Title Improving the phytochemical composition of broccoli sprouts by elicitation

Author Santiago Pérez-Balibrea, Diego A. Moreno and Cristina García-Viguera

Citation Food Chemistry, Volume 129, Issue 1, 1 November 2011, Pages 35–44

Keywords Brassica oleracea; Methionine; Tryptophan; Chitosan; Salicylic acid; Methyl jasmonate; Vitamin C; Phenolic compounds; Glucosinolates

Abstract

In order to increase the concentrations of bioactive compounds in broccolisprouts, exogenous elicitors: methionine, tryptophan, chitosan, salicylic acid (SA) and methyl jasmonate (MeJA) were sprayed at different concentrations during germination. The effects of the elicitors on vitamin C, phenolic compounds and glucosinolate levels were assessed in 3, 5 and 7-days old seedlings. The application of 200, 300 μM SA and 0.01% chitosan induced increases, by 26%, 18% and 54%, respectively in the content of vitamin C in 5 days old broccolisprouts. Flavonoid concentration was also increased by 31% and 33% after 10 μM MeJA and 100 μM SA treatments, respectively in 7 days old broccolisprouts. In contrast, methionine or tryptophan solutions did not positively affect the vitamin C or the phenolic compounds in the sprouts. The individual classes of glucosinolates respond differently to the elicitor treatment. Methionine, a sulphur-containing amino acid, applied at 5 mM, significantly increased, by 32%, the levels of aliphatic glucosinolates. However, indole glucosinolates presented a significant response to the induction with tryptophan, SA or MeJA treatments. Tryptophan at 10 mM concentration augmented by 1.8-fold the indole glucosinolate concentration in 7 days old broccolisprouts, and the treatments of 100 μM SA and 25 μM MeJA also induced significantly higher amounts of indole glucosinolates (by 33% and 51%, respectively) in 7 days old treated broccolisprouts. Therefore, the application of elicitors could be a useful tool for improving the bioactive metabolites in broccolisprouts for fresh consumption or functional ingredients for nutraceuticals foods.