Abstract

A laboratory experiment was conducted in the Hydroponic Lab,

Department of Field Crops, Faculty of Agriculture, University of Basra. The objective was to study six solutions added in two ways and their impact on sprouting the barley and the fodder mixture (barley + Mungbean) for three

periods. The solutions were:

1. Ideal standard solution (Hoagland solution) (S1).

2. Tap water + potassium nitrate + ammonium phosphate (S2).

3. 2.5% seawater + potassium nitrate + ammonium phosphate (S3). 4. 5% seawater + potassium nitrate + ammonium phosphate (S4).

5. Tap water only (S5).

6. 2.5% seawater only (S6).

The two methods of addition were:

1. The usual way, adding the nutrient solution to the growth dishes whenever the need arises (M1).

2- The method of spraying the solution on the seeds or vegetable part at the specified daily times (M2).

Three sprouting periods were conducted during the breeding periods: From 01.02.2013 to 13.02.2013, where the ambient temperature ranged from

17 to 19°C with an average of 18°C (d1),

From 16.02.2013 to 28.02.2013, where the ambient temperature ranged from 19 to 27°C with an average of 24°C (d2), and from 18.03.2013 to 01.04.2013, where the ambient temperature ranged from

26 to 31°C with an average of 29°C (d3).

The results of the experiments showed the following:

A - The highest plant growth was recorded using two solutions (S1) and (S3) and amounted to 20.1 and 20.0 cm, respectively, while the growth was less when using (S6) and (S5) and amounted to 17.4 and 17.5 cm, respectively.

B - The root zone thickness was recorded at the highest values using two solutions (S1) and (S3) and amounted to 2.5 and 2.4 cm, respectively, while the growth was less when using solutions (S5) and (S6) and amounted to 1, 2, and 1.2 cm, respectively.

C - The solutions (S1) and (S3) showed greater moist weight totaling 16.570 and 16.464 kg m^2, respectively, and differed significantly from the rest of the solutions, while the least moist weight was recorded when solution (S5) was used and amounted to 11.629 kgm^{-2}

D- The highest dry weight of barley was recorded when using the two solutions (S1) and (S3) and reached 3,623 and 3,715 kg m 2 and differed significantly from the rest of the solutions. The least dry weight was recorded for solution (S5) and gave 2,059 kg m 2.

E- The highest percentage of protein in sprouted barley was recorded when using the first three solutions S1, S2, and S3, which did not differ significantly from each other and gave 21.32, 20.93, and 20.83%, respectively. The amounts of yielded protein were 1.352, 1.257, 1.292, and 2% for solutions (S1), (S4), (S3), and (S2), respectively, which did not differ significantly from each other. The least yielded amount of protein was obtained when solution (S5) was applied and amounted to 0.701 kg/m^2.

F- There was no significant difference with respect to the effect of the two addition methods with respect to the wet and dry weights of barley sprouts, as well as the thickness of the root zone. The increase in plant height differed significantly with the normal method giving a height of 19.6 cm, while the spraying method gave 18.2 cm

G-With regard to the dates of sprouting, the second date gave higher values with respect to the height of plants, the thickness of the root zone, the fresh weight of the part of the shoot, root, and total dry weight (23.0 cm and 2.3 cm, 9,215 and

16,462 and 6,423 kg m2, respectively), and differed significantly with a large margin for the first and third dates.

I- The interaction between the type of solution and the method of addition had a significant effect on the average increase of sprouted barley. The S3M1 and SIM1 interactions showed higher values, amounting to 21.5 and 20.6 cm, respectively. In the total fresh weight, the highest recorded values were for the combinations S1M1, S2M2, and S3M1, being 18.318, 18.019, and 17.902 kg m², respectively. The combination S3M1 gave the highest total dry weight, reaching 4.054 kg m², while the lowest values were recorded for the recipes mentioned when using the combination (S5M2).

The results showed the following: When planting fodder mixture, the treatments were the solutions only, and the A- The highest total moist and dry weights and the thickness of the root zone

The height of sprouts was obtained when using solution S1. The dry weight was 5.420 kg m², which did not differ significantly from solutions S3 and S5. The thickness of the root zone

A - The highest plant height was 23.17 cm when using solution S1, which did not differ significantly from solution S4. B - The highest percentage of protein in a fodder mixture in the vegetable portion was obtained using solution S4 and amounted to 28.8%, which did not differ significantly from solution S3, and in the root when using solution S3, which amounted to 24.2%, which did not differ significantly from solutions S1, S2, and S4.

C - The highest amount of protein was obtained using solution S1 and reached 1.295 kg m², and the least with solution S6 and reached 0.688 kg m²

D - The highest percentage of phosphorus in barley sprouts was obtained using solution S4 (0.37 and 0.38%) in the shoot and root sections, respectively, and the highest concentration of potassium was obtained using solution S1, and the percentage in the shoot and root of barley sprouts was 1.99 and 1.45%, respectively.

E - With respect to the fodder mixture, solution S3 gave the highest sulfur content (0.31%) in the vegetable portion, while solution S5 gave the highest percentage of sulfur in the root (0.25%).