

***In vivo* control of phytopathogens by using omega-3
fatty acid docosahexaenoic acid (DHA) bioconverted by
Pseudomonas aeruginosa PR3**

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Abstract

Bioconverted hydroxy fatty acid, docosahexaenoic (bDHA) obtained from the microbial conversion by *Pseudomonas aeruginosa* PR3 was evaluated for its *in vivo* anti-fungal activity. bDHA showed great potential of anti-fungal activity against phytopathogenic fungi tested in this study. bDHA at the concentration of 500 µg/ml. showed remarkable anti-fungal activity against all the fungus tested.

Introduction

The hydroxyl group on fatty acids is well known to give fatty acids special properties such as higher viscosity and reactivity compared with other normal fatty acids so that the hydroxy fatty acids are used in a wide range of industrial products. We are reporting here the industrial potential of hydroxylated omega-3 fatty acid docosahexaenoic acid by determining its anti-fungal activity against the range of phytopathogens *in vivo*.

Materials & methods

Microorganisms : *Pseudomonas aeruginosa* PR3, kindly provided by Dr. Hou in USDA, was grown at 28°C aerobically at 200 rpm on standard medium containing per liter 4 g dextrose, 2 g K₂HPO₄, 2 g (NH₄)₂HPO₄, 1 g NH₄NO₃, 0.5 g yeast extract, 0.014 g ZnSO₄, 0.01 g FeSO₄·7H₂O and 0.01 g MnSO₄·7H₂O. Fungal strains were obtained from Korean Agricultural Culture Collection (KACC), Korea.

Bioconversion of docosahexaenoic acid

Bioconversion was carried out in SM. DHA as substrate was added to a 24 hour old culture followed by continued incubation for an additional 72 h. The culture broth was acidified to pH 2 with 6N HCl followed by immediate extraction twice with an equal volume of ethyl acetate and diethyl ether. The solvent was evaporated from the combined extract with a rotary evaporator and bioconverted oil extract of DHA was obtained.

Results & discussion

The bioconverted oil extract of docosahexaenoic acid at the concentration of 500 $\mu\text{g/ml}$ showed 100% anti-fungal effect against *P. capsici*, *C. capsici*, and *F. oxysporum* (Fig 1.).

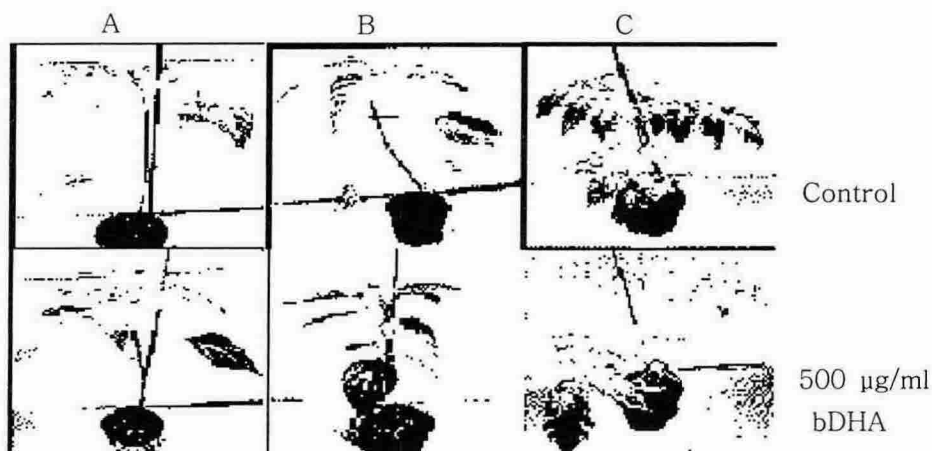


Fig. 1. Anti-fungal activity of bDHA (500 $\mu\text{g/ml}$) against phytopathogens. A: *P. capsici*; B: *C. capsici*, C: *F. oxysporum*.

Conclusion

These results suggest the availability of bioconverted crude oil of omega-3 fatty acid docosahexaenoic acid for trials in controlling the incurable diseases caused by phytopathogens.

Reference

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