Total polyphenol content of peaches is influenced by crop management regime and nitrogen fertilisation

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l Sweet Corn Carotenoid Concentrations Influenced By Herbicide Applications

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enoids serve antioxidant functions in plant photosynthetic processes, as well as in
ıs of disease reduction in mammalian systems. Lutein and zeaxanthin are important
ʏ carotenoids in suppressing aging eye diseases, such as cataracts and macular degene-
ı. Age-related macular degeneration now affects more than 1.75 million individuals in
nited States, with projections reaching nearly 3 million by year 2020. Sweet corn (Zea
var. rugosa) is one of only a few vegetable sources high in zeaxanthin. Mesotrione her-
ɜ is currently labeled for selective pre- and post-emergence weed control in sweet corn
ield corn. Mesotrione competitively inhibits phytoene desaturase, a critical enzyme in
enoid biosynthesis, which results in bleaching of leaf tissues in susceptible species and
:ual plant death. Sweet corn is tolerant to mesotrione applications; however, differing
tivity exist among genotypes. Therefore, mesotrione has become a popular herbicide
eed control in maize. What remains unclear is the impact of mesotrione on carotenoid
ɜntrations in mature sweet corn kernels when post-emergent applications are made to
ʒ corn plants. Our research objective was to measure mature kernel carotenoid concen-
ns in response to post-emergence applications of mesotrione to genotypes of different
ɨivities ['Merit' (sensitive), 'Temptation' (tolerant), 'Incredible' (moderately sensitive)].
ɜmergence treatments included mesotrione applied alone, or in mixtures with the pho-
:em II inhibitor atrazine applied at two stages of growth. Corn plants were 5-10 and 15-
ı in height for early-post and late-post applications, respectively. Kernels were freeze-
and ground in liquid nitrogen prior to carotenoid extraction and HPLC quantification.
trione applied alone, or in mixtures with atrazine acted to increase concentrations of
·l antheraxanthin, lutein, and zeaxanthin carotenoids in several sweet corn genotypes.
ɜl lutein and zeaxanthin levels significantly increased 15.6% after mesotrione + atrazine
·post applications, as compared to the control treatment. Mesotrione applications re-
ɜ in greater pools of kernel carotenoids once the sweet corn genotypes overcame initial
cidal photo-oxidative stress to leaf tissues, which acted to increase nutritional levels.
s the first report of herbicides directly up regulating a key biochemical pathway linked
ɜ nutritional quality of a vegetable crop.

S9SC2 Total polyphenol content of peaches is influenced by crop management regime and nitrogen fertilisation

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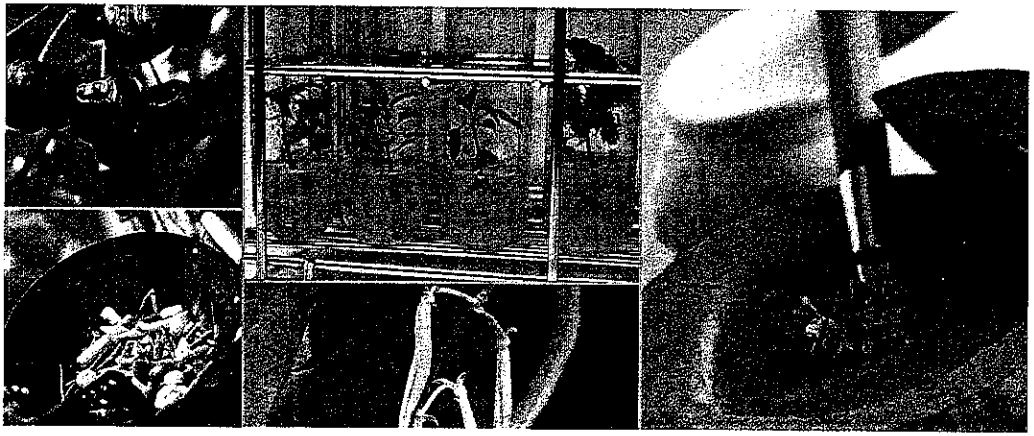
Organic fruits are increasingly requested by consumers. Their nutritional value is usually higher, as compared with conventional fruits. Our study aimed at determining the influence of two management regimes - organic farming (OF) and integrated fruit production (IFP) - and two levels of nitrogen (N) fertilisation - 120 kg N/ha/yr and 150 N/ha/yr - on total polyphenol content of peach fruits and leaves. The experimental design thus included four modalities. Fruits vitamin C content and leaves N content were also measured. The 4 modalities were compared on an a plot of yellow peach (cv Inra n°6607) with 4 replicates. Total polyphenol contents were measured following Folin-Ciocalteu method. In 2008, organic fruits exhibited a higher total polyphenol content as compared with IFP modalities (347.1 vs 271.2 mg/100g MS, P=0.012). Within each management regime, fruit polyphenol content is higher with lower fertilisation levels (p=0.012). As a whole, total polyphenol content decreases from OF with lower N fertilisation to IFP with higher N fertilisation, whereas the two other modalities exhibit similar values. Concerning leaves composition, total polyphenol content is significantly lower with IFP-150 kg N.ha-1 than in both organic modalities. Leaves N content is significantly higher in IFP, as compared with OF. Organic management combined with a restricted N fertilisation display higher polyphenol contents in fruits and leaves. After three years of monitoring, we conclude that binding both factors can contribute to a peach production with higher nutritional value. Our results plead for a development of OF towards low-input systems, which can counteract with OF «eco-functional» intensification challenges.



