Selection In Vitro Flower King Planlet With Polyethylen Glicol (Peg) 6000 On Drought As An Animal Feeding

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Abstract Bananas besides being a superior fruit plant in Indonesia, banana plants can be utilized as animal feedstocks. The results showed that the administration of banana stems as animal feed did not have a negative effect on the appearance of young sheep, and even showed more nitrogen in comparison with sheep receiving control rations. Banana skin can be used as a substitute feed for livestock, especially in broilers. Banana skin has been used as poultry feed, a mixture of banana peel and coconut pulp with a ratio of 2:1 can be used up to 15% substitute for corn in broiler feed. Banana skin fermented with probiotics can increase crude protein content by 14.88% and rough seats by 11.43% which is good for broiler growth. Drought that occurs every year is the main limitation of the growth of banana plants. Drought in plants can result in slow leaf area increase and influence on the rate of photosynthesis so that it can reduce productivity and growth of plants. PEG 6000 was used as an effort in early detection of genotypes from plant varieties that tolerated drought stress. So far there has never been a study of plantain feathers against drought stress using PEG 6000. So this research is interesting to do. This research was conducted to obtain candidates for plantain plantain which are tolerant to drought as animal feed

Keywords—in vitro, PEG, feed animal

1. INTRODUCTION

Indonesia is one of the primary central countries in the diversity of banana varieties. Besides being a superior fruit plant in Indonesia, bananas can only be used as leaves on banana stone plants[1]. Banana banana stems can also be used as livestock feed. The results of the study showed that giving banana stems as animal feed did not have a negative effect on the appearance of young sheep, and even showed more nitrogen compared to sheep receiving control rations [2]. Banana skin can be used as a substitute feed for livestock, especially in broilers. Banana skin has been used as poultry feed, a
mixture of banana peel and coconut pulp with a ratio of 2:1 can be used up to 15% substitute for corn in broiler feed. Banana skin fermented with probiotics can increase crude protein content by 14.88% and rough seats by 11.43% which is good for broiler growth [3].

In banana plant growth, there are problems with disease disorders and lack of availability water, which causes dryness of banana plantations. Drought that occurs every year is the main limitation of the growth of banana plants. Drought in plants can result in slow leaf area increase and influence on the rate of photosynthesis so that it can reduce productivity and growth of plants [4]. Efforts to overcome the constraints of drought need to be done, to obtain the genotype of banana plants which are resistant to drought stress. According to [5] stated that PEG 6000 was used as an effort in early detection of genotypes from plant varieties that tolerated drought stress. In hybrid rice plants using PEG 6000 with a concentration of 25% is quite effective in predicting drought resistant rice varieties.

This needs to be done as an increase in the growth of banana plants as animal feed ingredients using Poly-ethylene-glycol (PEG) compounds which can reduce the osmotic potential of the solution with the activity of the ethylene oxide sub unit matrix so that it binds water molecules with hydrogen bonds. Giving PEG to plantlets aims to produce dry stress conditions [6]. Several studies have shown that the use of PEG 6000 solutions in the medium is an attempt to detect the selection cycle in a variety repair program or assembly that has drought tolerance. In vitro selection that has been studied in producing plants that are resistant to drought stress includes hybrid rice plants from the use of PEG concentrations of 5%, 10%, 15%, 20%, 25% [5], in vitro research has also been carried out on soil orchids [7] and [8].

So far there has never been a study of plantain feathers against drought stress using PEG 6000 as animal feed ingredients. so this research is interesting to do. This research was conducted to obtain candidates for plantain plantain (Musa paradisiaca L. var sapientum) that are tolerant to drought stress as animal feed ingredients. Planlets that are able to withstand drought will be expected to be able to be applied in increasing the growth of banana plants as animal feed ingredients [3].

2. MATERIALS AND METHODS
The study design was arranged in a basic pattern of Completely Randomized Design (CRD). The concentration of PEG 6000 with 5 levels of concentration is 0%, 5%, 10%, 15%, and 20%. Each concentration was carried out 6 replications and each replication consisted of 3 explants of Musa paradisiaca L. var sapientum in each culture bottle. The formula used to calculate the number of live plantain plantains is:

\[
\frac{\text{Number of live plantlets}}{\text{Total number of plantlets}} \times 100\% \text{ planlets}
\]

Visualization of plantlets, including the color of the buds formed by the following classification: green, green with certain parts colored brown, brown.

2.1. Selection of Plantain Plantlets with Polyethylene Glycol (PEG) 6000
Selection of drought stress of plantain plantain against Polyethylene glycol (PEG) 6000 planted in medium Murashige & Skoog (MS). The concentration of PEG 6000 which was added to MS medium was 5%, 10%, 15% and 20%, and feather plantain plantlets which were not given PEG 6000 as controls (0%). Each culture bottle was planted with 2 plantlets and each treatment was carried out 5 replications. The total plantlets planted were 50 plantlets (25 bottles).

