SENSORY TESTING LABORATORIES POLICY

Contents

1-PURPOSE

This document is supplement for Jordanian Accreditation System (JAS). It provides specific requirements on the accreditation of sensory testing laboratories for both assessors and laboratories preparing for Accreditation. It gives detailed guidance for the interpretation of ISO/IEC 17025 for those undertaking sensory testing.

2-SCOPE

Accreditation bodies will only accredit laboratories for objective tests that have been fully documented and validated. It is the responsibility of the laboratory to demonstrate to the accreditation body assessors that, when using these techniques, it meets all of the criteria for accreditation. Some subjective tests may be accredited when they are designed to lead to an objective result. Tests which are solely performed by only one individual will not be accredited as a sensory test. For each product to be tested number of testers, samples, time and conditions should be specified in the scope.

Objective tests are controlled by the following .details will be covered in the policy:-

a) Test validation.
b) Test documentation.
c) Training and authorization of staff carrying out the test.
d) Adequate test facilities.
e) Planning, organization and operation of the test facility.
f) Maintenance and calibration of equipment.
g) Procedures for the selection, training and re-training of sensory assessors.
h) On-going quality control (QC) procedures.
i) On-going individual sensory assessor and panel performance monitoring.
j) Use of appropriate reference and training materials.
k) Data checking procedures.
l) Records of the test performance.

Some subjective tests may be accredited when they are designed to lead to an objective result, such as consumer preference tests. Factors to consider will include scientific selection of test procedures, experimental design, statistical treatment, number of consumers, etc.

Accreditation can cover sectorial, national and international standard methods and fully documented validated in-house methods.

3- PERSONNEL

3.1 The laboratory shall maintain an up-to-date record of the training that all staff and all sensory assessors have received. The purpose of these records is to provide evidence that everybody involved in the tests has been adequately trained and that their competence to carry out particular accredited tests has been assessed. In some cases, it may be pertinent to state any particular limitations to competence. The records should be available for assessment by the accreditation body if required and should also include:

a) Academic qualifications (where relevant).
b) External and internal pertinent courses attended (where relevant).
c) Relevant on-the-job training (and re-training as necessary).
d) Previous experience.

Where a method or technique is not in regular use, the need to retrain staff periodically should be considered. In each case the critical interval should be established and documented. If the personnel doesn't attended the retrain or doesn't attend the sensor testing regularly he should be exempted from the panel.

3.2 The sensory laboratory personnel include:

-Panel leader (Laboratory Supervisor)
-Deputy panel leader
- Sensory assessors

3.2.a Panel Leader (Laboratory Supervisor)

The Panel Leader must possess an expert level of qualification, knowledge and experience necessary for the key posts within the laboratory, with at least five years relevant sensory analysis work experience. Sensory analysis must be carried out by, or under the supervision of panel leader who is the sole person responsible for selecting, training and monitoring the sensory analysis. Thus is responsible for the performance of the panel .Skills required should be formalized as a written job description.

Training should cover the intended sensory testing area, including at least:

a) Selection of test procedures, experimental design and analysis.
b) Product preparation and implementation of testing.
c) Data input and processing.
d) Preparation of reports.
e) Maintenance of records.
f) Maintenance of all necessary supplies and services.
g) Sensory assessor screening, selection, training and monitoring procedures.
h) Importance of the assessor's health and safety.

3.2. b Deputy Panel leader:

The panel leader may, on justified grounds, be replaced by a deputy panel leader who may stand in for duties regarding the performance of the tests. This substitute must have all the necessary skills required of a panel leader.

3.2.c Sensory assessors :

3.2.c.1 A Sensory Analysis Panel constitutes a true measuring instrument, and the results of any analysis conducted depend on its members. The selection and training of sensory assessors needs to be carried out with care (training and monitoring of candidates intended to become sensory assessors can be found in ISO 8586.
Number of sensory assessors must be specified for each sensory test (with minimum of two assessors).

The selection and training of sensory assessors is not applicable to consumers that participate in consumer tests; if the consumer is the assessor.

The principles should focus on personal safety and voluntariness of the assessors and confidentiality of all private information.

