

## Effect of medicinal plant extracts on physiological changes in tomato, inoculated with *Meloidogyne javanica* and *Fusarium oxysporum* f. sp. *lycopersici*

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### Abstract

The nematicidal and fungicidal effect of plant materials of two Iranian native plant species, *Ferulago angulata* and *Zataria multiflora* was evaluated. The interrelationship between *M. javanica* and *F. oxysporum* f. sp. *lycopersici* in susceptible local tomato, *Lycopersicon esculentum* Mill, was studied and their management by plant materials was evaluated in glasshouse conditions. The effects of different parts of these two medicinal plants, on growth-related parameters, the chlorophyll content, photosynthesis and gas-exchange parameters of tomato were also determined. Statistical analysis indicated a significant effect of tested plant extracts on all tested parameters. On the basis of these tests, in *Meloidogyne* infected plants, leaf powder of *F. angulata* at the rate of 0.4 percent was most effective on tomato growth parameters, whereas in case of plants infected with both pathogens, stem powder of *F. angulata* at the same rate was the best treatment. Data showed that chlorophyll a, b and total, were significantly increased by treating the *Meloidogyne* infected plants as well as the plants infected with both pathogens, with leaf powder of *Z. multiflora* at the rate of 0.2 percent. In this treatment, the amount of chlorophyll was considerably more than the uninoculated control plants. In case of intercellular CO<sub>2</sub> concentration (Ci), transpiration (E), photosynthesis rate (A), stomata conductance (Gs) and water use efficiency (WUE), the best treatments were leaf extract of *Z. multiflora* (0.4%), leaf powder of *Z. multiflora* (0.2%), leaf powder of *Z. multiflora* (0.4%), leaf extract of *Z. multiflora* (0.2%) and leaf extract of *F. angulata* (0.5%), respectively. The findings from this study suggest that the performance of *L. esculentum* can be improved by soil application of these plant materials. The results for the test of effects of different parts of plants on gall formation and reproduction rate of *M. javanica* on tomato plants, inoculated with nematode alone or combination of nematode and *F. oxysporum* f.sp. *lycopersici*, indicated a significant effect of plant materials on studied characters. On the basis of LSD test, stem powder of *F. angulata* at the rate of 0.4 percent was the most effective treatment in reducing the reproduction rate of the nematode, whereas the flower extract of this plant at the same rate significantly reduced the gall and egg-mass numbers.