

**UNIVERSITI TEKNOLOGI MARA**

**PHYTOREMEDIATION ACTIVITY  
ON *Heliconia psittacorum* VIA WATER  
QUALITY TESTING AND BACTERIA  
IDENTIFICATION**

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Thesis submitted in partial fulfillment  
of the requirements for the degree of  
**Bachelor of Science (Hons.)  
Biology**

**Faculty of Applied Sciences**

**January 2020**

## AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi Mara. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic or non-academic institution for any degree or qualification.

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## ABSTRACT

The accumulation of contaminants capable to give negative impact towards environment in various ways. Thus, phytoremediation come as a cost-effective technology that used plant and associated microbes to outweigh the problem in soil and water contamination. *Heliconia psittacorum* becomes one of the plants that have potential characteristic as phytoremediation and ecological friendly. This study was aimed to analyze the concentration and identification of bacteria that could assisted in phytoremediation. Besides, the water quality was tested to correlate with the phytoremediation activity of *Heliconia psittacorum*. Two samples of soil and roots were prepared and serially diluted for bacteria counting. The concentration of bacteria in roots sample was  $4.4 \times 10^9$  cfu/ml, while, for soil sample was  $1.5 \times 10^4$  cfu/ml. Roots often associated with bacteria and eventually contribute to a higher concentration of bacteria compared to soils. Several suspected colonies then picked, cultured and identified based on biochemical tests and API identification kits. Seven strains of bacteria were identified consisted of *Pseudomonas luteola*, *Serratia liquefaciens*, *Serratia marcescens*, *Enterobacter cloacae*, *Staphylococcus xylosus*, *Staphylococcus saprophyticus* and *Enterococcus faecium*. All bacteria that were identified provide a related background mechanism that capable to remove, transfer, stabilize contaminants and indirectly enhanced the plant growth. Besides, the water quality showed reduction in individual concentration of copper, zinc and phosphate from 0.64 mg/l to 0 mg/l, 0.173 mg/l to 0.068 mg/l, and 0.513 mg/l to 0.293 mg/l respectively. In conclusion, the concentration and identification of bacteria in roots and soil provided information regarding on the ability of these bacteria to reduce the contaminants and the water quality assessment proved the potential of *Heliconia psittacorum* in phytoremediation.

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