

Comparative Study on the Effect of Urine from Pregnant and Non-Pregnant Women and Algafer LPF Plus on the Length of Epicotyl to the Germinating Corn (*Zea Mays*) Seeds in Hydroponics

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Abstract— This study was conducted to analyze the effect of urine from pregnant and non-pregnant women and Algafer LPF Plus on the germination rate of Corn (*Zea mays*) seeds in hydroponics by determining the length of epicotyl in various percentage concentrations of urine and Algafer. There were four (4) treatments used namely: T1 (0.75%), T2 (5%), T3 (10%), and T4 as control. Treatment was done by allowing the plants to grow in water culture and adding different concentrations of the test solution in every test system. A total of fifteen (15) seedlings per replicate were considered and the average length of epicotyl was taken. The data were then subjected to a 3X4 Factorial Analysis of Variance (ANOVA) and Duncan's Multiple Range Test (DMRT). Results of the study indicated that the rate of germination increases at a 10% level concentration of urine from pregnant and non-pregnant women, whereas in Algafer, concentrations in T2 (5%) and T3 (10%) caused seed rotting. Among the three test solutions, both urines from pregnant and non-pregnant women have been shown to cause growth by promoting cell elongation on epicotyl. DMRT for both urines of pregnant and non-pregnant women revealed that T3 (10%) was significantly different from the other treatment means. In Algafer LPF Plus, DMRT revealed that T2 and T3 were not different from each other, likewise with T1 and T4. These findings indicated that certain components in urine are essential to the germination of corn seeds. The presence of these essential elements in plants plays a vital role in attaining earlier and greater growth. The waste product, therefore, excreted by the kidney can now be used as an inexpensive substitute for fertilizers for faster germination at the proper concentration.

Keywords— Urine, Pregnant Women, Non-pregnant Women, Algafer LPF Plus, Germination, Epicotyl, Corn, Hydroponics

I. INTRODUCTION

A. Nature and Importance of the Study

Humans depend largely on their environment for subsistence. Vast lands with vegetation and the surrounding waters provide them with many materials for their needs. One way by which they learn how nature provides them with their needs is by cultivating various economically important plants.

Corn, which is most commonly known as maize, is an essential cereal crop (Shah, Prasad, & Kuma, 2016) with a short life cycle and requires warm weather, proper cultivation, and management. It is an important livestock feed, valuable human food, and raw material for a lot of industries (Kumar & Jhariya, 2013). It is considered as mother grain in the United States of America, which is the largest corn producer in the world. It has grown extensively in the Philippines and has become the second alternative to the diet next to rice. Analysis of corn shows that the percentage of carbohydrates is high, and there is a higher content of protein and fat than

any other cereal. It has become increasingly valuable food for both humans and livestock. However, farmers have difficulty sustaining production in relation to human consumption. Fertilizers are used to encourage more production but their high price adds more woes to the farmers.

In order to help farmers grow corn in an inexpensive way, this study is conducted to explore the solution that might help them produce corn at a low cost or no cost at all, and at a much faster pace than the use of urine of pregnant and non-pregnant women and Algafer as an alternative source of essential elements needed by plants.

Objectives of the Study

1. To determine the effect of pregnant and non-pregnant urine of women and Algafer on the germination of corn (*Zea mays*) seeds.
2. To test the effect of urine and Algafer on the length of epicotyl of germinated corn (*Zea mays*) seeds.
3. To find out which among the treatments can cause a considerable increase in the length of epicotyl.
4. To find out what concentration is effective in causing the growth.

II. MATERIALS AND METHODS

Preparation and Collection of Test Solutions

Urine from pregnant and non-pregnant women was used in the experiment. Three pregnant and non-pregnant women were assigned and instructed to collect their urine as soon as they woke up early in the morning in the sterilized containers given to them. Around 500 ml of urine was taken and the treatment started accordingly. The Algafer LPF plus was also used in this study.

Preparation of Seeds

Corn seeds were obtained from newly harvested corn plants. The seeds were mature enough and free from abnormalities. It has undergone exposure to the sun to eliminate the growth of organisms that will cause undesirable results in the experiment. The seeds were stored at room temperature for two (2) weeks in an airtight container.

