

Antibacterial Activity of Marine Bacterium *Pseudomonas* sp. Associated with Soft Coral *Sinularia polydactyla* against *Streptococcus equi* Subsp. *zooepidemicus*

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Abstract: A marine bacterium associated with soft coral *Sinularia polydactyla* collected from Bandengan water, Jepara, North Java Sea, Indonesia, was successfully screened for antibacterial activity against pathogenic bacterium *Streptococcus equi* subsp. *zooepidemicus* K6.72 isolated from infected monkey of the island of Bali and identified based on morphological, biochemical and molecular methods. Marine bacterium was identified as *Pseudomonas* sp. based on its 16S rDNA and was found to amplify gene fragments of Non-ribosomal peptide synthetase (NRPS). Cloning and subsequent sequencing, a 360 bp long DNA fragment was obtained and the deduced amino acid sequence showed conserved signature regions for peptide synthetases and revealed a high similarity of 61.1% to genes peptide synthetase of *Bacillus subtilis*.

Key words: Screening, soft coral-associated bacteria, secondary metabolites

INTRODUCTION

Soft corals are an important and diverse group of colonial invertebrates belonging to the Phylum Coelenterata (Cnidaria), Class Anthozoa, Subclass Octocorallia. One of the major groups, the order Alcyonacea consists of hundreds of different species including the member of *Sinularia* can dominate many Indo-Pacific reefs (de Nys *et al.*, 1991). Furthermore, one of the reasons for the evolutionary success of the alcyonacean soft corals in the Indo-Pacific is considered to be the high level of secondary metabolites commonly found in their tissues (Sammarco and Coll, 1992). Thus, it has been the main reason for the searching of secondary metabolites with various biological activities from softcorals.

Among streptococcus, *Streptococcus equi* subsp. *zooepidemicus* has been known as the cause of infection of a wide variety of animals such as pigs, cows, goats and monkeys (Salasia *et al.*, 2004), which resulted in the occurrence of pneumonia, meningitis and arthritis. Infections of streptococcus group C (SGC) have been reported from Mexico (Edwards *et al.*, 1988) and the island

of Bali, Indonesia (Salasia *et al.*, 2004). Further, Bradley *et al.* (1991), reported that infection of SGC was caused by pathogenic *Streptococcus zooepidemicus* (72.7%).

Bioactive-producing marine invertebrates, including softcorals are insufficient for producing commercial quantities of metabolites of interest. Therefore, a solution to overcome the problem of supply is needed. It has been widely reported that many bioactive natural products from marine invertebrates have striking similarities to metabolites of their associated microorganisms including bacteria (Proksch *et al.*, 2002; Thiel and Imhoff, 2003; Radjasa *et al.*, 2007). Thus, it is important to highlight the possible role of marine bacteria associated with soft coral in providing solution to the problem of infection by pathogenic bacterium *Streptococcus equi* subsp. *epidemicus*. Bacteria-soft coral association that occurs on the soft coral surface then could be of great interest to search for potential use as new source of antibiotics.

Advanced techniques of molecular biology such as Polymerase Chain Reaction (PCR), in particular the application of degenerated primers of Non-ribosomal peptide synthetases (NRPS) to amplify gene fragments