Fermented Weed Juice as Catalyzer on Growth and Yield of *Luffa acutangula*

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ABSTRACT

Weed was commonly described as unwanted plant. It was a highly successful wild plant, adapted to rapidly colonies bare ground or land that constantly being disturbed. Weeds may give the benefit effects if it was converted to natural fertilizer such as Fermented Weed Juice. The application of fermented weed juice in natural farming system can reduce the application of chemical fertilizer in agriculture and at the same time reduced the unwanted plant in the field. The objectives of this study were to identify the best types and rate of Fermented Weed Juice on growth and yield of Luffa acutangula. This study was conducted at 100 Acre, UiTM Jengka, Pahang from May 2012 until January 2013. The study was carried out by using Randomize Completely Block Design with 13 treatments and four replications. The treatments consist of three types of weed that were Amaranthus spinonsus, Chromolena odorata, and Asystasia gangetica with 10ml, 20ml, 30ml and 40ml of fermented weed juice applied as foliar fertilizer. Data collected were analyzed by using MINITAB and Microsoft Excel to compare the each treatment. Asystasia gangetica with 30 ml give the best effect to the height, number of leaves and number of fruits of Luffa acutangula. From this study it can be concluded that Asystasia gangetica with 30 ml was the best treatment among the others.

Keywords: *weeds, natural, growth*

Introduction

Farming was defined as practice or business for growing crops or rearing animals on a farm. Conventional farming known as modern farming that used the new technology to support the production of yield. It also defined as an industrial farming or agricultural system that used modern mechanization, chemical fertilizer and chemical pesticide to maximize the productivity and profitability. This system helps to ensure the well being of human world population in order to supply food for human consumption (Eicher, 2003).

Conventional farming had been widely used and extremely effective to provide the source of food supply for the world during the Second World War at 1939 to 1945 (Mitchel, 2007). In addition, this farming was developed with various environmental protections such as water pollution and prevention of soil erosion. However, poor management practice such as application of chemical in field had affected the surrounding environment.

Since 1950s, Malaysia was practices the nature technique or traditional technique toward environmental friendly and human health protection. However, after chemical and pesticide policy announce by government, it had direct and indirectly effect to human health and nature ecological. The application of chemical and pesticide in agriculture area was to increase the profitability and yield in order to coop with human demand (Van, 2006). Furthermore due to reliance on synthetic-chemical fertilizer and pesticides have serious impact on public health and environment. In United States, the estimation of environment and health care cost of the recommended use of pesticide was about $10 billion per year (David et al, 2005).

Due to that, natural farming was introduced to the agriculture system and was developed gradually because it's environmental friendly technique. Natural farming seeks to augment ecological process that foster plant nutrient while conserving soil and water resource. The natural farming systems eliminate agrichemical and reduce other external input to improve environment as well as farm economics. This method give advantages to the consumer of how their food is produced and for the first time consumers have the ability to select food base on food production method (David et al, 2005).

In Malaysia, applications of chemical fertilizers used in conventional farming have huge effects on consumer health and also to the environment. Farming method should be switched from conventional to the application of natural farming. Development of organic fertilizer is one of the methods to reduce the application of chemical fertilizer in farming system. So, weeds are selected as source of organic fertilizer because it has the own potential to increase crop growth under certain circumstance and at the same time it can reduce the population of weeds in certain area. The study was conducted with the aim to identify the best types and rate of Fermented Weed Juice on growth and yield of *Luffa acutangula.*

Materials and Methods

Site preparation

The study was conducted in Share Farm 100 Acres in University Teknologi MARA Pahang. Coco peat was used as planting medium and filled in polybag size of 15 inches x18 inches. Before that seeds of *Luffa acutangula* were sowing in germination tray and ready for transplanting after one week of germination into the polybags.

Preparation of Fermented Weed Juice (FWJ)

Types of weeds used in this study were *Amaranthus spinonsus* (Bayam Duri), *Chromolaena odorata* (Rumput Kapal Terbang), and *Asystasia gangetica* (Rumput Israel) (Figure 1). The process in preparing FWJ started with mixing together weeds with brown sugar. This process was conducted three times with different types of weeds and it has been placed in plastic containers that covered with white paper. The material was placed and stored under the shade for five to seven days after completed mix the material. Once fermentation process was completed, the material was filtered by using sieve to extract the solution of weeds that we call Fermented Weed Juice (Figure 2). This solution has been tested as catalyzer to the growth and yield of *Luffa acutangula.*

Treatment and experimental design

Thirteen treatments including control were used in this study consists of FWJ for *Amaranthus spinonsus, Chromolaena odorata*, and *Asystasia gangetica* with 10ml, 20ml, 30ml and 40ml for each FWJ. The experiment was arranged in randomized complete block design (RCBD) with four replications

Plant sampling and growth measurement

Luffa acutangula was transplanted into polybag after two weeks from sowing. The seedlings were irrigated using drip irrigation system, twice a day for 15 minutes per irrigation except on rainy day. Plant height was measured twice a week. Fruits of *Luffa acutangula* was collected twice a week by hand picking and weighed. Fruits of *Luffa acutangula* were harvested at maturity of 45 days after transplanting. Numbers of Luffa acutangula fruits were counted at the end of study.

