**AOAC SMPR® 2017.016**

## *Standard Method Performance Requirements* (SMPRs®) for Determination of SAMe in Dietary Ingredients and Dietary Supplements

Intended Use: Quality Assurance and Compliance to Current Good Manufacturing Practices (CGMPs)

### *1 Purpose*

AOAC SMPRs describe the minimum recommended performance characteristics to be used during the evaluation of a method. The evaluation may be an on-site verification, a single-laboratory validation, or a multi-site collaborative study. SMPRs are written and adopted by AOAC stakeholder panels composed of representatives from industry, regulatory organizations, contract laboratories, test kit manufacturers, and academic institutions. AOAC SMPRs are used by AOAC expert review panels in their evaluation of validation study data for method being considered for *Performance Tested Methods*$^{SM}$ or AOAC *Official Methods of Analysis*$^{SM}$, and can be used as acceptance criteria for verification at user laboratories.

### *2 Applicability*

Determination of total (*S,S* and *R,S* isomers) SAMe in dietary ingredients and dietary supplements (*see* Table 1).

### *3 Analytical Technique*

Any analytical technique that meets the following method performance requirements is acceptable.

### *4 Definitions*

*Dietary ingredients*.—A vitamin; a mineral; an herb or other botanical; an amino acid; a dietary substance for use by man to supplement the diet by increasing total dietary intake; or a concentrate, metabolite, constituent, extract, or combination of any of the above dietary ingredients. {United States Federal Food Drug and Cosmetic Act §201(ff) [U.S.C. 321 (ff)]}

*Dietary supplements*.—A product intended for ingestion that contains a "dietary ingredient" intended to add further nutritional value to (supplement) the diet. Dietary supplements may be found in many forms, such as tablets, capsules, softgels, gelcaps, liquids, or powders.

*Limit of quantitation (LOQ)*.—Minimum concentration or mass of analyte in a given matrix that can be reported as a quantitative result.

*Recovery*.—Fraction or percentage of spiked analyte that is recovered when the test sample is analyzed using the entire method.

*Repeatability*.—Variation arising when all efforts are made to keep conditions constant by using the same instrument and operator and repeating during a short time period. Expressed as the repeatability standard deviation ($SD_r$); or % repeatability relative standard deviation (%$RSD_r$).

*Reproducibility*.—The standard deviation or relative standard deviation calculated from among-laboratory data. Expressed as the reproducibility standard deviation ($SD_R$); or % reproducibility relative standard deviation (%$RSD_R$).

*SAMe*.—*S*-Adenosyl methionine, IUPAC name: (2*S*)-2-Amino-4-[[(2*S*,3*S*,4*R*,5*R*)-5-(6-aminopurin-9-yl)-3,4-dihydroxyoxolan-2-yl] methyl-methylsulfonio]butanoate. CAS No.: 97540-22-2 (Figure 1).

### *5 Method Performance Requirements*

*See* Tables 2 and 3.

### *6 System Suitability Tests and/or Analytical Quality Control*

Method must be able to separate SAMe from decomposition products (Table 4) and synthetic precursors (Table 5), and quantify total SAMe in the presence of stabilizing agents (Table 5).

Suitable methods will include blank check samples, and check standards at the lowest point and midrange point of the analytical range. A control sample must be included.

### *7 Reference Material(s)*

USP Ademetionine Disulfate Tosylate (*S*-Adenosyl-L-Methionine Disulfate Tosylate); Cat. No. 1012134

Refer to Annex F: *Development and Use of In-House Reference Materials* in Appendix F: *Guidelines for Standard Method Performance Requirements, Official Methods of Analysis of AOAC INTERNATIONAL* (2016) 20th Ed., AOAC INTERNATIONAL, Rockville, MD, USA (http://www.eoma.aoac.org/app_f.pdf)

### *8 Validation Guidance*

Method must be able to separate SAMe from decomposition products (Table 4) and synthetic precursors (Table 5), and quantify total SAMe in the presence of stabilizing agents (Table 5).

