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**Isolation and Physiological Characterization of PGPR from Potato Plant Rhizosphere in Medium Land of Buru Island**

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**Abstract**

A total of 70 bacteria were isolated from the rhizosphere of potato cv. Hartapel that grew at an altitude of 700 m above sea level on the island of Buru-Maluku. Of these isolates, 36 isolates were capable of producing IAA, GA, Siderophore and phosphate solubilization. Among the selective isolates, isolate HB8 produced the highest amount of IAA (5.816 mg l<sup>-1</sup>), while isolate HB32 produced the highest amount of GA (6.879 mg l<sup>-1</sup>). Isolate HB18 had the best ability in producing salicylate type siderophore (4.214 mg l<sup>-1</sup>) and isolate HB3 showed the highest phosphate solubilization (14.237 mg l<sup>-1</sup>). There were three isolates (HB3, HB8 and HB31) positively produced HCN. All 36 isolate showed physiological characters which revealed the potential use for biostimulant, biofertilizer and bioprotectant against soil borne pathogens.

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*Key words : Potato cv. Hartapel, PGPR, Isolates, physiological characters, Bioprotectant, Medium land.*

**INTRODUCTION**

Potatoes are one of the world's major food after rice, wheat, and corn but potatoes is relatively insensitive to losses due to soil salinity, drought, and low nutrient availability [1]. Potatoes in Indonesia are generally cultivated in the highlands, it is an obstacle in preserving nature. Cultivation of potato in the highlands can constantly damage the environment, especially the occurrence of soil erosion and lowered productivity. Therefore, the expansion

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step in land medium potato planting is one of the alternative measures that could be pursued, on the other hand these efforts will have problems due to environmental factors such as high temperature changes can hinder the process of tuberization.

One effort that can be done is through the use of microbes as biostimulant effort, biofertilizer and bioprotectant. This is due to different types of microbes such as bacteria have been known to be used as a biocontrol agent to enhance the growth and production of plants known as the Plant Growth Promoting Rhizobacteria (PGPR), these bacteria are actively colonize the rhizosphere around the root surface and provide a positive influence to spur growth plants by providing nutrients and hormones to the plant and can be antagonistic to bacterial and fungal pathogens. These bacteria have the ability to provide and facilitate the absorption of various nutrients such as nitrogen and phosphate in the soil as well as synthesize phytohormones hyper growth [2].

Plant Growth Promoting Rhizobacteria can provide benefits through a variety of mechanisms such as helping plant the induced systemic resistance [3] and induced systemic tolerance [4]. Some strains of *Bacillus* have been isolated from the rhizosphere of potato [5,6,7], but there has been no research reports that discuss the role of the bacterial strains in abiotic stress tolerance in potato plants.

The purpose of the study is isolate and characterize the physiological rhizosphere bacterial isolates potential as biostimulant, biofertilizer and bioprotectant which can to growth plants and confer protection against soil borne pathogens.

## **MATERIALS AND METHODS**

### **Source of bacteria**

Bacteria were isolated from the rhizosphere soil samples Hartapel varieties of potato plants that grow on the altitude of 700 m above sea level in Leksula, Buru South-Maluku, Indonesia. In each sampling point, one sample consisted of rhizosphere soil (soil around the root zone) plants. Soil samples have been taken at a depth of 0-20 cm in the four quadrants stands Hartapel potato varieties then were combined.

### **Isolation of rhizosphere soil samples of potato**

Isolation of rhizosphere bacteria carried by serial dilution method. Ten grams of rhizosphere soil was weighed and dissolved in 90 ml of sterile water, then shaken for 30 minutes. One ml of rhizosphere soil suspension was added to a test tube containing 9 ml of sterile water to obtain a suspension with a  $10^{-2}$  dilution level. Dilution was done so in the same manner until

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