Statistical analysis

All data were analyzed and interpreted using SPSS. Effect of treatments on plant growth parameters were evaluated by ANOVA. Variances and separation of means was analyzed using Duncan New Multiple Range

Test (DNMRT) for post hoc comparisons at alpha = 0.05. Values are reported as mean and standard deviation (SD).

Figure 1: (A) *Amaranthus spinonsus*; (B) *Chromolaena odorata* and (C) *Asystasia gangetica*

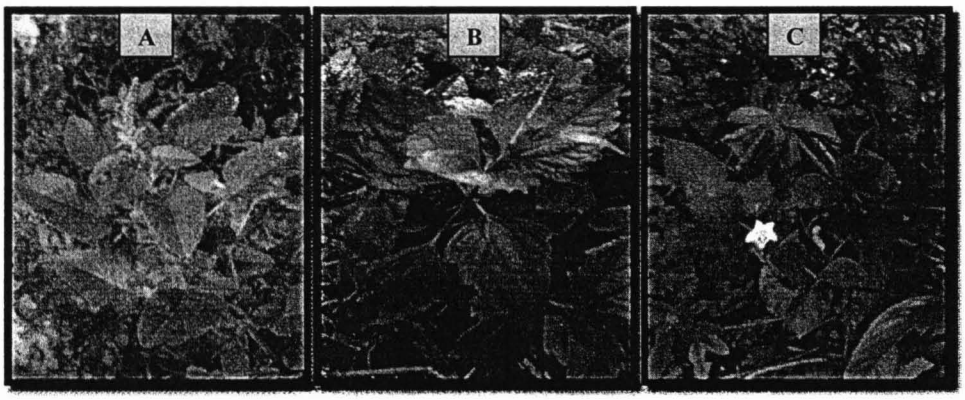
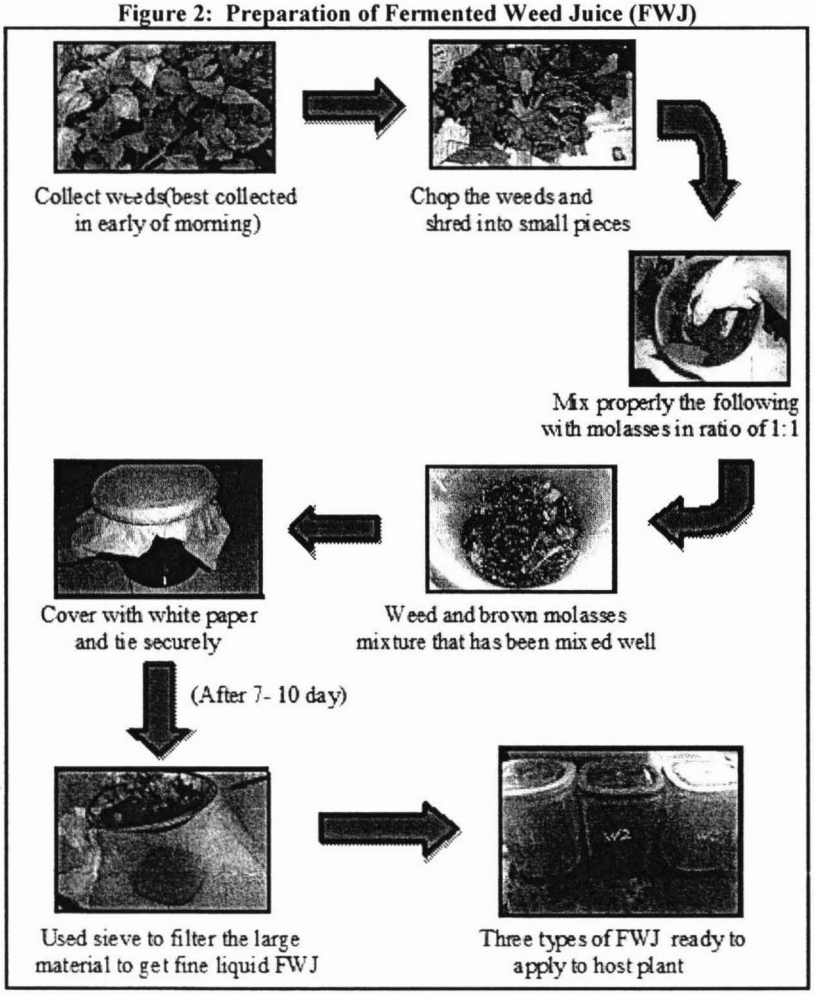


