

Now sold under the
Thermo Scientific brand

Thermo
SCIENTIFIC

Determination of Organic Acids in Cranberry and Bilberry Extracts

The dietary supplement industry is a rapidly growing market segment with U.S. sales estimated at nearly \$20 billion.¹ Nearly 50% of the U.S. population claim that they have used dietary supplements as more health-conscious consumers seek complementary and alternative medical treatments.

The primary mission of the Office of Dietary Supplements at the National Institutes of Health (NIH) is to promote the quality, safety, and efficacy of dietary supplements.² To accomplish this mission, authentic reference materials that closely match the matrix components of the dietary supplements are needed. *Vaccinium* (e.g., cranberries, blueberries, and bilberries) Standard Reference Materials (SRMs) are being developed at the at the National Institute of Standards and Technologies (NIST) in collaboration with the NIH-ODS to evaluate these types of dietary supplements.³ Several SRMs are currently available from NIST, with certified values for organic acids to aid dietary supplement and juice manufacturers in their analytical method development and QA/QC operations.⁴ Further work to certify anthocyanins and anthocyanidins is under way.

Because products from cranberries provide various health benefits (such as prevention of urinary tract infections, stomach ulcers, and dental caries), these products are among the top selling classes of herbal dietary supplements in the U.S. Cranberry consumption also reportedly reduces the incidence of various cancers.⁵ Although the primary benefits of the *Vaccinium* species are derived from their antioxidant properties, the relative amounts of organic acids can significantly influence the characteristics of the berries. For example, organic acids

are known to impart specific flavors, and the specific ratios in fruit juices can be used to detect adulteration. In addition, organic acids are often used to control pH and can be an indicator of product quality.⁶

The work shown here demonstrates the determination of quinic, malic, and citric acids in cranberry and bilberry extracts using an IonPac[®] AS11-HC column with suppressed conductivity detection (Figures 1 and 2).

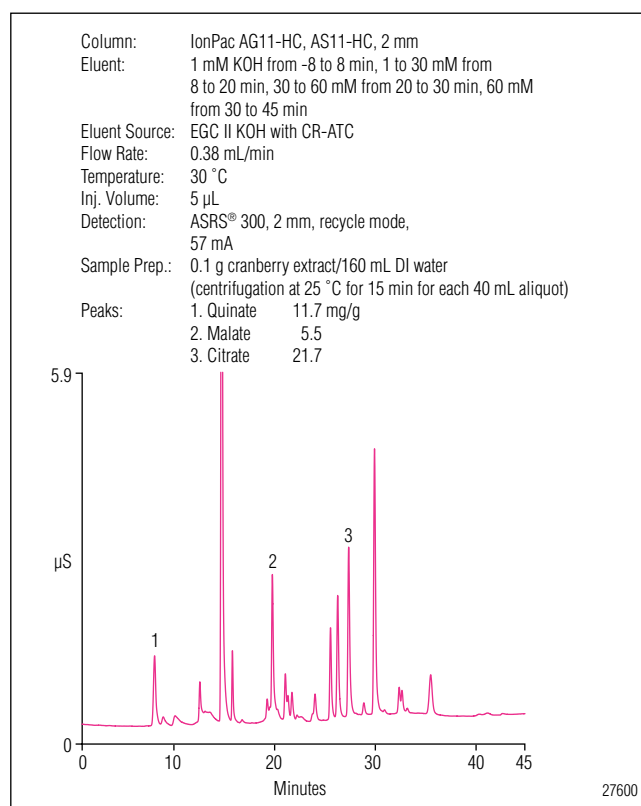


Figure 1. Determination of quinic, malic, and citric acids in cranberry extract.

