

Research in soil drench application of insecticides to protect tomatoes and cucumbers crops in solarium

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Abstract The research was conducted in a solarium grown tomatoes, Prek variety, cucumber, Mirabelle F1 hybrid, in the testing group from ICDLF Vidra, Giurgiu County.

In the cultures under study there were drenched Nudrin Actar 200 and SC 25 WG into the soil, 100 ml / plant each, after 10-15 days from the final planting in the solarium. The concentration of each solution was of 0.008%. Both insecticides were aimed to reduce populations of greenhouse white flies (*Trialeurodes vaporariorum* - Westw) and of cucumber green lice (*Cerosipha gossypii* - Glove). Their effect on plants was studied at each 3, 7, 14, 21 and 28 days, throughout counting the number of pests remaining on the plants. From the obtained results, it can be shown that the two products are highly effective on tracking and destroying the pests.

Regarding the effect of these pesticides on the greenhouse white fly, both at tomato and cucumber cultures, it was observed that the maximum reduction of L1-L2 adult and larvae populations occurs after 21 days and of L3-L5 larvae after 14 days. In what regards the cucumber green lice both products showed a swift, reducing 90% of the population after only three days.. Actar reduced the population at its maximum after 14 days, but Nudrin showed a longer period of time.

Key words

tomatoes, cucumber, plant protection

Vegetable crop production in protected areas of cultivation is a system which allows the production of fresh products with lower costs and earlier than in greenhouse and field systems. These favorable environmental conditions are also exploited by a number of pests that can cause extensive damage to crops (2, 4), if they are not kept under the minimum threshold of damage. The choice of protection products should be made taking into consideration the natural structure of the pests and the means to avoid pollution for the future products and the environment (1,2,3).

In order to have high quality production that can be sold safely to the consumer is necessary to correlate the preventive measures with specific products in appropriate concentrations.

Material and Method

The research was conducted in ICLF Vidra testing field, Giurgiu County, analyzing the culture of tomato and cucumber, Prek variety and F1 Mirabelle hybrid in solarium. The products used were Nuprid 200 SC and Actar 25 WG in order to highlight their effectiveness in combating pests such as white flies (*Trialeurodes vaporariorum* - Westw) and cucumber green lice (*Cerosipha gossypii* - Glove) in protected spaces.

Product description

Actara 25 WG

It is a systemic insecticide, which after the application enters the leaves, stems and roots. It acts on insects by ingestion and contact with their nervous system.

It shows fine, granular, homogeneous, without shattering tendency, beige granules. Contains 25% thiametoxam. After the application of the last treatment until harvest, it must pass 3 days in tomato, eggplant and cucumber cultures, 7 days at potato and 21 days in cabbage and onion. To reduce the risk of groundwater contamination are avoided more than 200 g product per hectare per year. It is compatible with many plant protection products.

Nuprid 200 SC

It is a systemic insecticide, presented in the form of fine suspension, homogenous, white colored, containing 200 g / limidacloprid. Acts both by contact and through ingestion in a large number of insect pests. The active ingredient acts on the nervous system of insects causing their death very fast.

It is applied as foliar treatment during the growing season, but also as soil treatment after the foundation of the culture. Mixture is compatible with most plant products.

Arrange to do randomized experience, the lots of culture were formed in two variants, with three repetitions each, arranged linearly:

- V1-25 WG Actar - 0.8 kg / ha
- V2-200 SC NUPRID -0.8 l / ha

The treatment was applied one single time using the soil drench method, with 100 ml / plant, 10-15 days after planting in the solarium, in the final place. The solarium environmental conditions were optimal for the culture of the two vegetable species and had the followi characteristics: the average atmospheric temperature of 26 ° C - 30 ° C, relative humidity of 65% - 75%. Applied water on the plants was performed by a drip system.

After applying the treatment, observations regarding the reduction of populations of both insects were noted after 3, 7, 14, 21 and 28 days.

Having these observations permitted the calculation of the percentage of pest populations reduction and appreciated the phytotoxic effect after 7 days of treatment.



Fig.1 General aspect from cucumber culture

Results and Discussions

The soil drench application of the two insecticides to the culture of tomatoes and cucumbers in solarium has proven to be an effective option for treatment of crops, having a great impact on pest tracking. The amount of 0.8 kg / ha Actar and 0.8 l / ha Nuprid, acted on the two monitored pests in both the adult and larval stage, of different ages and different degree of mobility.

For the tomatoes grown in solarium, after 3 days of treatment, the populations of *Trialeurodes vaporariorum* decreased to 62.1% after Actar application and to 63.2%, after Nuprid application. The treatments were more effective on adults after 21 days. Mobile larvae, L1-L2, have been affected more than 90%, again after 21 days of treatment. In contrast, at the non moving larvae, L3-L5, the treatment effect was produced 14 days after the treatment (Table 1).