Figure 2: Preparation of Fermented Weed Juice (FWJ)



Results and Discussion

The results of the study show that the growth of *Luffa acutangula* was affected with the application of treatments. The treatments of 30 ml Fermented Weed Juice by *Asystasia gangetica* (W3R3) perform better in terms of plant height with the value of 293.6cm compared than other treatments with the increasing about 37% from the control (Figure 3). There is significant difference in plant height of *Luffa acutangula* when treated with the different treatments. Number of leaves recorded showed that treatment with 30 ml Fermented Weed Juice by *Asystasia gangetica* performs better with the increasing of about 27.7% compare to the control (Figure 4). Besides that, result of the study also revealed that total number of fruits in treatment with 30 ml Fermented Weed Juice of *Asystasia gangetica* still recorded the highest value compare to other treatments (Figure 5). Plant biomass of *Luffa acutangula* shows the significant difference under the different treatments.

The basis nutrients require for plant growth were divided into two categories that were micronutrient and macronutrient (Uttara, 2011). The plant was required in large quantity of macronutrients. Some nutrients that recorded for the findings are calcium element. According to Bassey (2012), the value of calcium for *Asystasia gangetica* is highest (7mg/100g) compare to other plant. Nurul (2011) reported that *Asystasia gangetica* showed highest rate of growth and total relative leaves compare to other weeds. Findings from Tanuwat (2010) recorded that studied of using plant that composed of starch sugar for natural fertilizer showed the higher value of NPK rather than other plant. Statement from Tanuwat (2010), production of yield will be increased when increased in plant growth performance. So, this study was consistent with Tanuwat's (2010) where highest value of plant height produced the highest numbers of fruits on *Luffa acutangula.*

