The Influence of Some Foliar Fertilizers on Tomato Yield and Fruit Quality

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Abstract

The foliar fertilizers applied on tomatoes plant grown under high plastic tunnels improve the quantity and quality of yield. The foliar products with many active substances (N, P, K, Fe, Mg, Zn, Cu, Mn, B, Ca, Mo, Co, Ni, organic aminoacids, vitamins, vegetable enzymes and growth stimulators) application on tomato determined higher yields. Other foliar products with organic matter, natural plant hormones from algae extracts, essentials aminoacids and biostimulators application improve the content in C vitamin of fruits.

Keywords: *tomato, fertilizers, high plastic tunnels*

INTRODUCTION

Using foliar fertilizers on vegetable protected crops helps to improve the nutritional status of plants, providing an appropriate nutrition in relation with the requirements of plant phenophases (vegetative growth, flowering, fruiting). Many new formulations of foliar fertilizers have been recommended and implemented in the practical agriculture and horticulture. This development encouraged the progressive production of foliar fertilizers in many countries (El-Fouly, 2002). The efficiency with which foliar applied nutrients are utilized depends on the mobility of the specific nutrient throughout the entire plant, mobility comprising long distance transport especially phloem transport as well as the symplastic transport (Mengel, 2002). Foliar fertilization is a complementary measure, unconventional and ecological who improve the mineral nutrition and makes the plants to withstand stress conditions and also to ensure satisfactory yields (Anton *et al.*, 2011).

AIMS AND OBJECTIVES

The research aimed to study the influence of some foliar fertilizers on the tomato yield and quality of fruits.

MATERIAL AND METHODS

The studied biological material was represented by tomato cultivar Siriana F1. Planting date was April 16, 2014 and planting density 33500 pl ha⁻¹. The variants foliar fertilized with the following substance active:

- V1. (2000mg N, 4000mg P, 200mg K, 220mg Fe, 550mg Mg, 49mg Zn, 35mg Cu, 54mg Mn, 10mg B, Ca, Mo, Co, Ni, organic aminoacids, vitamins, vegetable enzymes, growth stimulators) 0.2%;
- V2. (12N:52P:0,5K: Me - 1 application, 20:20:20: Me - 1 application, 11:05:19:9CaO: Me - 2 applications, 15:10:31: Me - 2 applications) 0.3–0.5%;
- V3. (30% P, 20% K) 0.2%,
- V4. (38% organic matter, 3,2% N, 1,6% P, 3,2% K, 6,5% aminoacids, 150 mg/l Fe, 1200 mg/l Mg, 25 mg/l Zn, 4,3 mg/l Cu, 33mg/l Mn, 71 mg/l B, 670 mg/l Ca, 16 mg/l Mo) 0.25%;
- V5. (natural plant hormones from algae extracts *Ascophyllum nodosum*) 0.4%;
- V6. (42 g/l N, 100 g/l P, 70 g/l K, 5 g/l Mg, Zn, Fe, Cu, Mn, B, Mo, 6 essentials aminoacids and biostimulators) 0.3%;
- V7. (9% N, 6% K, 1% Ag) 0.045%;
- V8. unfertilised check.

For each foliar product, there were made 6 applications in the following stages: 1. First inflorescence, first flower open (BBCH 61); 2. Third inflorescence, first flower open (BBCH 63); 3. First fruit cluster, first fruit has typical size (BBCH 71); 4. Second fruit cluster, first fruit has typical size (BBCH 72); 5. 10% of fruits show typical fully ripe color (BBCH 81); 6. 20% of fruits show typical fully ripe color (BBCH 82). The plants top were cut - off after 6 inflorescences.

RESULTS AND DISCUSSION

The highest number of fruits/plant were obtained at V1 (28.3), V2 (27.0) and V6 (27.0). The highest average weight of fruits presented the variants V6 (150.3g) and V2 (149.2g). The yield varied between 11.75 kg·m⁻² (without foliar fertilization) and 13.8 kg·m⁻² (V1).