Table 1

Effectiveness of Actar 25 WG and 200 SC Nuprid drenched in soil to combat greenhouse white fly, *Trialeurodes vaporariorum* – Westw in solarium tomato crops

Product	Dose kg/l /ha p.c.	Development stage	Population reduction%				
			Treatment days				
			3	7	14	21	28
Actara 25 WG	0,8	Adulti	62,1	86,6	92,8	95,6	86,1
Nuprid 200 SC	0,8	Adulti	63,2	80,1	88,9	91,4	78,5
Actara 25 WG	0,8	L1-L2	44,3	60,6	83,9	90,3	79,2
Nuprid 200 SC	0,8	L1-L2	35,3	50,8	81,7	88,5	79,3
Actara 25 WG	0,8	L3-L5	40,5	53,1	80,6	79,8	77,3
Nuprid 200 SC	0,8	L3-L5	34,2	64,3	85,6	82,7	71,1

In cucumber, after applying the treatment, the reduction of greenhouse white fly populations was evident and similar to the tomato crop. Mobile populations of adults and larvae showed a decrease in number from the third day since treatment, the maximum being of 21 days after application when

adults are being destroyed at a rate of 94.6% with Nudrin and 95.7% with Actar. The L1-L2 larvae were destroyed in proportion of 93% with both treatments. The non moving larvae, L3-L5, were affected in the highest proportion after 14 days of treatment (Table 2).

Table 2

Effectiveness of Actar 25 WG and 200 SC Nuprid drenched in soil to combat greenhouse white fly, *Trialeurodes vaporariorum* – Westw in solarium cucumber crops

Product	Dose kg/l/ha p.c.	Developme nt stage	Population reduction%				
			Days of treatment				
			3	7	14	21	28
Actara 25 WG	0,8	Adulti	69,7	87,4	94,3	95,7	90,3
Nuprid 200 SC	0,8	Adulti	78,3	87,2	91,5	94,6	93,0
Actara 25 WG	0,8	L1-L2	67,4	73,4	91,6	93,8	81,7
Nuprid 200SC	0,8	L1-L2	52,7	51,2	88,5	93,2	79,5
Actara 25 WG	0,8	L3-L5	67,5	61,5	86,6	85,7	78,4
Nuprid 200 SC	0,8	L3-L5	66,7	58,2	85,0	83,9	76,1

In what regards the cucumber green lice , Actar 25 WG had a very fast action and effect, which conducted to reduction of the population up to 90% after 3 days since the treatment. After 7 days, the rate at which populations were reduced was of 98, 3% and the

maximum was reached after 14 days, up to 99.1%. Nuprid treatment resulted with the same rapid effect in reducing green lice populations and additionally it had a longer effect, respectively of 21 and 28 days (Table 3).

Table 3

Effectiveness of Actar 25 WG and 200 SC Nuprid drenched in soil to combat cucumber green lice, *Cerosipha gossypii* – Glov. in solarium cucumber crops

Product	Dose kg/l/ha p.c.	Population reduction %				
		Days of treatment				
		3	7	14	21	28
Actara 25 WG	0,8	90,7	98,3	99,1	85,7	79,3
Nuprid 200 SC	0,8	90,4	91,8	94,2	90,9	81,7



Fig.2 *Trialeurodes* attack on tomato leaves

The 0.8 kg / ha (0.8 l / ha) dose applied as soil drench, after transplanting the seedlings of tomatoes and cucumbers in greenhouses, did not have phytotoxic effect on the studied cultures.

Conclusions

The research showed that the effect of products drenched in soil is dependent on soil moisture content. The dryer the land is (and the plants are in a fluid deficit), the faster, complete and efficient the product absorption is, at all tissues levels. Throughout the performing experience, it was noticed that the product Actar 25 WG, applied as soil drench also had a repellent effect in which the greenhouse white fly adults bypassed the treated seedlings after transplantation into the solarium. The application of the two insecticides, by soil drench, had great effect on reducing populations of white flies and aphids, for a long time. Thus, both in the tomato and the cucumber cultures, Actar product showed a good efficacy for reducing white flies populations after 21 days in adults and mobile larvae and after 14 days in non moving larvae.



Fig.3 *Cerosipha gossypii* attack on cucumber leaves

For aphids, Actar determined, after 3 days from treatment, 90% population reduction, the maximum being reached after 14 days (99.1%). The Nudrin product culture of tomatoes and cucumbers showed a similar action to the product Actar in the cultures of tomatoes and cucumber for white flies, from larvae to adult stage L1-L2, L3-L5. To combat aphids, Nudrin has a fast effect, likewise Actar, but the maximum reduction after 14 days of treatment is 94.2%, a lower percentage than the one given by Actar.

References

1. Baicu T., 1992 - Perspective în combaterea biologică a Bolilor și Dăunătorilor Plantelor Agricole, Editura Tehnica Agricolă București.
2. Hoza Gheorghita, 2003– Sfaturi practice pentru cultura legumelor. Ed. Nemira, Bucuresti.
3. Papacostea P., 1994– Ferma biodinamica. Ed. Enciclopedica, Bucuresti,
4. Rosca I., Drosu Sonica, Bratu Elena, 2001– Entomologie hortocola speciala, Ed. Didactica si Pedagogica R.A., Bucuresti.