

## MORTALITY OF *Myzus persicae* DEPENDING ON THE COMPONENTS OF SPRAY LIQUIDS

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### ABSTRACT

The objective of this study was to assess the insecticidal effect of the preparation Actellic-50 applied alone and in two- and three-component mixtures with the fungicide Antracol WP-70 and the mineral nutrient Ferticare I (FI), taking into account the quality of water used in the mixtures (tap and well water). Tests were conducted under laboratory conditions. The test organism was the green peach aphid (*Myzus persicae*). Insecticidal effect was determined via the mortality rate of aphids. Depending on concentration and length of exposure, highest mortality rates were achieved with the preparation Actellic-50 after 3.5 hrs; Actellic-50 + Antracol WP-70 after 4 hrs; Actellic-50 + FI and Actellic-50 + Antracol WP-70 + FI after 24 hrs. These rates indicated that individual components of a mixture tended to affect its biological effectiveness. The effect of the mixture Actellic-50 + Antracol WP-70 was additive in relation to the application of the insecticide applied alone, while the three-component mixture exhibited antagonism, i.e., lower toxicity.

**Key words:** *Myzus persicae*, mortality, pesticides, compatibility, incompatibility

### IZVLEČEK

#### SMRTNOST *Myzus persicae* V ODVISNOSTI OD KOMPONENT ŠKROPIV

Namen raziskave je bil oceniti insekticidni učinek pripravka Actellic-50, nanesenega samostojno in v dve- ter trikomponentnih mešanica s fungicidoma Antracol WP-70 in rudninskim gnojilom Ferticare I (FI). Ob tem smo upoštevali kakovost vode (vodovodna voda in voda iz vodnjaka), uporabljene za pripravo mešanice. Poskus je potekal v laboratoriju. Testni organizem je bila siva breskova uš (*Myzus persicae*). Insekticidni učinek smo določali prek stopnje smrtnosti omenjenih uši. V odvisnosti od koncentracije in dolžine izpostavitve smo največjo učinkovitost ugotovili pri pripravku Actellic-50 po 3,5 urah, kombinaciji pripravka Actellic-50 in fungicida Antracol WP-70 po 4 urah, kombinaciji pripravka Actellic-50 in FI ter kombinaciji pripravka Actellic-50 in fungicida Antracol WP-70, v obeh primerih po 24 urah. Ugotavljamo, da delež individualnih komponent v mešanica določa biotično učinkovitost pripravka. Učinek mešanice pripravka Actellic-50 in fungicida Antracol WP-70 je bil primerljiv z učinkovitostjo samostojnega nanosa insekticida, medtem ko smo pri trikomponentnih mešanica zaznali antagonizem, to je manjšo toksičnost.

**Key words:** *Myzus persicae*, smrtnost, fitofarmacevtska sredstva, kompatibilnost, inkompatibilnost

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## 1 INTRODUCTION

The practice to mix different kinds of pesticides (insecticides, fungicides) with mineral nutrients calls for a preliminary check of physicochemical properties and biological effects of these mixtures (Indić *et al.*, 1999; Klokočar-Šmit *et al.*, 2000). It is necessary to be thoroughly acquainted with specific properties of mixture components (formulation, compatibility or incompatibility), agroecological conditions of application site and the effect of the components on the yield and quality of agricultural products (Tomlin, 2001; Whitehead, 2001; Mitić, 2004; Maceljiski, 2005). Previous experiences indicate that pesticides and mineral nutrients are not always compatible, or that they are partially compatible, therefore, it is necessary to check their physicochemical and biological compatibility (Perović *et al.*, 2005). The objective of this study was to assess the insecticidal effect of the preparation Actellic-50 applied alone and in two- and three-component mixtures with the fungicide Antracol WP-70 and the mineral nutrient Ferticare I (FI), taking into account the quality of water used in the mixtures (tap and well water).