3.2.c.2 The recommended procedures involve:

a) *Recruitment, preliminary screening and initiation to the test*
   (i) The recognition and perception of odours and the basic tastes should be confirmed. Where relevant, colour vision, the detection of specific taints /odours and the person's ability to describe product characteristics should also be confirmed. Consideration should be given to the personality and

personal habits of the sensory assessor, if these could have a possible influence on the test.

b) Training in general principles and methods

(i) The areas covered should include the use of the senses, familiarization with the test procedure, and awareness of the effect of extraneous factors involved such as foods and perfumes. Laboratory should instruct sensory assessors to keep good practices before testing including not using any perfume and not eating and smoking at least one hour before testing.

(ii) Sensory assessors should be made aware about the types of products which may be involved in the test. Special consideration should be given to the safety of sensory assessors. In addition, dietary, health and ethical considerations of sensory assessors should be recorded where applicable and taken into account.

(iii) At all times, sensory assessors should report any ill effects they suffer.

(iv) The selection and training programme must be documented to ensure that all sensory assessors are adequately trained for the tasks they are required to carry out. The programme must define levels of competence and other relevant requirements which shall be attained before sensory assessors are permitted to take part in a test. Where possible, objective measures, for example repeatability, should be used to assess the attainment of competence.

c) Selection for particular purposes

The ability to perform the test procedure should be confirmed. This can be achieved by altering the concentration of a constituent in the sample and recording the results of the test, by the analysis of replicate samples or, for descriptive analysis, by testing using a range of a product type.

d) Monitoring of individuals to ensure satisfactory performance:

(i) Comprehensive training records should be maintained for each member of the Sensory Analysis Panel. Individual performance should be monitored on a regular basis after training. Results, along with the date and product assessed, should become a part of the individual performance record. To help with this, the record system should be easily accessible.

(ii) Results should also be monitored to investigate for any fatigue effect. If noted, the number of samples/session or sessions/day should be reduced and recorded.

e) Health factors

Health and related factors that might affect the performance of the sensory assessors should be recorded and consideration given to removing the sensory assessor from the test. Factors might include allergic reactions, colds, upset stomachs, toothache, pregnancy, certain medications and psychological stress.

f) Re-training and expulsion as necessary

Procedures and criteria shall exist for re-training if a sensory assessor has not performed a test for a defined period of time, or if his/her results fall outside acceptable limits. The same requirements should be followed as described above in b (iii). The laboratory shall have a practice and documentation of expulsion (removing) a sensory assessor if he/she would not re-qualify for the panel.

Detailed guidance on initiation and training of assessors in the detection and recognition of odours can be found in ISO 5496. General guidance for the selection, training and monitoring of assessors can be found in ISO 8586.

4- ACCOMMODATION AND ENVIRONMENT

4.1 Environmental conditions are particularly important in sensory work as they have an effect on the results. The laboratory should provide appropriate environmental conditions and controls necessary for the particular test being carried out. The testing must be performed in a specific area dedicated for the purpose. Normally, the sensory facility shall be a quiet area free from distractions and with controlled lighting, partitions between subjects to minimize visual contact, neutral colours for the walls, odour-free surfaces and appropriate ventilation. In addition, a separate area for sample preparation should be provided. The design of test rooms for sensory analysis is covered in ISO 8589.

4.2 Where it is not possible to fulfill the above criteria, for example in consumer tests, it is the responsibility of the laboratory to demonstrate that the procedures in place are suitable for the purpose and do not invalidate the test.

4.3 The laboratory should be aware of the importance of good housekeeping and the cleanliness of the test and preparation areas. If the sample preparation area is not

situated near the testing area, attention must be given to the transportation of the samples and the maintenance of the correct serving temperature. The access of sensory assessors to the preparation area should be controlled to avoid the analysis being influenced by visual clues. This is particularly important when the samples are being laid out prior to analysis.

4.4 Environmental conditions required for the analysis should be documented and where they are critical for performing the test they shall be monitored, controlled and recorded appropriately. For example, in temperature-controlled areas a maximum minimum thermometer or a recording thermometer should be used to demonstrate effective control. These temperature measuring devices should be included in the laboratory calibration programme and the calibration should be traceable to national or international standards via an approved route.