Appendix D: *Guidelines for Collaborative Study Procedures to Validate Characteristics of a Method of Analysis, Official Methods of Analysis of AOAC INTERNATIONAL* (2016) 20th Ed., AOAC INTERNATIONAL, Rockville, MD, USA (http://www.eoma.aoac.org/app_d.pdf)

Appendix K: *Guidelines for Dietary Supplements and Botanicals, Official Methods of Analysis of AOAC INTERNATIONAL* (2016) 20th Ed., AOAC INTERNATIONAL, Rockville, MD, USA (http://www.eoma.aoac.org/app_k.pdf). Also at: *J. AOAC Int*. **95**, 268(2012); DOI: 10.5740/jaoacint.11-447

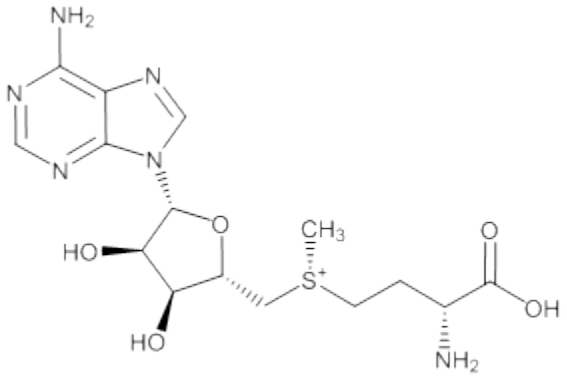
### *9 Maximum Time-to-Determination*

Method developers must specify a maximum time-to-determination; and less than the stability time of SAMe samples.

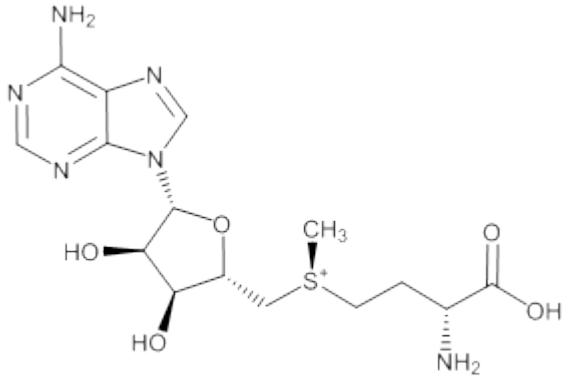
*Approved by the AOAC Stakeholder Panel on Dietary Supplements (SPDS) on September 22, 2017. Final Version Date: September 22, 2017.*

**Table 1. Dosage forms**

| |
|---|
| Tablets |
| Capsules |




(*S,S*)-*S*-Adenosyl-L-methionine




(*R,S*)-*S*-Adenosyl-L-methionine

**Figure 1. Molecular structures of SAMe.**

**Table 2. Analytical range and LOQ based on matrix[a]**

| Parameter | |
|---|---|
| Analytical range, mg/g | 5 to 800 |
| LOQ, mg/g | 1 |

[a] Results are in total SAMe.

**Table 3. Method performance requirements as a function of range[a]**

| | Range, mg/g | |
|---|---|---|
| Parameter | ≤15 | >15 |
| Recovery, % | 90–110 | 98–105 |
| $RSD_r$, % | ≤8 | ≤5 |
| $RSD_R$, % | ≤10 | ≤8 |

[a] Results are in total SAMe.

**Table 4. Decomposition products**

| |
|---|
| *p*-Toluenesulfonic acid (PTSA) |
| *S*-Adenosylhomocysteine (SAH) |
| Adenosine |
| 5'-Deoxy-5'-methylthioadenosine (DMTA) |

**Table 5. Synthetic precursors (SP) and stabilizing agents (SA)**

| |
|---|
| Methionine (SP) |
| Adenosine triphosphate (SP) |
| Toluene (SA) |
| Sulfonic acid (SA) |