

**A STUDY ON THE PLANT GROWTH-PROMOTING RHIZOBACTERIA  
(PGPR) AND ITS EFFICIENCY TO ENHANCE THE GROWTH OF MR263  
VARIETY OF PADDY**

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## ABSTRACT

Plant growth promoting rhizobacteria (PGPR) is the bacteria that live freely in the soil rhizosphere. It is the soil bacteria that live around or at the plant roots. The mechanism of the rhizobacteria to enhance and promote the growth and development of the plant through the direct or indirect mechanism. This process can be done via discharge and production of many type of chemical into the soil rhizosphere. The use of PGPR will give the significant effect which is increase the agriculture production and quality. Other than that, the using of PGPR in agriculture will reduce the using of chemical input like pesticide, herbicide, and others which is will reduce the environmental pollution trough the agriculture activities. Thus, I was isolate the PGPR and study the characteristic of the PGPR that was took from the soil rhizosphere of paddy field 5 different location in Melaka state. The isolated PGPR that obtain from the field was randomly choose and assigned as PGPR 1, PGPR 2, PGPR 3, PGPR 4, and PGPR 5. All the five PGPR was successfully isolated and cultured in Nutrient Agar (NA) plate. In order to determine the efficiency of the PGPR isolate to enhance the growth of MR263 variety of paddy, the pot experiment was conducted and obtained. During the pot experiment, all the seeds was treated with different PGPR strain to obtain the result. Seeds that not treated was used as the control. From the pot experiment, the growth of the treated paddy seedling is better compared to the control paddy seeds. Other than that, the germination that was conducted shows the PGPR isolate was give the significant effect on increase the germination process of the seed. From the study, it can be suggested that the isolate of PGPR 1 and 4 can be used as the bio-fertilizer that can enhance the growth of paddy plant.

## CHAPTER 1

### INTRODUCTION

#### 1.1 Background of the study

Bacteria are known as the microorganism that lives freely in the soil ecosystem. Bacteria that settle down in the soil rhizosphere and also at the plant root will boost the plant growth and development by any mechanism that usually mentioned as plant growth-promoting rhizobacteria (PGPR) (Ashrafuzzaman, et al., 2009). The awareness about increasing of world concern for food and environmental quality, the application of PGPR is needed in order to decrease the use of chemical inputs into the agriculture area has become very significant and essential issues. Since today, various type of crops has been introduced with the PGPR in order to increase growth of the crops, seed germination and crop production (Ashrafuzzaman, et al., 2009). Some of the application has been commercialized in the market place to meet the people demand. For example, a PGPR *Pseudomonas fluorescens* that isolated into the root of graminaceous plants and crops.

The result was shown that the bacteria has colonized the roots of the various plants, increase the height of the plant, the number of flower produced, number of fruit and total weight of the fruit produced by the tomato plants (Minorsky, 2008). In addition, under the salinity stress, the PGPR have shown the good and significant effect on the plants established on the parameter like the germination rate of the seeds, tolerance toward the drought and dry condition, weight of shoot and root produced by the plant, yield produced and also enhance and improve the growth of the plant itself (Kloepper et al., 2004).