A rapid and sensitive analytical method for quantification of polyacetylenes in carrot roots was developed. The traditional extraction method (stirring) was compared to a new ultrasonic liquid processor (ULP)-based methodology using high-performance liquid chromatography–ultraviolet (HPLC–UV) and mass spectrometry (MS) for identification and quantification of three polyacetylenes. ULP was superior because a significant reduction in extraction time and improved extraction efficiencies were obtained. After optimization, the ULP method showed good selectivity, precision [relative standard deviations (RSDs) of 2.3–3.6%], and recovery (93% of falcarindiol) of the polyacetylenes. The applicability of the method was documented by comparative analyses of carrots grown organically or conventionally in a 2 year field trial study. The average concentrations of falcarindiol, falcarindiol-3-acetate, and falcarnol in year 1 were 222, 30, and 94 μg of falcarindiol equiv/g of dry weight, respectively, and 3–15% lower in year 2. The concentrations were not significantly influenced by the growth system, but a significant year–year variation was observed for falcarindiol-3-acetate.

General information
State: Published
Organisations: Division of Food Chemistry, National Food Institute
Pages: 7673-7679
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: Journal of Agricultural and Food Chemistry
Volume: 58
Issue number: 13
ISSN (Print): 0021-8561
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 3.64 SJR 1.269 SNIP 1.343
Web of Science (2017): Impact factor 3.412
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 3.45 SJR 1.305 SNIP 1.343
Web of Science (2016): Impact factor 3.154
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): CiteScore 3.23 SJR 1.224 SNIP 1.245
Web of Science (2015): Impact factor 2.857
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): CiteScore 3.25 SJR 1.267 SNIP 1.413
Web of Science (2014): Impact factor 2.912
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): CiteScore 3.44 SJR 1.43 SNIP 1.47
Web of Science (2013): Impact factor 3.107
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): CiteScore 3.2 SJR 1.408 SNIP 1.464
Web of Science (2012): Impact factor 2.906
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): CiteScore 3.1 SJR 1.389 SNIP 1.441
Web of Science (2011): Impact factor 2.823
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 1.42 SNIP 1.391
Web of Science (2010): Impact factor 2.816
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 1.33 SNIP 1.306
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 1.327 SNIP 1.338
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.252 SNIP 1.44
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.367 SNIP 1.418
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 1.298 SNIP 1.517
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 1.353 SNIP 1.489
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 1.152 SNIP 1.469
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 1.219 SNIP 1.532
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 1.044 SNIP 1.239
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 0.805 SNIP 1.307
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 0.843 SNIP 1.237
Original language: English
Keywords: HPLC-UV and MS, Carrots (Daucus carota), polyacetylenes, conventional and organic growth systems, method development and validation, ultrasonic liquid processor (ULP)
DOIs:
10.1021/jf101921v
Source: orbit
Source-ID: 264947
Research output: Research - peer-review › Journal article – Annual report year: 2010