. The sea hare *Aplysia dactylomela* Rang has long been known to possess halogenated metabolites of dietary origin that are used as a self-defense mechanism. The compounds from *Aplysia dactylomela* Rang are comprised mainly of terpenoids and small percentages of C-15 acetogenins, indoles, macrolides, sterols and alkaloids with potent cytotoxic, anti-microbial and anti-inflammatory properties. For decades the metabolites discovered have been investigated for their medical and pharmaceutical applications, so much so that the ecological role of the metabolites has been overlooked. The interaction between *Aplysia dactylomela* Rang and its diet that is comprised of seaweed can provide information into the distribution and diversity of the seaweed, the application of bioaccumulated secondary metabolites as part of its defense mechanism and the potential roles of these metabolites for adaptation in the marine environment. This paper compiles the diversity of halogenated secondary metabolites documented from *Aplysia dactylomela* Rang.

Keywords: sea hare; invertebrate; halogenated; secondary metabolite; bio-activity

1. Sea Hare *Aplysia dactylomela* Rang

Sea hares are gastropod mollusks that supply one of the richest sources of halogenated secondary metabolites among marine invertebrates [1]. Since the 1960s sea hares have been investigated for their diet-derived halogenated secondary metabolites. With greatly reduced shell and potential vulnerability to predators, these organisms are forced to display effective chemical defense. These chemicals are sequestered from their diet [2] and stored in tissues exposed to predation [3].

Aplysia dactylomela Rang is known to selectively feed on the red algae genus *Laurencia* that produces a diverse range of halogenated secondary metabolites [4]. It is also known to bio-accumulate and sequester metabolites through transformation of existing compounds for defenses against predators [5]. The relationship between the sea hare and red algae is also shown in the purplish chemical ink it secretes as