## 2 MATERIALS AND METHODS

Tests were conducted under laboratory conditions. The test organism was the green peach aphid (*Myzus persicae*) cultured on pepper plants. The tests included III and IV stage larvae, not less than 25 individuals per replication. The insects were immersed in active liquids of the insecticide and its mixtures. Actellic-50 was applied in the conventionally used and lower concentrations (0.1, 0.05, 0.025, 0.005%), Antracol WP-70 in the concentration of 0.25%, and the nutrient FI in the concentration of 1%. All tests were performed at the temperatures of 22-25°C, relative air humidity 41-55% and the day/night regime 16/8 hours, replicated four times. Larval mortality rate was estimated 0.5, 1, 2, 2.5, 3, 3.5, 4, 5, 6, 12, 24 and 36 hours after treatment. Dead individuals were the criterion for mortality. Insecticidal effect was determined via the mortality rate of aphids.

## 3 RESULTS AND DISCUSSION

The conventionally used concentration of Actellic-50 and the two-component mixture (Actellic-50 + Antracol WP-70) caused a slightly increased mortality rate 2.5 hours after treatment (78-85%) and 100% mortality 6 hours after treatment, irrespective of water quality (Fig. 1. and Fig. 2.)

The mixture Actellic-50 + FI performed similarly to the mixture Actellic-50+ Antracol WP-70 2.5 hours after treatment, achieving the initial mortality rate of 77-82%. However, 24 hours after treatment, the mortality rate ranged from 94 to 97% (Fig. 3).

The application of the three-component mixture (Actellic-50+ Antracol WP-70+FI) lowered the initial insecticidal effect 2.5 hours after treatment to 23-27% in the case of the tap water and 43-48% in the case of the well water. Those were significant reductions in relation to the performance of insecticide alone and the two-component mixtures. Six hours after treatment, the mortality rate varied from 69 to 76%, regardless of the source of water, 24 hours after treatment it varied from 80 to 87% (Fig. 4).

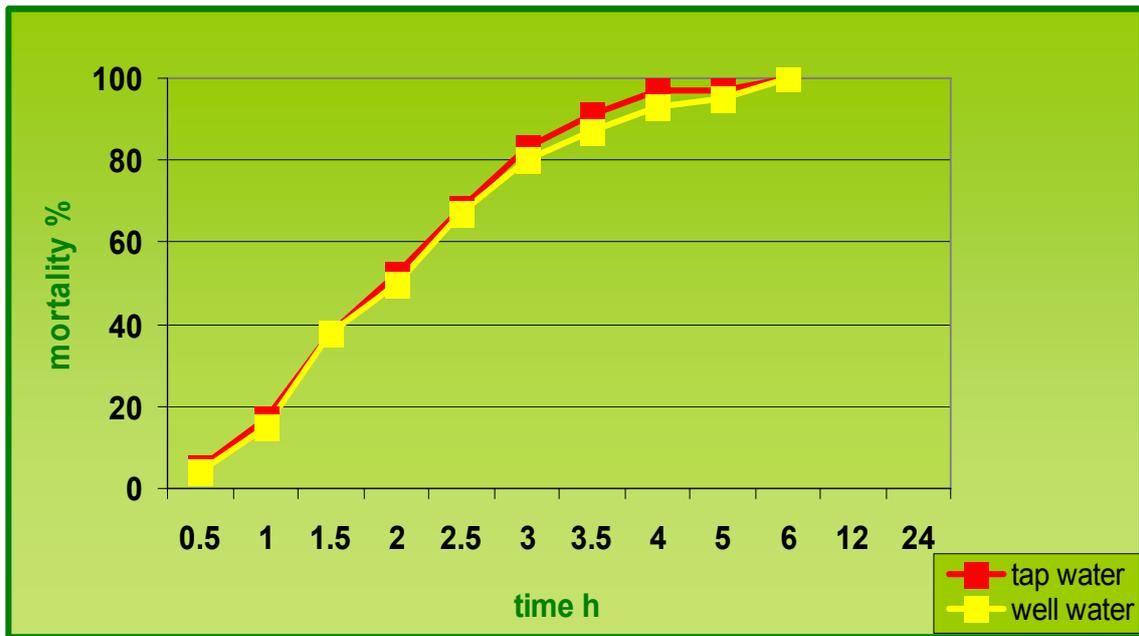


Figure: 1. Mortality of *Myzus persicae* caused by Actellic-50 in different water

