

## THE EFFECT ON PHENOLIC CONTENT AND ANTIOXIDANT CAPACITY OF SELECTED MEDICINAL PLANT PLANTED ON CONTAMINATED SOIL

Enos Jeffry\*, Normala Halimoon

M.Sc (GS 23784)  
2<sup>nd</sup> Semester

---

Introduction, Hypothesis, Problem Statement, Significance of Study, Literature Reviews

In this globalization, pollution is one the most serious of all environmental problems and at its worst poses a major threat to the health and well-being of million of people and the global ecosystem. Heavy metals are considered to be one of the main sources of pollution in the environment, since they have a significant effect on its ecological quality (Sastre *et al.*, 2002). The present of heavy metal in sludge that producing by the several industries is a major problem where is can effect the environmental, soil, water qualities, living organism and human health. The heavy metal contamination can come from various type of sludge for example from sewage sludge. The Department of Environment of Malaysia (2000) reported that improper disposed of sludge by the industry is the main contributors of soil and water pollution and environment degradation.

The most of technique today are using plant as a phytoremediation. Phytoremediation is the process to remove organic and inorganic substance from water/ soil contaminated by plant. These techniques are practical and inexpensive. In general some of plant that been used not only can acts as a phytoremediators but also have the potential in the medicinal uses it call medicinal plant. Medicinal plants are believed to have ability to chelate contamination by producing chelating agent along with other medicinal compound such as polyphenol and antioxidant. Previous studies have shown that phenolic compounds display antioxidant activity as a result of their capacity to scavenge free radicals (Seyoum, Asres, & El-Fiky, 2006). Phenolic compounds can also act as antioxidants by chelating metal ions, preventing radical formation and improving the antioxidant endogenous system (Al-Azzawie & Mohamed-Saiel, 2006).

However, what the risk if we planting the medicinal plant on contaminated area may be the medicinal properties will polluted by the contamination. According to the WHO guidelines, the production of herbal medicines must be in good quality, safe, sustainable and poses no threat to either people or the environment. The hypothesis tested in this study was if medicinal plants could be grown as a phytoremediation in heavy metal polluted soils without contamination of the final marketable produce.

The object of this research is:

1. To determine the phenolic content and measure the antioxidant capacity of the examined plant.
2. To study the medicinal properties as a metal chelating agent.
3. To evaluate the potential of selected medicinal plant as a phytoremediators without contamination on their medicinal properties.

Research Methodology

1. Experiment will be conducted in greenhouse.
2. Examine medicinal plant
  - Pokok Jarak
  - Pokok Jelutung
  - Pokok Gelam
3. Preparation of sludge and plant (Figure 1)
  - Sewage sludge will be used. The sewage sludge will be mixed according to the following soil:sludge ratios; 100:0, 80:20, 60:40, 40:60, 20:80, 100:0.
  - 3 different species will be selected (Gelam, Jarak, Jelutung) will be done in the greenhouse experiment.
4. Plant Screening
  - Identification of medicinal properties will be done with three different extract solution in three different part of exmine plant. Part of exmine plant ( Leaf, Stem, Root), Extract Solution ( Methanol, Water, Metahanol:Water).
  - Evolution of metal chelating activity will be done using metal chelator assay procedure to study the metal chelator in plant extract to chelate the metal pollution.
  - Identification of medicinal properties of plant extract that contain metal contaminations will be studied.
5. Experiment design
  - 1 type of sludge X 6 mixture X 3 plant spesies X 3 replicates X 6 times harvesting (every 1 month) = 324 sample
6. Frame work (Figure 2)
  - Greenhouse experiment: conduting pot trials of selected medicinal plant
  - Laboratory analysis: Trace of medicinal properties will be determine using HPLC. Evolution of metal chelating agent will be test by using metal chelator assay. Trace element and other heavy metals in sludge/plant will be analysed using ICP-MS.

Expected result

- It is expected that we will discover new value added uses of medicinal plant on their potential in medicinal and as a phytoextractors without contamination of the final marketable produce.