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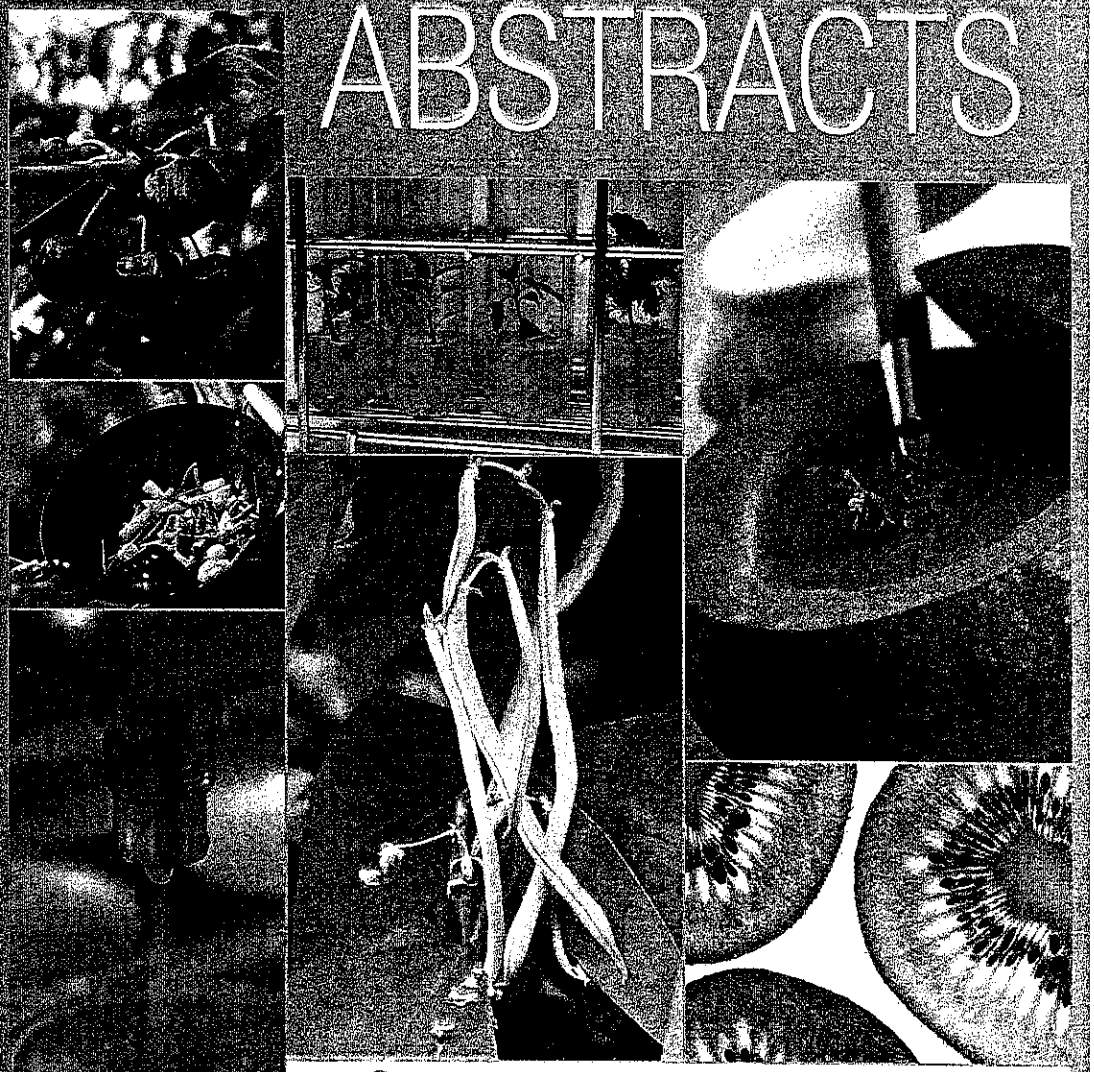
ABSTRACTS



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