The content in C vitamin varied between 16.72 mg/100 g fresh material (without foliar fertilization) and 32.56 mg/100 g fresh vegetable material (V3).

CONCLUSION

The foliar fertilizers (42 g/l N, 100 g/l P, 70 g/l K, 5 g/l Mg, Zn, Fe, Cu, Mn, B, Mo, 6 essentials aminoacids and biostimulators) 0.3%, (2000mg N, 4000mg P, 200mg K, 220mg Fe, 550mg Mg, 49mg Zn, 35mg Cu, 54mg Mn, 10mg B, Ca, Mo, Co, Ni, organic aminoacids, vitamins, vegetable enzymes, growth stimulators) 0.2% and (12N:52P:0.5K:Me - 1 application, 20:20:20:Me - 1 application, 11:05:19:9CaO:Me - 2 applications, 15:10:31:Me - 2 applications) 0.3 - 0.5% applied on tomato crop grown under high plastic tunnels improve the yield (13.8 kg·m⁻², 13.59 kg·m⁻² and 13.49 kg·m⁻²). The foliar products with following active

Tab. 1. The influence of foliar fertilizers on tomato yield

No. crt.	Foliar fertilizer	No. fruits/plant	Nr. fruits/cluster	Average fruits weight (g)	Yield/plant (kg)	Yield/sqm (kg)
1.	V1	28.2	4.7	146.1	4.12	13.8 ^{xx}
2.	V2	27.0	4.5	149.2	4.03	13.5 ^x
3.	V3	25.8	4.3	143.6	3.70	12.4
4.	V4	26.4	4.4	145.6	3.84	12.8
5.	V5	25.2	4.2	145.7	3.67	12.3
6.	V6	27.0	4.5	150.3	4.06	13.6 ^x
7.	V7	25.8	4.3	147.7	3.81	12.7
8.	Check unfertilized	24.6	4.1	142.6	3.51	11.7
LSD 5%						1.80
LSD 1%						2.03
LSD 0.1%						2.44

Tab. 2. The influence of foliar fertilizers on the biochemical composition of tomato fruits

Foliar fertilizer	Water (%)	Total dry matter (%)	Soluble matter (%)	Acidity (g citric acid/100g fresh matter)	pH	Glucids (%)	Nitrats (mg/kg)	C Vitamin (mg/100g fresh matter)
V1	94.51	5.49	4.1	0.34	3.84	3.4	29.00	22.00
V2	94.01	5.99	3.7	0.53	3.93	3.07	34.00	19.36
V3	94.84	5.16	4.0	0.64	3.91	3.32	33.00	32.56
V4	95.46	4.54	3.2	0.34	3.84	2.65	36.00	30.80
V5	95.03	4.97	3.1	0.51	3.93	2.57	36.38	29.04
V6	94.58	5.42	3.2	0.53	3.90	2.65	34.00	29.04
V7	94.47	5.53	3.6	0.64	3.82	2.98	36.00	18.48
Check unfertilized	95.03	4.97	3.0	0.43	3.92	2.49	34.50	16.72

substances (30% P, 20% K) 0.2%, (38% organic matter, 3,2% N, 1,6% P, 3,2% K, 6,5% aminoacids, 150 mg/l Fe, 1200 mg/l Mg, 25 mg/l Zn, 4,3 mg/l Cu, 33mg/l Mn, 71 mg/l B, 670 mg/l Ca, 16 mg/l Mo) 0.25%, (natural plant hormones from algae extracts *Ascophylum nodosum*) 0.4% and (42 g/l N, 100 g/l P, 70 g/l K, 5 g/l Mg, Zn, Fe, Cu, Mn, B, Mo, 6 essentials aminoacids and biostimulators) 0.3% improves the content in C vitamin of fruits (32.56 mg, 30.80 mg and 29.04 mg/100g fresh matter).

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