Title Effects of temperature and relative humidity on the in vitro and in vivo radial growth of *Penicillium italicum* and on the biocontrol activity of *Pichia guilliermondii*, strain Z1

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Abstract

The objective of this study was to assess the effect of temperature (5-25°C) on the 'in vitro' and 'in vivo' growth rates of *Penicillium italicum* and to determine the combined effect of temperature and relative humidity (45 to 100%) on lesion size of this pathogenic fungus on Valencia late oranges, either alone or in combination with the antagonistic yeast strain Z1 of *Pichia guilliermondii* Wickerham. Statistical analysis showed a significant effect of temperature on the 'in vitro' and 'in vivo' radial growth of *P. italicum* with the maximum growth observed at temperature of 25°C. In both cases, no growth was observed at a temperature of 35°C. These factors had a significant effect on *P. italicum* lesion size when it was applied alone on Valencia late oranges and insignificant when yeast strain Z1 was applied 24 h before *P. italicum* inoculation. Our results confirm previous 'in vitro' findings that a_w has a greater influence than temperature on *P. italicum* growth and highlight that the strain Z1 showed high antagonistic potential against this pathogen over a range of temperature-relative humidity regimes favouring *P. italicum* development.