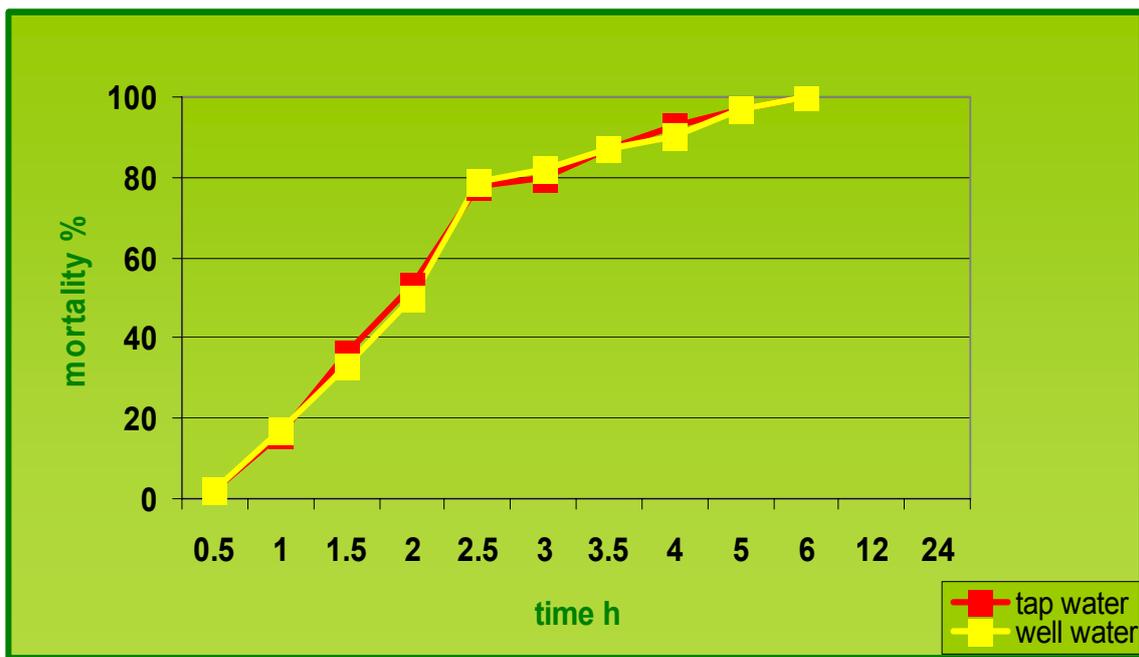


Figure 2: Mortality of *Myzus persicae* caused by mixture Actellic-50+Antracol WP-70 in different water

