

## Best food reference material challenge

Melissa Phillips<sup>1</sup>

© Springer-Verlag GmbH Germany, part of Springer Nature 2018

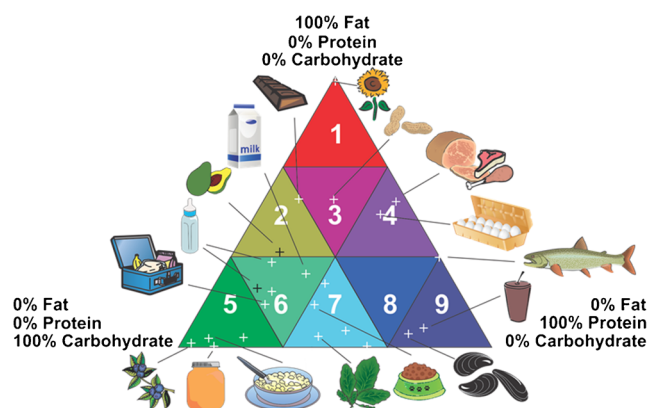
We would like to invite you to participate in the Analytical Challenge, a series of puzzles to entertain and challenge our readers. This special feature of “Analytical and Bioanalytical Chemistry” has established itself as a truly unique quiz series, with a new scientific puzzle published every three months. Readers can access the complete collection of published problems with their solutions on the ABC homepage at <http://www.springer.com/abc>. Test your knowledge and tease your wits in diverse areas of analytical and bioanalytical chemistry by viewing this collection. In the present challenge, food reference material is the topic. And please note that there is a prize to be won (a Springer book of your choice up to a value of €100). Please read on...

### Meet the challenge

Some analytical scientists are fortunate in that a National Metrology Institute or other reference material (RM) producer has prepared a reference material with the same matrix as their sample. If only we could all be so lucky, or if only these producers had unlimited time and resources to make a matrix-matched reference material for every application.

Alas, we are often forced to improvise, and find the best available substitute to provide quality assurance in the analytical laboratory. In the case of food analysis, scientists are fortunate that a rubric for selection of reference materials has been established [1] and embraced by reference material producers such as the National Institute of Standards and Technology. The AOAC Food Triangle categorizes foods

and related reference materials on the basis of the relative composition of fat, protein, and carbohydrate, as these macronutrients represent the greatest challenge in analytical sample preparation. In addition to matching the macronutrient profile, the ideal reference material will also match not only the analyte(s) of interest but also their fortification status (i.e., endogenous or fortified) and the form of the nutrient (e.g., free, protein-bound, or total).



### The challenge

The challenge this month is to help Sally scientist, an employee at a large food company, identify the best available RM for her analysis of fortified calcium and vitamin D<sub>3</sub> in a meat-containing Italian pasta sauce product produced by her company. The Nutrition Facts panel for this product is shown below.

✉ Melissa Phillips  
melissa.phillips@nist.gov

<sup>1</sup> National Institute of Standards & Technology, Gaithersburg, MD, USA

<b>Nutrition Facts</b>	
5 servings per container	
<b>Serving size</b>	<b>1/2 cup (130g)</b>
<b>Amount Per Serving</b>	
<b>Calories</b>	<b>90</b>
	<small>% Daily Value*</small>
<b>Total Fat</b> 3g	<b>4%</b>
Saturated Fat 1g	<b>5%</b>
Trans Fat 0g	
<b>Cholesterol</b> 5mg	<b>2%</b>
<b>Sodium</b> 480mg	<b>21%</b>
<b>Total Carbohydrate</b> 13g	<b>5%</b>
Dietary Fiber 3g	<b>11%</b>
Total Sugars 10g	
Includes 2g Added Sugars	<b>4%</b>
<b>Protein</b> 2g	<b>4%</b>
<small>Not a significant source of vitamin D, calcium, iron, and potassium</small>	
<small>*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.</small>	

In a solution to this challenge, please be sure to include the name, number, and manufacturer of the best RM chosen, as well as the macronutrient (fat, protein, carbohydrate) and micronutrient (calcium, vitamin D<sub>3</sub>) content of the chosen RM. Points will be assigned for:

1. Proximity in matrix match to the test sample
2. Rationale for choice
3. Description of other RM possibilities and rationale for selection

We hope that you enjoy this unique challenge.

## Reference

1. Wolf WR, Andrews KW. Fresenius J Anal Chem. 1995;352:73–6.

*We invite our readers to participate in the Analytical Challenge by solving the puzzle above. Please send the correct solution to [abc-challenge@springer.com](mailto:abc-challenge@springer.com) by June 1, 2018. Make sure you enter “Best food reference material challenge” in the subject line of your e-mail. The winner will be notified by e-mail and his/her name will be published on the “Analytical and Bioanalytical Chemistry” homepage at <http://www.springer.com/abc> and in the journal (volume 410/issue25) where readers will find the solution and a short explanation.*

*The next Analytical Challenge will be published in 410/17, July 2018. If you have enjoyed solving this Analytical Challenge you are invited to try the previous puzzles on the ABC homepage.*