4.5 For tests involving samples not at ambient room temperature, facilities must be available to bring the sample to the correct and homogenous temperature and to maintain it for the required length of time. Records that demonstrate the fulfillment of this requirement should be maintained.

5- TEST METHODS AND METHOD VALIDATION

5.1 Wherever possible, a laboratory shall use methods and procedures that are up-to date and established as standard. Where such methods are not available, or where other methods or procedures are used, the laboratory may be accredited for methods developed in-house or from other sources, provided that the laboratory has documented and appropriately validated and evaluated these methods.

5.2 All methods shall be documented to the extent necessary to ensure proper implementation and consistency of application from one occasion to another.

Some standard methods need to be formed in a laboratory procedure. Non- standard methods and procedures should contain all information necessary for the proper performance of the test. The minimum information required to be included in such a non-standard method or procedure is indicated in ISO/IEC 17025, but a sensory test method should also include:

a) Method or type of test;
b) Sensory assessor training requirements;
c) Sample preparation and presentation;
d) Sensory panel composition;
e) Monitoring and performance of assessors;
f) Special environmental conditions and facilities;

g) Methods of statistical analysis of results;

5.3 In order to ensure that the same procedure is always applied to the same sensory problem, a procedure for determining the applicable test method and the strategy of analysis must be formalized. The procedure should define the route and each step in this process and identify the personnel responsible for each step, and all the process should be adequately documented.

5.4 Where appropriate, effects such as sensory assessor fatigue, session fatigue and sensory assessor comfort should be addressed by careful attention to experimental design, a balanced presentation of samples and, where necessary, allowing sufficient time between tests.

5.5 Sensory assessor safety is of paramount importance and should have precedence over all other considerations.

5.6 Standard methods should be verified for the use of the laboratory. Methods developed in-house, including modifications of standard methods and methods for specific food products, should be validated to ensure that they are suitable for the intended purpose. The whole test procedure, covering the method, the sensory team and the statistical processing of data, shall be evaluated. Validation should include procedures for sample storage, handling, preparation and presentation. Each laboratory should determine the individual requirements for the performance characteristics of a particular method, and produce validation data to prove the method meets these requirements. Depending on the method used, the following could be of particular importance:

a) Reproducibility/repeatability;
b) Discrimination of samples;
c) Sensitivity;
d) Detection threshold;
e) Comparison against existing methods;
f) Inter-laboratory tests.

6- UNCERTAINTY OF MEASUREMENT

Sensory tests are usually supported by statistical data elaboration which establishes the level of significance of the results. Moreover, sensory tests come into the category of

those that preclude the rigorous, metrologically and statistically valid calculation of uncertainty of measurement.

In some cases, when a numerical result is expressed, it could be possible to base the estimation of uncertainty on repeatability and reproducibility data alone. In these cases the individual components of uncertainty should be identified and demonstrated to be under control. The estimation of the uncertainty depends on the method used and the objectives evaluated and their importance in the quality and significance of the final result.

7- RECORDS

7.1 The records for each test should include all the information needed to ensure that any test could be repeated in conditions as near as possible to the original test.
In sensory testing the following sets of information/parameters/details are especially important:

a) Instruction sheets/questionnaires given to the sensory assessors;
b) Analysis results sheets or reference to computer file;
c) Timing between samples;
d) Sub-sample identification codes;
e) Sample preparation method and equipment used;
f) Identity of the personnel preparing the samples;
g) Order and details of presentation to individual sensory assessors;
h) Identity of the sensory assessors and their relevant qualification level for the performed method;
i) Description of consumers in consumer tests;
j) Identity of the panel leader or sensory analyst;
k) Data collection method;
l) Method of statistical analysis.

7.2 Regarding computers and software used for statistical analysis the laboratory shall ensure that:

a) Computer software developed by the laboratory has been adequately validated as adequate for use. Commercial of the shelf software in general use and within the designed application range can be considered to be sufficiently validated, however calculations and data transfer shall be subject to appropriate checks in a systematic manner.
b) Procedures are established and implemented to protect data.