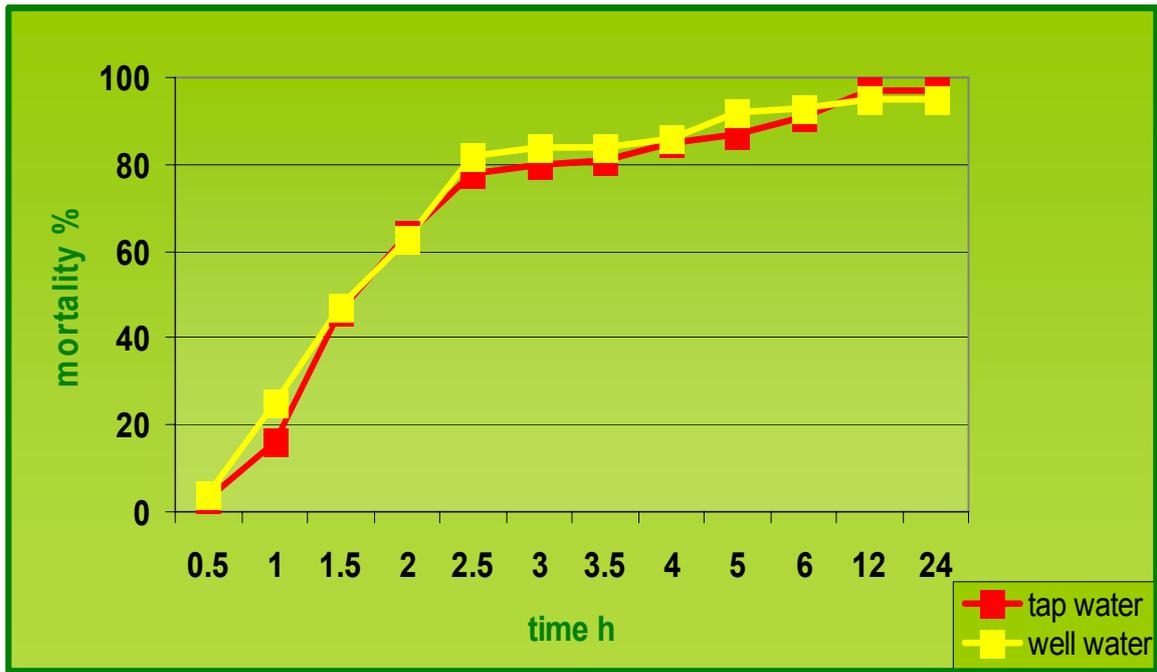


Figure 3: Mortality of *Myzus persicae* caused by mixture Actellic-50+Ferticare I in different water

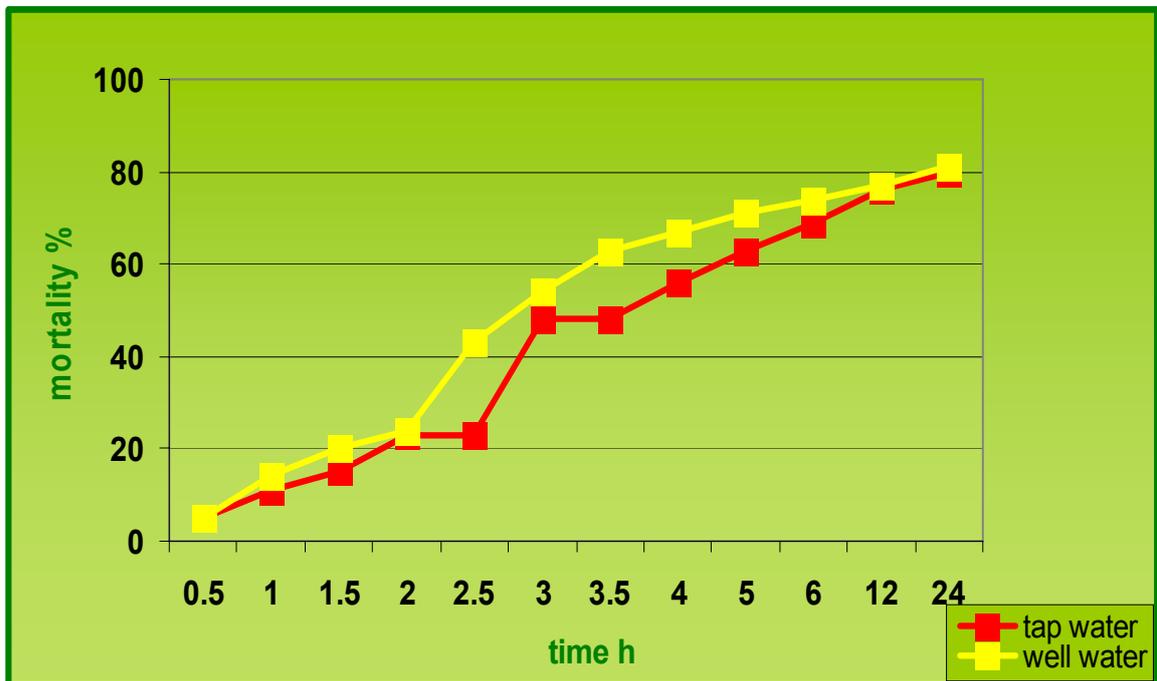


Figure 4: Mortality of *Myzus persicae* caused by mixture Actellic-50+Antracol WP-70+Ferticare I in different water

#### 4 CONCLUSIONS

It may be stated on the basis of the above that the changes in biological effect demonstrated through the slower and lower mortality rates are obviously due to the

biological incompatibility of the component (Actellic-50 and Ferticare I), especially in the three-component mixture where the incompatibility may be intensified by differences in water quality.

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