Figure 3: Plant Height of *Luffa acutangula*

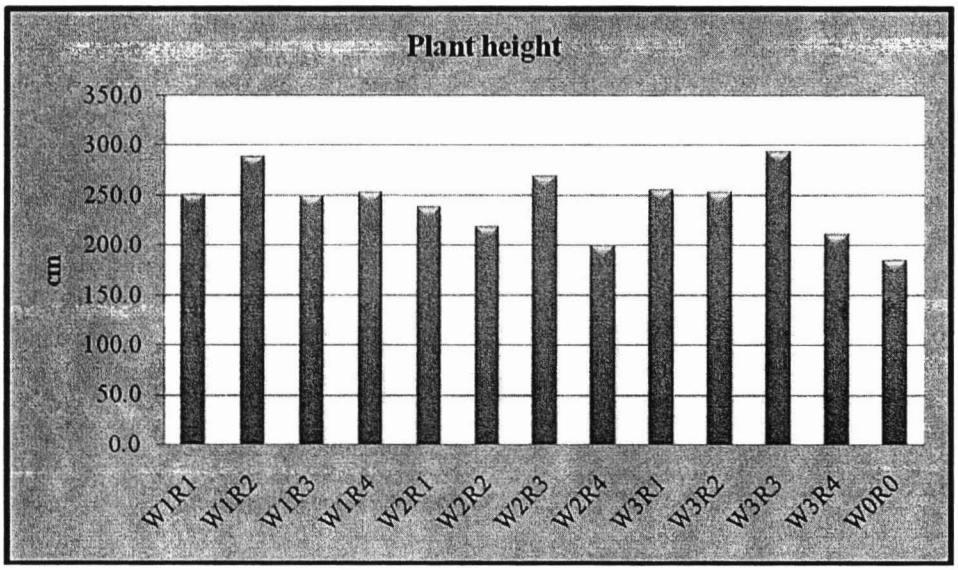


Figure 4: Total number of leaves of *Luffa acutangula*

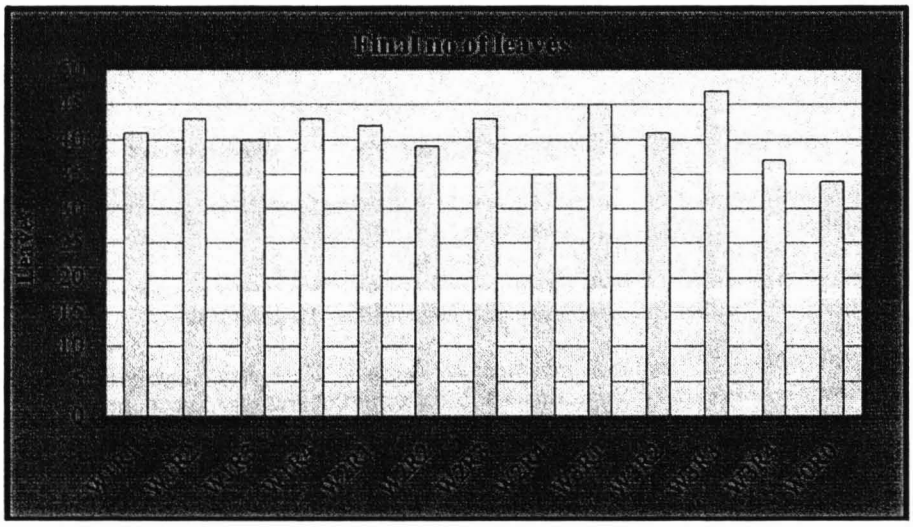
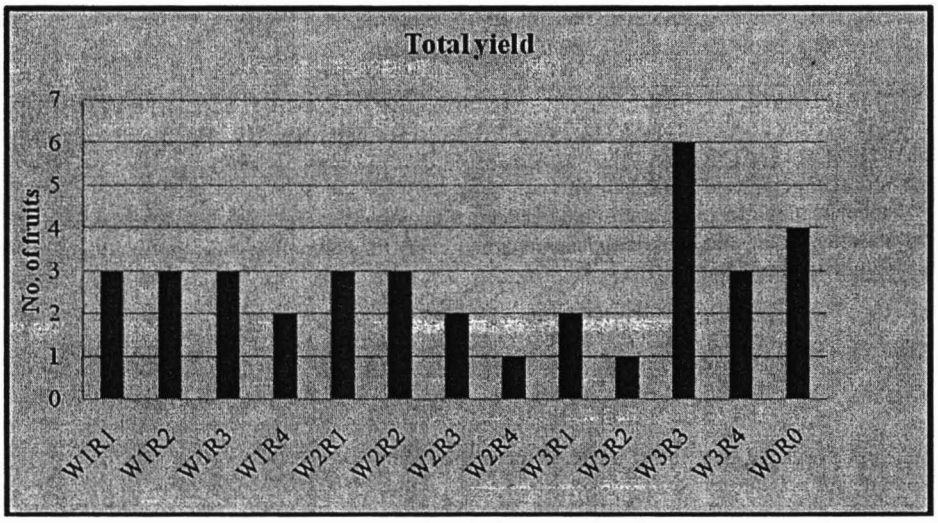


Figure 5: Total Number of *Luffa acutangula* fruits



Conclusion

Based on the study, it can be concluded that 30 ml Fermented Weed Juice of *Asystasia gangetica* gave better growth performance and yield of *Luffa acutangula* that using *Asystasia gangetica* can provide the highest nutrient content such as calcium compared with using other weeds. So, the study shows that application of natural fertilizer in the farming system has given the better yield.

References

Bassey, M.E. (2012). Phytochemical investigations of Tapinanthus Globiferus (Loranthaceae) from Two Hosts and the Taxonomic Implications. Department of Botany and Ecological Studies University of Uyo, Uyo Nigeria.

David L. Clement, & Kevin G. Williams. (2005). Organic and Inorganic Fertilizers.

Eicher, A. (2003). *Organic agriculture: A glossary of terms for farmers and gardeners*. Eureka: University of California.

Mitchel, U., & Tarchitzky, J. (2007). *Fertigation: A tool for efficient fertilizer and water management*. Paris: International Fertilizer Industry Association, International Potash Institute.

Nurul. (2011). *Respon Tumbuhan dan Anatomi Jaringan Daun pada Asystasia gangetica, Impatiens balsamina dan Mirabilis jalapa Akibat Polisi Udar*. Institut Pertanian Bogor. Indonesia.

Tanuwwat. (2011). *The effectiveness of bacteria and fungi in liquid organic fertilizer production*. Department of Biotechnology, Faculty of Applied Science, King Mongkut's University of technology North Bangkok, 1518 Piboonsongkarm Rd., Bangsue, Bangkok10800.

Uttara, Manohar. (2011). Plant growth factor. Retrieved from http://www.buzzle.com/article/plant growth-factors.html

Van. (2006). How much guano to add to soil. Retrieved from http://www.ehow.com/info_8734890_much-guano-add

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