8- EQUIPMENT

8.1 Regular maintenance and performance checks should be carried out to ensure that equipment meets the required performance specifications. The importance of good housekeeping with respect to equipment is emphasized. Attention should be paid to the possibility of contamination arising from the equipment or cross-contamination from previous use. Equipment that is not directly used in analysis or examination, for example washing machines and water purifiers, should be subject to an appropriate programme of maintenance and cleanliness. Records of maintenance should be kept.

8.2 Equipment normally found in the sensory analysis laboratory can be categorized as:

a) Sample preparation and storage equipment (e.g. ovens, hobs, microwave ovens, refrigerators, cold stores, freezers, food processors, knives, cutting devices)

(i) Typically, equipment will be maintained only by cleaning and conducting safety checks as necessary. Calibrations or performance checks will be necessary where the setting can significantly affect the test result.

(ii) The performance of heating units will depend on a number of variables. If critical, it may be necessary to establish heating profiles and to provide clear instructions on the use of the heating units based on those profiles. Temperature distribution studies within ovens may also need to be undertaken.

b) Measuring instruments and equipment (thermometers, timers, balances, flasks, devices for maintaining a specified temperature of the sample, etc.)

(i) Correct use, combined with periodic servicing, cleaning, and, where appropriate, calibration will be necessary.

c) Sample serving equipment

(i) The form this equipment takes is dictated by the samples and the test method. In some testing standards, specific testing devices are required. All containers must be identical in any one sensory analysis session. Glass or pottery utensils must be cleaned thoroughly before use and kept solely for the purpose of sensory analysis. Where plastic cups and utensils are used, it should be checked that they will not impart a taint.

The use of marker pens which give off a strong odour are to be avoided when coding the sample containers.

d) Computers

Requirements for safeguarding hardware and software from adjustments which would invalidate results. Regarding software see 7.2 above.

9-REFERENCE MATERIALS AND CHEMICAL STANDARDS

9.1 Where appropriate reference materials are available (including certified reference materials) they should be used in training sensory assessors, monitoring laboratory performance, validating methods, and to enable comparison of methods. For many types of analysis, training may be carried out using standards prepared within the laboratory from chemicals of known purity and composition; in other instances it may be necessary to use representative foods or other materials.

9.2 Reference materials and chemical standards should be labeled clearly so that they are identified unambiguously. Information should be available to indicate shelf life, storage conditions, applicability and restrictions of use. All containers should be adequately labeled to indicate identity, concentration, and date of preparation and/or expiry date. Reference materials and standards should be handled in such a way as to safeguard against contamination. Personnel responsible for preparation and handling should be identifiable from records.

10- SAMPLING

10.1 In many cases, testing laboratories are not responsible for primary sampling to obtain test items. Where they are responsible, it is strongly recommended that this sampling be covered by quality assurance and ideally by accreditation.

10.2 Transport and storage should be under conditions that maintain the integrity of the sample (e.g. chilled or frozen where appropriate). The conditions should be monitored and records kept. Where appropriate, responsibility for transport, storage between sampling and arrival at the testing laboratory shall be clearly documented. Testing of the samples should be performed as soon as possible after sampling and should conform to relevant standards and/or national/international regulations.

10.3 Sampling should only be performed by trained authorized personnel. It should be carried out using properly clean equipment. Environmental conditions that could

affect the assessor's performance and the sample properties should be monitored and recorded at the sampling site. The time and date of sampling should be recorded.

11-SAMPLE HANDLING AND PREPARATION

11.1 Sample packaging, and instruments used for sample manipulation, should be selected so that no surface in contact with the sample will impart any taint or introduce any microbiological or chemical hazard. The seal of the sample package should be adequate to prevent leakage of the sample from the container and prevent contamination.

11.2 The sample label is important and should unambiguously identify the sample to related plans and sample register. Further into the analytical process, labeling becomes particularly important as the sample may have been divided and sub-sampled . At that stage, additional information such as references to the main sample and to any processes used to take the sub-sample, may be appropriate. Labeling should be firmly attached to the sample packaging and where appropriate, be resistant to fading, sample spillage, and reasonable extremes of temperature and humidity.