Experimental Set-up and Treatment

The test solutions were prepared to obtain the following concentrations: 0.75%, 5%, 10%, 0% of the test solutions for each test system. The concentrations were computed using percentage by volume as follows:

0%	-	control, 1,000 ml tap water
0.75%	-	7.5 ml test solution + 992.5 ml tap water
5%	-	50 ml test solution + 950 ml tap water
10%	-	100 ml test solution + 900 ml tap water

This type of experiment is the practice of growing plants in a liquid nutrient solution rather than in soil. This is an artificial culture wherein the solution was placed in an open, concrete tank. Clear plastic jars were

used in the experiment. It was this type of hydroponics in which the plant roots were immersed in nutrient solutions.

A total of fifteen (15) seeds per replicate were used, thus, a total of 180 seeds per test system was considered in this study.

The experiment was composed of these treatment groups and a control group. There were three (3) groups of set-ups with four treatments per group. Each group has three replicates. The control group received only tap water. Results were observed when the seedling sprouted up to its third day of growth. Growth was considered in terms of measuring the epicotyl (mm.) of the seedlings. The average of the final height was taken in five (5) seedlings of every replicate.

Statistical Analysis

The experimental study employed a Completely Randomized Design (CRD). Results were statistically analyzed using the 3x4 Factorial Analysis of Variance (ANOVA). Duncan’s Multiple Range Test (DMRT) was used for further analysis to determine whether the results were significantly different from each other.

Results and Discussions

The length of epicotyl of germinating corn seeds (zea mays) after they were grown in hydroponics with different concentrations of urine from pregnant and non-pregnant women and Algafer were presented in Table 1. The data were transformed and the results were statistically analyzed using a 3x4 Factorial Analysis of Variance.

Table 1. The average length of epicotyl (in mm) of germinating corn seeds (zea mays) treated with various concentrations of the three (3) test solutions in hydroponics.

Treatments	Replicates			Treatment Total	Treatment Means
	R1	R2	R3		
Urine of Pregnant					
T1 (0.75%)	20.1	20.4	19.6	60.1	20.03
T2 (5%)	25.5	24.0	28.4	77.9	25.97
T3 (10%)	65.4	55.4	38.1	158.9	52.97
T4 (CONTROL)	16.3	15.8	14.6	46.7	15.57
Urine of Non- Pregnant					
T1 (0.75%)	14.0	18.4	17.3	49.7	16.57
T2 (5%)	32.8	33.0	30.4	96.2	32.07
T3 (10%)	41.3	56.5	46.0	143.8	47.93
T4 (CONTROL)	15.5	12.8	13.4	41.7	13.9
Algafer					
T1 (0.75%)	10.0	7.0	8.6	25.6	8.53

T2 (5%)	0.0	0.0	0.0	0.0	0.0
T3 (10%)	0.0	0.0	0.0	0.0	0.0
T4 (CONTROL)	14.0	17.6	15.6	47.2	15.73
Replicate Total	240.9	260.69	232.0		
Grand Total				747.8	
Grand Mean					20.77

The 3x4 Factorial Analysis of Variance indicates that the variations among treatments as well as the test solutions were highly significant. Likewise, interactions between concentrations and test solutions were shown to be highly significant. The DMRT showed that among the four (4) treatments, T3 (10%) was significantly different from other treatments.

III. CONCLUSIONS

Urine from pregnant and non-pregnant women and Algafer LPF Plus were studied to determine the possible rate of germination of corn (*Zea mays*) seeds in hydroponics by measuring the length of epicotyl.

The results of the study lead to the following conclusions:

1. The length of epicotyl increased as the concentration of urine increased.
2. That as high as 0.75% concentration of Algafer can cause seed rotting.
3. Among the three test solutions, urines from pregnant and non-pregnant women attained the highest growth at T3 (10%).

The following are the recommendations:

1. Further study may be conducted using the lesser concentrations (lower than 0.75%) of Algafer to determine the rate of germination.
2. Further study can be conducted using higher concentrations (higher than 10%) of urine to determine the rate of germination.
3. A similar study may be done using another mode of treatment aside from seed germination.
4. A similar study may be done by using another index of growth like the hypocotyl.

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