

Microbiological and parasitological contamination of hydroponic grown curly lettuce under different optimized nutrient solutions

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Supplementary Table 1. Volumes of water (VW) and stock solution (VSS) added in the tanks to obtain 17 L of nutrient solution and EC of 1.5 dS m⁻¹ as a function of the mineral nutrient solutions of Furlani (1995) (FM), Bernardes (1997) (BM), Ueda (1990) (UM) and Castellane and Araújo (1994) (CM) and the modified nutrient solutions of Furlani (1995) (FO), Bernardes (1997) (BO), Ueda (1990) (UO) and Castellane and Araújo (1994) (CO) along the experiment

Evaluation, days	FM		FO		BM		BO		UM		UO		CM		CO	
	VW	VSS	VW	VSS	VW	VSS	VW	VSS	VW	VSS	VW	VSS	VW	VSS	VW	VSS
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.73	0.18	0.70	0.21	0.75	0.26	0.69	0.22	0.58	0.43	0.55	0.46	0.61	0.20	0.78	0.23
3	0.69	0.22	0.89	0.32	0.72	0.20	0.71	0.20	0.59	0.32	0.50	0.31	0.59	0.22	0.60	0.31
4	0.85	0.19	0.81	0.40	0.61	0.30	0.74	0.17	0.74	0.29	0.39	0.50	0.73	0.13	0.74	0.18
5	0.75	0.34	1.28	0.63	0.13	0.29	1.15	0.44	2.30	0.44	0.90	0.57	1.14	0.57	1.18	0.42
6	0.22	0.42	0.18	0.41	0.69	0.63	0.69	0.37	1.03	0.22	0.32	0.87	0.92	0.38	0.97	0.36
7	0.78	0.14	0.14	0.18	0.80	0.40	1.16	0.26	0.40	0.68	0.07	1.00	0.88	0.22	0.59	0.13
8	0.87	0.44	0.81	0.40	0.90	0.51	1.00	0.10	0.54	0.27	0.11	1.00	0.77	0.34	0.97	0.22
9	1.89	0.63	0.89	0.72	0.91	1.62	1.58	0.63	1.46	0.48	1.37	0.45	1.60	0.61	1.28	0.24
10	1.82	0.51	1.00	0.98	1.30	0.72	0.93	0.44	1.58	0.11	0.33	2.09	1.55	0.35	0.92	0.81
11	0.68	0.89	1.96	0.07	0.25	2.02	0.80	0.09	0.60	0.91	0.31	2.19	0.21	1.02	1.06	0.24
12	0.33	0.84	0.26	0.63	1.50	0.26	0.42	0.45	0.75	0.12	0.43	10.62	0.21	0.89	0.33	0.76
13	1.95	0.62	1.63	0.75	2.40	0.63	0.96	0.25	1.80	0.28	0.81	2.18	2.45	0.21	0.97	0.54

14	1.66	1.38	1.51	1.12	1.70	1.84	1.96	0.57	1.54	0.69	0.92	2.68	1.60	0.93	1.49	0.93
15	1.11	1.25	1.05	0.79	1.33	1.40	0.64	0.32	1.14	0.62	0.00	2.79	1.23	0.61	1.10	0.67
16	1.98	0.61	1.23	0.25	1.41	1.21	1.14	0.38	1.43	0.23	0.92	0.74	1.37	0.65	1.22	0.48
17	2.86	0.54	2.25	1.11	2.96	0.79	1.61	0.49	2.58	0.01	0.00	6.23	3.15	0.00	2.34	1.01
18	0.59	1.69	0.28	1.14	0.58	2.65	0.86	0.64	0.64	0.78	0.70	1.16	0.47	1.01	0.53	1.19
19	2.16	2.83	2.72	1.63	2.32	2.33	1.97	0.09	2.24	1.20	0.84	3.53	2.44	1.20	2.68	1.29
20	2.13	2.72	2.27	1.67	2.82	3.14	1.52	0.69	1.83	1.71	3.27	1.42	1.53	1.90	1.92	0.86
21	1.85	2.23	1.80	1.30	1.89	2.90	1.28	0.37	2.14	1.64	0.12	16.88	2.39	2.36	2.12	1.01
22	3.82	2.61	1.62	2.87	2.17	5.89	0.77	1.25	2.83	1.02	0.00	14.04	2.85	1.40	1.64	2.28
23	0.00	6.36	1.88	3.06	1.23	4.02	0.91	1.41	3.56	1.70	3.30	6.23	0.12	5.85	1.70	2.54
24	3.51	2.28	3.03	1.22	4.31	2.56	1.37	0.55	2.83	1.33	3.16	0.98	2.99	1.46	2.67	0.67

Supplementary Table 2. Chemical composition of the mineral nutrient solutions

Nutrients	Solution			
	Ueda (1990)	Castellane and Araújo (1994)	Furlani (1995)	Bernardes (1997)
	-----mg L ⁻¹ -----			
NO ₃	42.35	216.00	200.00	178.00
NH ₄	5.80	20.09	15.56	18.00
P	8.08	61.28	32.70	71.37
K	77.34	425.39	310.28	269.67
Ca	21.00	159.60	168.00	201.60
Mg	5.92	24.26	24.65	49.30
S	7.80	31.98	32.50	65.00
Mn	0.64	0.54	0.64	0.49
Zn	0.01	0.26	0.20	0.05
Cu	0.01	0.06	0.07	0.03
Bo	0.52	0.49	0.36	0.50
Mo	0.02	0.05	0.11	0.01
Fe	2.23	2.23	2.23	2.23

NO₃⁻- Nitrate; NH₄⁺- Ammonium; P- Phosphorus; K- Potassium; Ca- Calcium; Mg- Magnesium; S- Sulfur; Mn- Manganese; Zn- Zinc; Cu- Copper; Bo- Boron; Mo- Molybdenum; Fe- Iron.