11.3 Samples should be stored so that the integrity of the samples is preserved. Storage areas should be kept clean and organized. Extremes of environmental conditions, which might change the sensory attributes of the samples, should be avoided. If necessary, environmental monitoring should be used. An appropriate level of security should be exercised to restrict unauthorized access to the samples.

11.4 Food samples submitted for analysis may often require special storage conditions such as refrigeration or freezing. In such cases, laboratories should store samples under appropriate conditions and maintain, monitor and record such conditions in order to demonstrate that specific requirements are being met.

11.5 It is of paramount importance to develop written procedures that include all the details of sample preparation (cutting, unfreezing, toasting, boiling, cooking, roasting… when used). These descriptions should be as comprehensive as possible to ensure that any sample will be treated always in the same way, which will improve the repeatability of results. For example when boiling potatoes: amount of water, salt, time of cooking, average size of potatoes, etc. should be described.

11.6 The laboratory should establish procedures for handling and preparing any new sample types.

11.7 The laboratory should have a documented policy for the retention and disposal of samples after testing.

12- QUALITY CONTROL

12.1 Internal quality control

12.1.1 Laboratories shall employ appropriate quality control procedures as a means of monitoring day-to-day performance of each sensory method and individual sensory assessors. Quality control schemes adopted by the laboratory will vary according to the type of sample, methods of analysis and frequency of determination. However, the level of quality control should be sufficient to demonstrate the validity of results.

12.1.2 Examples of the ways in which quality control may be carried out include:

a) Replicate analysis of samples performed as a defined percentage of the total samples analyzed;
b) Random repeat samples (including samples with different results) introduced into the sample analysis system at appropriate intervals;
c) Reference and characterized materials used as a part of a quality control system.

12.1.3 The level and type of quality control will depend on the nature of the analysis, frequency of analysis, and test difficulty and reliability. As a guide, the level of quality control could be between 5% and 10% of the sample tested, although a greater percentage may be required for more complex procedures.

12.1.4 The performance of individual sensory assessors should also be monitored as part of the internal quality control scheme.

12.1.5 All QC measures should be clearly defined in the quality documentation.

12.2 External quality assessment (proficiency testing)

12.2.1 If available, laboratories should participate in proficiency testing which are relevant to their scope of accreditation, preference should be given to proficiency testing schemes which use appropriate matrices. In specific instances, participation may be mandatory.

12.2.2 Laboratories should use external quality assessment not only to assess laboratory bias but also to check the validity of the whole quality system.

REFERENCES

- EA-4/09 G: 2017 Accreditation for sensory testing laboratories.
- COI/T.20/DOC.No15/REV.10/2018 Sensory analysis of virgin Olive oil.
- ISO/IEC 17025 General requirements for the competence of testing and calibration laboratories.
- ISO 8586 Sensory Analysis. General guidelines for the selection, training and monitoring of selected assessors and expert sensory assessors.
- ISO 13300-1 Sensory analysis. General guidance for the staff of a sensory evaluation laboratory. Part 1: Staff responsibilities.
- ISO 13300-2 Sensory analysis. General guidance for the staff of a sensory evaluation laboratory. Part 2: Recruitment and training of panel leaders.
- ISO/DIS 11132 Sensory analysis. Methodology. Guidelines for monitoring the performance of a quantitative sensory panel.
- ISO 11037 Sensory analysis -- Guidelines for sensory assessment of the colour of products.
- ISO 6658 Sensory analysis. Methodology. General guidance.
- ISO 5496 Sensory analysis. Methodology. Initiation and training of assessors in the detection and recognition of odours.
- ISO 3972 Sensory analysis. Methodology. Method of investigating sensitivity of taste.
- ISO 8589 Sensory analysis. General guidance for the design of test rooms.
- ISO 5496 Sensory analysis. Methodology. Initiation and training of assessors in the detection and recognition of odours
- ISO 5497 Sensory analysis. Methodology. Guidelines for the preparation of samples for which direct sensory analysis is not feasible.
- ISO 4121 Sensory analysis. Guidelines for the use of quantitative response scales
- ISO 13302 Sensory analysis. Methods for assessing modifications to the flavour of foodstuffs due to packaging CCFRA
- Guidelines No. 35 International guidelines for proficiency testing in sensory analysis.2001. Edited by DH Ly