PLANT GROWTH PROMOTING AND ELICITOR EFFECTS TESTING OF NATURAL PRODUCTS ON POTATO IN CONTROLLED, SEMI-CONTROLLED AND FIELD CONDITIONS

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Abstract

Efforts to reduce the high chemical input in potato production have so far been hampered by the lack of convincing natural alternatives to chemical plant protection and copper preparations. A higher dependency of plant growth promoting and elicitor effects on environmental conditions and application mode may be the cause for the hitherto unsatisfactory performance of natural substances in the control of foliar diseases of the potato such as late blight (Phytophthora infestans) and early blight (Alernaria solani) under field conditions.

The performance of soluble chitosan produced from crab shells and three yeast extracts (Saccharomyces cerevisiae, Yarowia lipolytica, Rhodotorula mucilaginosa) was analysed on three levels: under controlled conditions in vitro with successive acclimatisation ex vitro, in the greenhouse with artificial infection with zoospores of Phytophthora infestans, and in the field in plot trials under temperate (Germany) and subtropical conditions (Cuba).

All four substances influenced plantlet quality in vitro positively, with marked effects manifested in subsequent ex vitro stages. In greenhouse plants peroxidase activity was altered after foliar application, response to artificial infection differed, with chitosan and the Yarowia lipolytica extract showing decreased infection rates. In field trials Chitosan and yeast extracts did not reduce incidence of early blight under subtropical conditions, while under temperate conditions late blight was slightly reduced by chitosan, the effect depending on the application mode. Soluble chitosan and yeast extracts improved tuber yields under subtropical, but not under temperate conditions.

Key words: *plant groth, elicitor effects, potato, field condition*