Bacterial cell cultures' effects on the infectivity of *Meloidogyne hapla*

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The increasing frequency of extreme weather events is affecting ecosystems and threatening food production. Therefore, to reduce the impacts of climate change and ensure sustainable agricultural practices, it is vital that the use of chemical pesticides decrease and eco-friendly alternatives are explored. PPN are a significant threat to crop production worldwide and, among them, *Meloidogyne* spp. are the most damaging. Conventional nematicides have been the best alternative to control PPN but their indiscriminate use has raised environmental concerns and led to the development of nematicide-resistant nematode populations. Hence, innovative coupled with sustainable strategies should be developed to control and mitigate their impact, such as plant-growth promoting bacteria (PGPB). This research seeks to explore the potential of strains from *Bacillus* and *Pseudomonas* genera, as biological control agents, against RKN. Tomato plants cv. Coração de Boi, susceptible to RKN populations, were selected to assess the nematode infectivity carried out in pots (7 cm diameter, ca. 118.37 g soil). The assay was split into three treatments, with five replicates, including (i) control without the bacteria and inoculated with 300 J2 of *M. hapla*, (ii) inoculated with 1 mL of each consortium bacterial strain (adjusted to $OD_{600} = 0.6$, equivalent to $\approx 1\times10^8$ CFU mL^{-1}) and, after 30 min, inoculated with 300 J2 of *M. hapla* and (iii) inoculated with 300 J2 of *M. hapla* and, after 30 min, inoculated with 1 mL of each consortium bacterial strain. After one week, the plants were uprooted, and the roots were carefully washed out of debris and stained with acid fuchsin. The RKN infectivity was determined by counting the number of stained nematodes inside the roots under a stereomicroscope. The bacterial consortium significantly reduced the infectivity of *M. hapla*, being the infectivity in the control 3 times more in average than in the treatments with consortium. Considering the two treatments, with the bacterial consortium, there were no significant differences, although the treatment with the consortium before inoculation of the nematodes was more effective to reduce the infectivity of RKN. In a previous study was shown that this consortium affected RKN motility and mortality but did not affect *Caenorhabditis elegans*. These findings revealed that this bacterial consortium has the potential to be a new tool for RKN management. **Acknowledgements**: funded by FEDER funds through the program COMPETE—Programa Operacional Factores de Competitividade and by national funds through FCT—Fundação para a Ciência e a Tecnologia, under the projects UID/EMS/00285/2020 and UIDB/04004/2020; by project SIRAM-PRIMA programme supported under Horizon 2020 the European Union's Framework for Research and Innovation. It was supported by Centre for Functional Ecology (CFE) and Project ReNATURE–Valorization of the Natural Endogenous Resources of the Centro Region (Centro2020, Centro-01-0145-FEDER-000007).