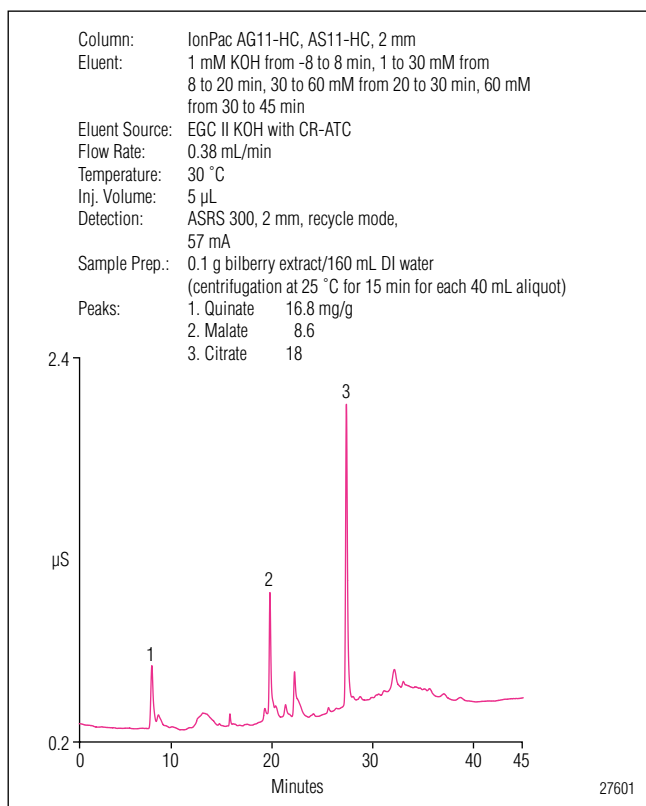


Figure 2. Determination of quinic, malic, and citric acids in bilberry extract.

REFERENCES

1. Thurston, C. Dietary Supplements: The Latest Trends and Issues. *Nutraceuticals World* **2008**, *11*, 54–62.
2. Dwyer, J.T.; Picciano, M.F.; Betz, J.M.; Fisher, K.D.; Saldanha, L.G.; Yetley, E.A.; Coates, P.M.; Milner, J.A.; Whitted, J.; Burt, V.; Radimer, K.; Wilger, J.; Sharpless, K.E.; Holden, J.M.; Andrews, K.; Roseland, J.; Zhao, C.; Schweitzer, A.; Harnly, J.; Wolf, W.R.; Perry, C.R. Progress in Developing Analytical and Label-Based Dietary Supplement Databases at the NIH Office of Dietary Supplements. *J. Food Compos. Anal.* **2008**, *21*, S83–S93.
3. Phillips, M. M.; Case, R. J.; Rimmer, C. A.; Sharpless, K. E.; Wise, S. A.; Sander, L. C. Determination of Organic Acids in Vaccinium Berry Standard Reference Materials. *Anal. Bioanal. Chem.* **2010**, *398*, 425–434.
4. National Institutes of Standards and Technology. Standard Reference Materials. <https://www-s.nist.gov/srmors/viewtable.cfm?tableid=79> (accessed Mar 29, 2011)
5. Klein, M.A. *Encyclopedia of Dietary Supplements*; MerceL Dekker: New York, 2005; pp 143–149.
6. Dionex Corporation, *Determination of Organic Acids in Fruit Juices*. Application Note 143, LPN 1415, 2003, Sunnyvale, CA.

ASRS and IonPac are registered trademarks of Dionex Corporation.

Passion. Power. Productivity.



Dionex Corporation

1228 Titan Way
P.O. Box 3603
Sunnyvale, CA
94088-3603
(408) 737-0700

North America

U.S./Canada (847) 295-7500

South America

Brazil (55) 11 3731 5140

Europe

Austria (43) 1 616 51 25 Benelux (31) 20 683 9768 (32) 3 353 4294
Denmark (45) 36 36 90 90 France (33) 1 39 30 01 10 Germany (49) 6126 991 0
Ireland (353) 1 644 0064 Italy (39) 02 51 62 1267 Sweden (46) 8 473 3380
Switzerland (41) 62 205 9966 United Kingdom (44) 1276 691722

Asia Pacific

Australia (61) 2 9420 5233 China (852) 2428 3282 India (91) 22 2764 2735
Japan (81) 6 6885 1213 Korea (82) 2 2653 2580 Singapore (65) 6289 1190
Taiwan (886) 2 8751 6655

www.dionex.com



LPN 2560-01 PDF 03/11
©2011 Dionex Corporation