3. RESULTS AND DISCUSSION
The selection results showed that plantlets were still able to survive up to a concentration of 15%, whereas at a concentration of 20% there were 2 plantlets that had browning or died. The results of the selection of fur plantain plantations treated with various concentrations of PEG 6000 are presented in Table 1 and Table 2.
Table 1. Percentage of visualization of feather plantain plantations selected by various concentrations of PEG 6000 PEG 6000

| Concentration PEG 6000 (%) | Planlet percentage and visualization on Sunday (%) |
|----------------------------|--------------------------------------------------|
|                            | I       | II      | III     | IV      |
| 0 (kontrol)                | H: 100  | H: 100  | H: 100  | H: 100  |
| 5                          | H: 100  | H: 100  | H: 80   | H: 70   |
|                            | HC: 20  | HC: 30  | HC: 30  | HC: 30  |
| 10                         | H: 100  | H: 60   | H: 50   | H: 40   |
|                            | HC: 40  | HC: 50  | HC: 50  | HC: 60  |
| 15                         | H: 100  | H: 40   | H: 20   | HC: 100 |
|                            | HC: 60  | HC: 80  | HC: 80  | HC: 80  |
| 20                         | H: 50   | H: 20   | HC: 100 | HC: 80  |
|                            | HC: 50  | HC: 80  | HC: 80  | C: 20   |

Description: H : Green
HC : Green brown
C : Chocolate

Table 2. Percentage of number of live plantlets as a result of selection of various concentrations of PEG 6000 PEG 6000

| Concentration PEG 6000 (%) | Percentage of number of live plantlets on Sunday (%) |
|----------------------------|-----------------------------------------------------|
|                            | I       | II      | III     | IV      |
| 0 (kontrol)                | 100     | 100     | 100     | 100     |
| 5                          | 100     | 100     | 100     | 100     |
| 10                         | 100     | 100     | 100     | 100     |
| 15                         | 100     | 100     | 100     | 100     |
| 20                         | 100     | 100     | 100     | 80      |

Based on Table 1 and Table 2 can be seen that in the first week the treatment of PEG 6000 with a concentration of 5%, 10% and 15% had not affected the treatment, whereas at a concentration of 20% there was a decrease in the visualization percentage where the leaves on the feather plantlets began to turn brown green. In the second week there appeared to be a decrease in the visualization percentage, seen at a concentration of 10%, 15% and 20%. It appeared that the leaflets and stems of the plantlets became brown green. The percentage of visualization began to show a marked decrease in the third and 1st week of all treatments (5%, 10%, 15% and 20%), in the leaflets and stems of the plantlets being brown green and at the highest concentration (20%) there was a percentage 20% of plantlets undergo browning (C) or die.

The number of plantlets in week I to week III of all plantlets is 100% alive. Starting in the fourth week at the highest concentration of 20%, the death of plantlets with a percentage of 20% was indicated by browning of stem and leaf. The results showed the effect of drought stress by PEG 6000 on plantain plantlets planted on medium selection in vitro. This research is supported by previous studies on soybeans [9] and [10], large red chili [11], Vigna aconitifolia [12], stiff callus [13] and Patchouli [14], has shown the occurrence of stress conditions drought insimulations in vitro.
with decreasing water potential in the medium treated with PEG 6000. The concentration of PEG 6000 on the selection medium planted with plantlets simulates drought stress which causes the number of wilted leaves, percentage reduction growth, increasing percentage of mortality and decreasing plantlet quality index [9] and [11].

![Figure 1](image)

**Figure 1.** Growth of plantain feather plantlets after 4 weeks of treatment gave a concentration of PEG 6000

A = 0% (control) and E = (20%).

Visualization of plantlets from each treatment showed morphological characteristics of plantlets that underwent changes. Visual appearance of changes in plantlets that were previously green began to turn brown and brown (browning) after being given treatment with PEG 6000. In Figure 1. seen at a concentration of 20% in plantlets that are not drought-resistant, the leaves undergo changes to brown (browning). However, in plantlets which are resistant to drought at a concentration of 20%, they will remain green.

The stress of drought in a planting medium that has been affected by PEG is able to change metabolism so that it affects growth and development[11]. The simulated drought stress conditions in the selection medium were in vitro able to inhibit shoot growth, increase proline, reduce chlorophyll content and influence the weight of leaves, stems and elongation of plant roots [6]; [14]; [15].

4. CONCLUSION

Based on the results of the research and discussion above, it can be concluded that the influence of drought stress by PEG 6000 on the *Musa paradisiaca* L. var *sapientum* plantlet planted in the selection medium was *in vitro* seen from the percentage of plantlets and percentage of living plantlets.

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