

AOAC SMPR 2016.001

Standard Method Performance Requirements (SMPRs®) for Determination of Ethanol in Kombucha

Intended Use: Use by trained technicians in a laboratory for routine quality assurance testing

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 the 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 MethodsSM* or AOAC *Official Methods of AnalysisSM*, and can be used as acceptance criteria for verification at user laboratories.

2 Applicability

Determination of low levels of ethanol as expressed as alcohol by volume (ABV) in kombucha.

3 Analytical Technique

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

4 Definitions

Alcohol by volume (%ABV).—A standard measure of how much alcohol (ethanol) is contained in a given volume of an alcoholic beverage (expressed as a volume percent).

Ethanol.—The 2-carbon alcohol with a molecular formula of $\text{CH}_3\text{CH}_2\text{OH}$. CAS Registry No. 64-17-5.

Kombucha.—Kombucha is a fermented, effervescent tea beverage made by adding a symbiotic culture of bacteria and yeast (SCOBY) to a solution of tea and sugar, and may include other ingredients.

Limit of quantitation (LOQ).—The minimum concentration which quantitative results may be obtained with 95% confidence.

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).

Recovery factor.—The fraction or percentage of the analyte that is recovered when the test sample is analyzed using the entire method.

5 Method Performance Requirements

See Table 1.

Analytical range (%ABV ^a)	0.1 to 2.0
Limit of quantitation (LOQ) (%ABV)	≤0.05
Accuracy (% of mean spiked recovery over the range of the assay)	97 to 102
Repeatability (RSD _r), %	≤4
Reproducibility (RSD _R), %	≤6
^a ABV= Alcohol by volume.	

6 System Suitability Tests and/or Analytical Quality Control

Suitable methods will include blank check samples, and check standards at the lowest point and midrange point of the analytical range.

7 Reference Material(s)

NIST Standard Reference Material® (SRM):

2893 Ethanol–water solution (nom. 0.08%)

2894 Ethanol–water solution (nom. 0.1%)

2895 Ethanol–water solution (nom. 0.2%)

2896 Ethanol–water solution (nom. 0.3%)

2897 Ethanol–water solution (nom. 2%)

Sigma-Aldrich:

459836 200 proof, anhydrous, ≥99.5% (Sigma-Aldrich)

Cerilliant Certified Reference Material (CRM):

E-037 Ethanol-80 (5 ampoule multi-pack), 80 mg/dL

E-038 Ethanol-100 (5 ampoule multi-pack), 100 mg/dL

E-039 Ethanol-200 (5 ampoule multi-pack), 200 mg/dL

E-041 Ethanol-150 (10 ampoule multi-pack), 150 mg/dL

E-044 Ethanol-400 (5 ampoule multi-pack), 400 mg/dL

LGC Standards:

BCR-651, beer at 0.505% (v/v) ethanol

BCR-652, beer at 0.051% (v/v) ethanol

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* (2016) 20th Ed., AOAC INTERNATIONAL, Rockville, MD, USA (http://www.eoma.aocac.org/app_f.pdf)

8 Validation Guidance

Appendix F: *Guidelines for Standard Method Performance Requirements, Official Methods of Analysis* (2016) 20th Ed., AOAC INTERNATIONAL, Rockville, MD, USA (http://www.eoma.aocac.org/app_f.pdf)

Appendix K: *Guidelines for Dietary Supplements and Botanicals, Official Methods of Analysis* (2016) 20th Ed., AOAC INTERNATIONAL, Rockville, MD, USA (http://www.eoma.aocac.org/app_k.pdf)

9 Maximum Time-To-Result

None.

Approved by AOAC Stakeholder Panel on Strategic Food Analytical Methods (SPSFAM). Final Version Date: March 31, 2016. Effective Date: March 31, 2016.