Supplementary Table 3. Chemical composition of the ingredients used in the formulation of the biofertilizers

Nutrients	Ingredients			
	Bovine manure	Molasses	Poultry blood	Milk
	-----%-----			
N	0.820	0.490	2.550	5.370
NO ₃	0.000	0.000	0.000	0.000
P	0.270	0.080	0.047	0.680
K	1.190	2.380	0.060	1.470
Ca	1.050	0.820	0.047	1.170
Mg	0.380	0.350	0.068	0.000
S	0.045	0.350	0.000	0.000
Zn	0.004	0.034	0.035	0.011
Fe	0.380	0.000	0.000	0.001
Mn	0.016	0.000	0.000	0.000
Cu	0.001	0.002	0.000	0.002
Bo	0.000	0.000	0.000	0.000

N- **Nitrogen**; NO₃⁻- Nitrate; P- Phosphorus; K- Potassium; Ca- Calcium; Mg- Magnesium; S- Sulfur; Zn- Zinc; Fe- Iron; Mn- Manganese; Cu- Copper; Bo- Boron.

Supplementary Table 4. Quantity of the ingredients used in the preparation of the biofertilizers

Organic fertilizers	Biofertilizer			
	BIO1	BIO2	BIO3	BIO4
	-----kg L ⁻¹ of water-----			
Bovine manure	0.120	0.120	0.150	0.100
Molasses	0.018	0.018	0.020	0.020
Poultry blood	0.003	0.003	0.005	0.003
Milk	0.010	0.000	0.010	0.010

BIO1-biofertilizer used in the modified solution of Ueda (1990); BIO2-biofertilizer used in the modified solution of Castellane and Araújo (1994); BIO3-biofertilizer used in the modified solution of Furlani (1995); BIO4-biofertilizer used in the modified solution of Bernardes (1997)

Supplementary Table 5. Chemical composition of the biofertilizers

Nutrients	Biofertilizer			
	BIO1	BIO2	BIO3	BIO4
	-----mg L ⁻¹ -----			
N	7.28400	12.800	34.787	14.144
NO ₃	0.004	0.004	0.010	0.004
P	4.036	14.009	66.855	56.350
K	35.716	79.124	23.050	14.807
Ca	7.748	24.708	23.083	14.807
Mg	94.800	33.220	21.059	181.844
S	0.000	0.000	0.000	0.000
Zn	0.078	0.269	0.259	0.158
Fe	0.493	1.300	2.328	0.884
Mn	0.100	0.241	0.044	0.197
Cu	0.013	0.027	0.038	0.016

BIO1-biofertilizer used in the modified solution of Ueda (1990); BIO2-biofertilizer used in the modified solution of Castellane and Araújo (1994); BIO3-biofertilizer used in the modified solution of Furlani (1995); BIO4-biofertilizer used in the modified solution of Bernardes (1997). N- Nitrogen; NO₃- Nitrate; P- Phosphorus; K- Potassium; Ca- Calcium; Mg- Magnesium; S- Sulfur; Zn- Zinc; Fe- Iron; Mn-Manganese; Cu- Copper.

Supplementary Table 6. Quantities of the biofertilizers used to prepare 360 L of stock nutrient solutions

Fertilizers	Unit	Nutrient solutions							
		FM	BM	UM	CM	FO	BO	UO	CO
Biofertilizer	L	0.0	0.0	0.0	0.0	179.5	359.30	229.22	331.46
(NH ₄) ₂ SO ₄	g	18.01	27.39	7.93	16.26	0.00	3.83	0.28	0.00
Ca(NO ₃) ₂ ·6H ₂ O	g	432.00	426.91	44.47	337.97	407.62	395.62	34.02	318.41
KNO ₃	g	151.30	25.8	71.41	270.56	156.19	52.25	80.21	282.03
KCl	g	84.85	173.29	0.00	53.00	55.67	106.68	0.00	19.05
CuSO ₄ ·5H ₂ O	g	0.07	0.028	0.01	0.09	0.04	0.01	0.002	0.07
ZnSO ₄ ·7H ₂ O	g	0.20	0.050	0.01	0.26	0.06	0.03	0.00	0.16
MnSO ₄ ·H ₂ O	g	0.88	0.48	0.63	0.53	0.85	0.29	0.56	0.44
MgSO ₄ ·7H ₂ O	g	41.75	133.26	15.93	58.79	10.12	64.67	0.00	15.96
Tank water	L	359.22	359.16	359.84	359.22	179.77	0.00	130.60	27.79
(NH ₄) ₆ Mo ₇ O ₂₄ ·4H ₂ O	g	0.10	0.01	0.02	0.048	0.105	0.01	0.02	0.04
H ₃ BO ₃	g	0.75	1.05	1.10	1.04	0.709	1.01	1.07	1.00
MAP	g	18.82	42.82	4.84	36.76	14.07	38.61	3.30	33.62

(NH₄)₂SO₄- ammonium sulfate; Ca(NO₃)₂·6H₂O- calcium nitrate; KNO₃- potassium nitrate; KCl- potassium chloride; CuSO₄·5H₂O- copper sulfate; ZnSO₄·7H₂O- zinc sulfate; MnSO₄·H₂O- manganese sulfate; MgSO₄·7H₂O- magnesium sulfate; (NH₄)₆Mo₇O₂₄·4H₂O- ammonium molybdate; H₃BO₃- boric acid; MAP- monoammonium phosphate; FM, BM, UM and CM are the mineral solutions of Furlani (1995), Bernardes (1997), Ueda (1990) and Castellane and Araújo (1994)