Chitosan nanocapsules can successfully protect tomato plants against tomato mosaic virus infection in a dose-dependent manner.

Dr. Jonas Vargas, Embrapa Vegetables, Km 09, BR060, 70275970 Brasília-DF, Brazil; jonasvgs@gmail.com (co-author); Dr. Odilio Assis, Embrapa Vegetables, Km 09, BR060, 70275970 Brasilia-DF, Brazil; odilio.assis@gmail.com (co-author); Dr. Erich Nakasu, Embrapa Vegetables, Km 09, BR060, 70275970 Brasilia-DF, Brazil; erich.nakasu@embrapa.br (co-author); Dr. **ALICE KAZUKO INOUE-NAGATA**, Embrapa Vegetables Km 09,BR060, 70275970 Brasilia-DF, Brazil; alice.nagata@embrapa.br (presenting author).

The domesticated tomato (*Solanum lycopersicum*) is highly susceptible to pathogens, particularly plant viruses. Currently, there are no market products that cure tomato plants infected by viruses, making the use of resistant varieties, and vector control, the most applied management practices. The application of chitosan (a linear polysaccharide composed of β-1,4-linked units of D-glucosamine and N-acetyl glucosamine) has been described as a preventive measure against pathogen attacks, as it can activate plant defense mechanisms, protecting against bacteria, fungi, and some plant viruses. Considering this potential, we tested the effects of chitosan nanocapsules application at different concentrations (0.0, 15.6, 31.2, 62.5, and 125.0 µg/mL) against infection in Santa Clara tomato plants challenged with tomato mosaic virus (ToMV, tobamovirus). Plants were inoculated 24 hours after chitosan application and analyzed for infection rates and growth parameters such as plant height, fresh weight, and dry weight. Results showed that nanocapsules synthesized at concentrations of 31.2 and 62.5 µg/mL performed best, leading to the lowest infection rates and viral particle accumulation. The 62.5 µg/mL concentration resulted in taller plants, while 15.6 and 125.0 µg/mL produced the shortest plants. Non-inoculated plants sprayed with water or chitosan nanocapsules at 31.2 µg/mL, along with inoculated plants treated with 62.5 µg/mL, had the highest fresh biomass, whereas the highest dry biomass was observed in the negative control at 31.2 µg/mL. Although effective, the protective response of chitosan nanocapsules varied with the different concentrations, but not linearly. Due to the aggressiveness of our pathosystem, chitosan is believed to be equally or more effective in protecting against other mild plant viruses, making it a promising molecule for pest and disease management in agriculture

Keywords: Resistance; nanotechnology; plant virus; protection; management; *Solanum lycopersicum*.