



Analysis of Cocoa Flavanols and Procyanidins (DP 1–10) in Cocoa-Containing Ingredients and Products by Rapid Resolution Liquid Chromatography: Single-Laboratory Validation

Authors: Machonis, Philip R.; Jones, Matthew A.; Kwik-Urbe, Catherine

Source: Journal of AOAC International, Volume 97, Number 1, January-February 2014, pp. 166-172(7)

Publisher: AOAC International

Buy Article:
\$50.00 plus tax
(Refund Policy)

[ADD TO CART](#)

[BUY NOW](#)

[< previous article](#) | [view table of contents](#) | [next article >](#)

[♥ ADD TO FAVOURITES](#)

Abstract:

Recently, a multilaboratory validation (MLV) of AOAC Official Method 2012.24 for the determination of cocoa flavanols and procyanidins (CF-CP) in cocoa-based ingredients and products determined that the method was robust, reliable, and transferrable. Due to the complexity of the CF-CP molecules, this method required a run time exceeding 1 h to achieve acceptable separations. To address this issue, a rapid resolution normal phase LC method was developed, and a single-laboratory validation (SLV) study conducted. Flavanols and procyanidins with a degree of polymerization (DP) up to 10 were eluted in 15 min using a binary gradient applied to a diol stationary phase, detected using fluorescence detection, and reported as a total sum of DP 1–10. Quantification was achieved using (-)-epicatechin-based relative response factors for DP 2–10. Spike recovery samples and seven different types of cocoa-based samples were analyzed to evaluate the accuracy, precision, LOD, LOQ, and linearity of the method. The within-day

precision of the reported content for the samples was 1.15–5.08%, and overall precision was 3.97–13.61%. Spike-recovery experiments demonstrated recoveries of over 98%. The results of this SLV were compared to those previously obtained in the MLV and found to be consistent. The translation to rapid resolution LC allowed for an 80% reduction in analysis time and solvent usage, while retaining the accuracy and reliability of the original method. The savings in both cost and time of this rapid method make it well-suited for routine laboratory use.

Document Type: Research Article

DOI: <http://dx.doi.org/10.5740/jaoacint.13-034>

Affiliations: Mars Inc., 6885 Elm Street, McLean, VA 22101, USA

Publication date: 2014年1月1日

More about this publication?

Related Articles from Ingenta Connect

Determination of Flavanols and Procyanidins (DP 1–10) in Cocoa-Based Ingredients and Products by UHPLC: First Action 2013.03

Author(s): Machonis, Philip R.; Jones, Matthew A.; Kwik-Urbe, Catherine; Dowell, Dawn

Source: Journal of AOAC International, Volume 97, Number 5, 2014年9月1日, pp. 1393-1396(4)

Publisher: AOAC International

Flavanol and Procyanidin Content (by Degree of Polymerization 1–10) of Chocolate, Cocoa Liquors, Cocoa Powders, and Cocoa Extracts: First Action 2012.24

Author(s): Robbins, Rebecca J.; Leonczak, Jadwiga; Li, Julia; Johnson, J. Christopher; Collins, Tom; Kwik-Urbe, Catherine; Schmitz, Harold H.

Source: Journal of AOAC International, Volume 96, Number 4, 2013年7月1日, pp. 705-711(7)

Publisher: AOAC International

Method for the Determination of Catechin and Epicatechin Enantiomers in Cocoa-Based Ingredients and Products by High-Performance Liquid Chromatography: First Action 2013.04

Author(s): Machonis, Philip; Jones, Matthew; Schaneberg, Brian; Kwik-Urbe, Catherine; Dowell, Dawn

Source: Journal of AOAC International, Volume 97, Number 2, 2014年3月1日, pp. 506-509(4)

Publisher: AOAC International

Determination of Flavanol and Procyanidin (by Degree of Polymerization 1–10) Content of Chocolate, Cocoa Liquors, Powder(s), and Cocoa Flavanol Extracts by Normal Phase High-Performance Liquid Chromatography: Collaborative Study

Author(s): Robbins, Rebecca J.; Leonczak, Jadwiga; Li, Julia; Johnson, J. Christopher; Collins, Tom; Kwik-Urbe, Catherine; Schmitz, Harold H.

Source: Journal of AOAC International, Volume 95, Number 4, 2012年7月1日, pp. 1153-1160(8)

Publisher: AOAC International

Influence of age on the absorption, metabolism, and excretion of cocoa flavanols in healthy subjects

Author(s): Rodriguez-Mateos, Ana; Cifuentes-Gomez, Tania; Gonzalez-Salvador, Isidro; Ottaviani, Javier I.; Schroeter, Hagen; Kelm, Malte; Heiss, Christian; Spencer, Jeremy P. E.

Source: Molecular Nutrition & Food Research, Volume 59, Number 8, 2015年8月1日, pp. 1504-1512(9)

Publisher: Blackwell Publishing

> Search for more related articles on Ingenta Connect

We recommend

Determination of Flavanols and Procyanidins (DP 1–10) in Cocoa-Based Ingredients and Products by UHPLC: First Action 2013.03
Philip R. Machonis et al., J AOAC Int, 2014

Method for the Determination of Aconitum Alkaloids in Dietary Supplements and Raw Materials by Reversed-Phase Liquid Chromatography with Ultraviolet Detection and Confirmation by Tandem Mass Spectrometry: Single-Laboratory Validation
Wai-Tong Tang et al., J AOAC Int, 2006

Method for the Determination of Catechin and Epicatechin Enantiomers in Cocoa-Based Ingredients and Products by High-Performance Liquid Chromatography: First Action 2013.04
Philip Machonis et al., J AOAC Int, 2014

Single-Laboratory Validation of a Method for the Determination of Vitamin D3 in Dietary Supplements by Liquid Chromatography with Tandem Mass Spectrometry (LC-MS/MS)
Victor K.M. Lam et al., J AOAC Int, 2014

Validation for the Determination of Biuret in Water-Soluble, Urea-Based Commercial Inorganic Fertilizer Materials, Urea Solutions, and Sulfur-Coated Urea Products by Reversed-Phase Liquid Chromatography: Single-Laboratory Validation of an Extension of AOAC Official Method SM 2003.14
Michael M. Hojjatie et al., J AOAC Int, 2014

Determination of Catechins and Caffeine in Camillia sinensis Raw Materials, Extracts, and Dietary Supplements by HPLC-UV: Single-Laboratory Validation
Mark C. Roman et al., J AOAC Int, 2013

Flavanol and Procyanidin Content (by Degree of Polymerization 110) of Chocolate, Cocoa Liquors, Cocoa Powders, and Cocoa Extracts: First Action 2012.24
Rebecca J. Robbins et al., J AOAC Int, 2013

Method for the Determination of β -Carotene in Supplements and Raw Materials by Reversed-Phase Liquid Chromatography: Single Laboratory Validation
Schierle, Joseph et al., J AOAC Int

Dietary cocoa flavanols reverse age-related memory decline in healthy older adults
Columbia University Medical Center, ScienceDaily, 2014

In Chocolate, More Cocoa Means Higher Antioxidant Capacity
USDA/Agricultural Research Service, ScienceDaily, 2005

Powered by

Share Content



Access Key

- F** *Free content*
- N** *New content*
- O** *Open access content*
- S** *Subscribed content*
- T** *Free trial content*

[Cookie Policy](#)