Stimulation of novel phenolic metabolite, epoxy-pseudoisoeugenol-(2-methylbutyrate) (EPB), in transformed anise (*pimpinella anisum* L.) root cultures by fish protein hydrolysates

Nuri Andarwulan[ab]; Kalidas Shetty[a]

[a] Department of Food Science, University of Massachusetts, Amherst, MA, USA
[b] Department of Food Technology and Human Nutrition, Bogor Agricultural University, Bogor, Indonesia

Abstract

Acetyl salicylic acid (ASA) and fish protein hydrolysate (FPH) were investigated for stimulating valuable phenolics production in transformed anise root cultures *(Pimpinella anisum* L.) for food and nutraceutical applications. Anise root cultures were grown in Murashige-Skoog (MS) hormone free medium. Total phenolics in anise root cultures decreased with ASA and ASA/FPH treatments and may possibly be diverted to lignification as indicated by increase in guaiacol peroxidase (GPX) activity. Epoxy-pseudoisoeugenol-(2-methylbutyrate) (EPB) production in root cultures in response to FPH treatment increased 3 fold compared to control and 6 fold higher compared to ASA treatment on day 60. The optimum concentration of FPH for EPB stimulation was 2 ml/L of standardized mackerel hydrolysates and if the concentration was higher than 2 ml/L, FPH was inhibitory to growth of root cultures. Antioxidant activity in all treatments was high on day 60 compared to day 30. On either day, there was no difference in antioxidant activity between treatments. The activity of glucose-6-phosphate dehydrogenase (G-6-PDH) did not vary. Free proline content in response to control and ASA treatments was higher than in FPH and ASA/FPH treatments on day 30. These results clearly indicate that mackerel hydrolysate can be used to stimulate EPB in transformed anise root cultures. EPB is potentially a valuable phenolic metabolite to regulate nutraceutical type phytochemicals during seed germination.

Keywords: Epoxy-pseudoisoeugenol-(2-methylbutyrate) (EPB); Acetyl salicylic acid (ASA); Fish protein hydrolysate (FPH); Transformed anise root cultures, Pimpinella anisum, phenolics, guaiacol peroxidase (GPX); lignification