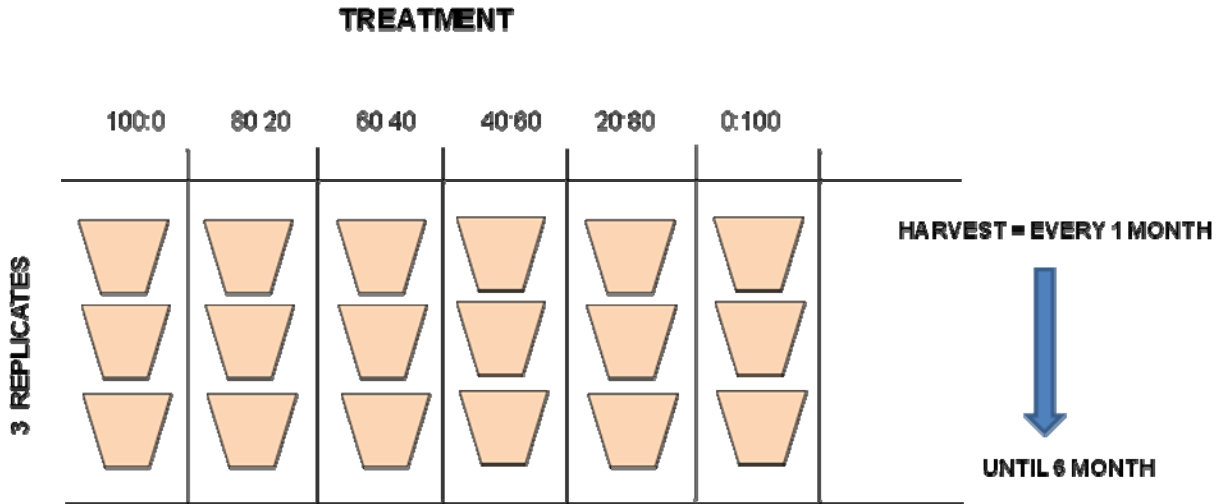


Figure 1

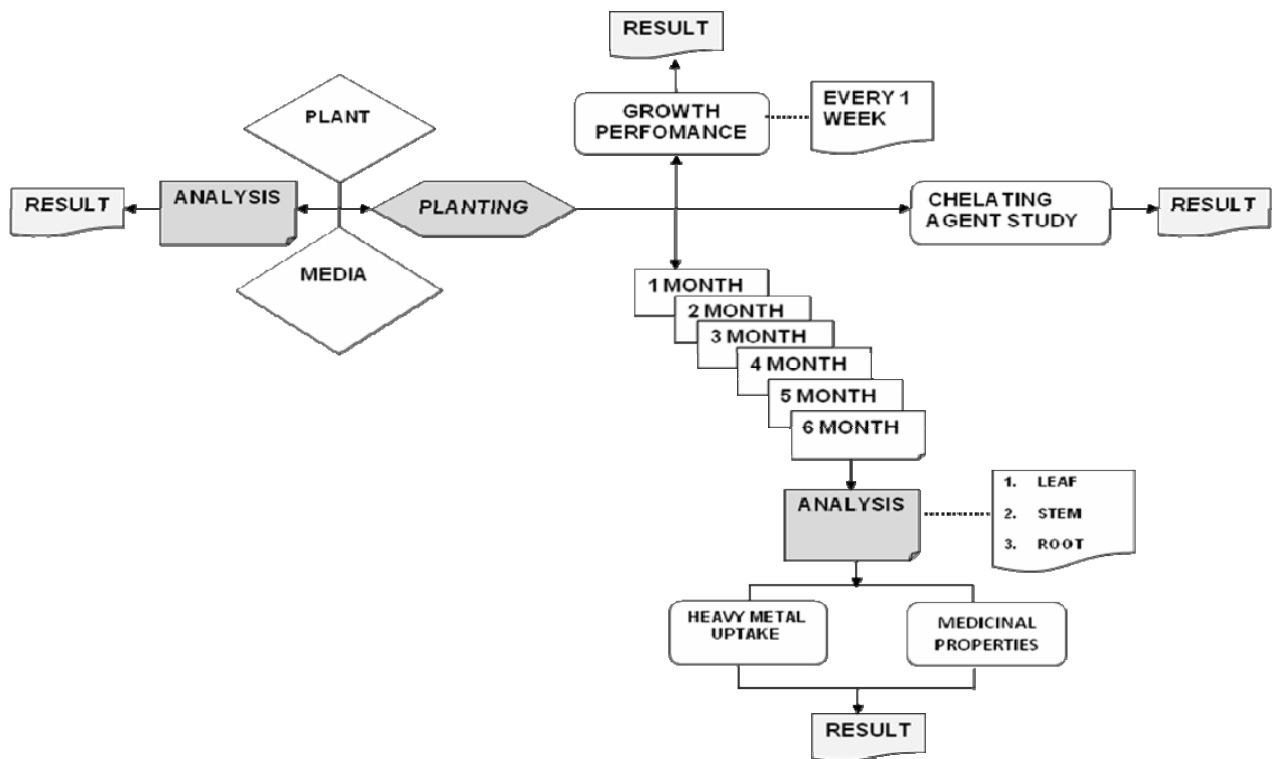


Figure 2