

Characterization of Psychrotrophic Bacteria from Sea Waters of Makasar Strait, Indonesia

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Abstract: In this study we isolated marine bacteria from seawaters of Makasar Strait, Indonesia and tested for low temperature adaptation profiles. A total of 27 bacterial isolates represented the most dominant colonies in ZoBell agar plates were selected and tested for low-temperature adaptation, in which all isolates were able to grow at 4 and 20°C incubation indicating that they are psychrotrophic bacteria. A rapid grouping by using repetitive PCR was carried to estimate the richness of the isolates. Following sequencing, it was shown that psychrotrophic bacteria belonged to the members of genera *Psychrobacter*, *Pseudomonas* and *Vibrio*.

Key words: Psychrotrophic bacteria, deep-sea, Makasar strait, *Psychrobacter*, *Pseudomonas*, *Vibrio*

INTRODUCTION

Low temperature adapted bacteria have been classified based on the occurring of growth at 4 and 20°C, i.e., psychrophiles were those able to grow at 4°C but unable to grow at 20°C, whereas psychrotrophs were those able to grow both at 4 and 20°C incubations (Urakawa *et al.*, 1999a; Radjasa *et al.*, 2001).

Several studies have been carried out to determine the richness of low temperature adapted-bacteria from geographically different regions (Bowman *et al.*, 2003; 1997; Urakawa *et al.*, 1999a,b; Radjasa *et al.*, 2001; Knoblauch *et al.*, 1999).

Rapid groupings of psychrotrophic bacteria based on molecular based-approaches have reported, such as RFLP (Restriction Fragment Length Polymorphism) (Urakawa *et al.*, 1999a,b; Radjasa *et al.*, 2001).

Recent technique known as repetitive sequence-based PCR (rep-PCR) has been applied to group a numbers of bacterial isolates that produced complex fingerprint profiles from both gram positive and negative bacteria (Rademaker and de Bruijn, 1997). However, this technique has not been employed to estimate the richness of marine psychrotrophic bacteria.

To my knowledge, there has no report been documented on the diversity of marine psychrotrophic bacteria from Indonesian waters. Studies regarding diversity of low temperature adapted-bacteria are important for understanding principal processes in the deep waters. Near Indonesia several deep-seas exist with diverse environmental conditions. However, up to now there has been no effort to study the microbial communities of the deep-sea environments by Indonesian scientists.

Microorganisms evolving in habitats with low temperatures need to be studied to understand their adaptation, the distribution within the ocean and the role of in the bio-geochemical processes as well as their biotechnological potentials.

In this study, we reported the richness of psychrotrophic bacteria isolated from the deep-sea waters of Makasar Strait, Indonesia assessed by 16S rDNA approach.

MATERIALS AND METHODS

Sampling and isolation of low temperature-adapted bacteria: Seawaters were collected by water samplers attached to CTD from Makasar Strait, Indonesia (Fig.1) during INSTANT Cruise on R/V Baruna Jaya I.