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Low-oxygen tolerance of *Ditylenchus destructor* (Tylenchida: Anguinidae)

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Abstract:

The nematode *Ditylenchus destructor* Thorne (Tylenchida: Anguinidae) is a serious garlic pathogen in Japan; cloves are infested by the nematode rot during storage, and there is no method that will completely eliminate the nematode from the clove. In the present study, we examined the survival of *D. destructor* under hypoxic and anoxic conditions to assess the use of controlled atmospheres as control strategies. Under hypoxic condition at 25 °C, the survival rate of *D. destructor* at 5 weeks was 60%, whereas the majority of *Caenorhabditis elegans* Maupas (Rhabditida: Rhabditidae) died in a week. Under anoxic condition at 25 °C, the survival rate of *D. destructor* at 2 weeks was approximately 80%, whereas that of *Meloidogyne incognita* (Kofoid and White) Chitwood (Tylenchida: Meloidogynidae) was 30% at the same time point. Under hypoxic and anoxic conditions at 35 °C, the survival rate of *D. destructor* dramatically decreased: most died within 14 and 7 days, respectively. These results suggest that *D. destructor* has a high tolerance to hypoxia/anoxia, but a combination of low oxygen with heat stress can cause high mortality in this species.

Keywords: anoxia, anoxybiosis, garlic, hypercapnia, hypoxia, modified atmospheres