

TERMS OF REFERENCE FOR THE R&D PROJECT

Food and Agriculture Department
Alcoholic Drinks Sectional Committee, FAD 29

1 Title of the Project

Study of Neutral Spirits for Alcoholic Drinks for their Quality and Safety Parameters

2 Background

Neutral Spirits is a base for production of vodka, gin and some other flavoured spirits. Neutral spirit is a product without distinctive character, aroma and taste and alcohol content which is obtained by removing majority of congeners during distillation process. Typically, neutral alcohol is produced from grains such as wheat, rye and corn, but some other starch- and sugar-based feedstock, such as potatoes, molasses, grapes, etc. can be used.

IS 6613: 2002 'Neutral spirit for alcoholic Drinks – Specification' prescribes the requirements and the methods of sampling and test for neutral spirit intended for use in the manufacture of alcoholic drinks (IS 6613 may be downloaded from BIS website by following the link https://standardsbis.bsbedge.com/BIS_SearchStandard.aspx?Standard_Number=IS%206613&i d=13226).

However, the requirements specified in IS 6613: 2002 need to be revised as per latest industrial practices with respect to its technical specifications such as ethanol percent, furfural content and lead content etc. In this regard, it has been decided to take up a research project for fixing the quality specifications for neutral spirits for alcoholic drinks.

3 Objective

To collect technical data and scientific evidence from both primary and secondary sources for neutral spirit used in alcoholic drinks for determining their quality and safety parameters for establishing specification for neutral spirit for alcoholic drinks

4 Scope

4.1 Thorough review of the available literature on neutral spirits for alcoholic drinks, including but not restricted to the following and provide comparative analysis:

- a) International and National guidelines;
- b) Regulatory stipulations;
- c) Research publications;
- d) National import export data;
- e) National infrastructure; and
- f) Any other sources.

4.2 Identification of manufacturing base of neutral spirits for alcoholic drinks in India along with categorization of large, medium, small and micro units. Collection of information on physico-chemical properties of neutral spirits, its test methods and packaging.

- 4.3 Determination of testing infrastructure available in India for neutral spirits for alcoholic drinks, characteristics being tested and test methods being followed.
- 4.4 Undertake industry visit to determine quality specifications of raw material and finished product along with the process control parameters. Further, study the sustainability aspects of the processes followed by industry such as energy conservation, waste management, 4Rs, carbon footprint etc. Prepare a questionnaire for this purpose.
- 4.5 Identification of user base of neutral spirits for alcoholic drinks and collection of feedback on intended applications, product quality, and performance satisfaction.
- 4.6 On the basis of literature review and industry visits establish the sampling plan. Sampling plan will be approved by the Alcoholic Drinks Sectional Committee, FAD 29.
- 4.7 Testing of collected samples of neutral spirits for alcoholic drinks from NABL accredited laboratory and submission of analytical report establishing limits and levels for following physico-chemical specifications:
- a) Relative density, Max
 - b) Ethanol percent, Min
 - c) Miscibility with water
 - d) Acidity as acetic acid, Max
 - e) Residue on evaporation, Max
 - f) Esters as $\text{CH}_3\text{COOC}_2\text{H}_5$, Max
 - g) Lead content, Max
 - h) Methyl alcohol, Max
 - i) Furfural content, Max
 - j) Aldehyde as acetaldehyde, Max
 - k) Permanganate reaction time, in minutes, Min
 - l) Higher alcohol as iso-amyl alcohol, Max
 - m) Heavy metals,
 - n) Other important parameters for neutral spirits, if required
- 4.8 Establish the safe and most suitable sustainable packaging materials for neutral spirit for alcoholic drinks.

5 Research Methodology:

- 5.1 Undertake thorough literature review as per 4.1 and prepare summary report including comparative analysis.
- 5.2 Identify manufacturing base categorized into large, medium, small, and micro. Contact the manufacturers and collect information using a structured questionnaire. Inform them about requirement of industry visit and collection of samples of neutral spirits for alcoholic drinks.

- 5.3** Identify exporters and importers of neutral spirits for alcoholic drinks. Contact them and collect information using a structured questionnaire. Inform them about requirement of collection of samples.
- 5.4** Undertake visit to identified manufacturing units (preferably 3 large and 2 small scale) and the following activities shall be carried out and report prepared:
- i) Observation on:
 - a) Raw material being used and its properties;
 - b) Manufacturing process being utilized;
 - c) Grades or varieties of the product being manufactured;
 - d) In-process quality control;
 - e) Characteristics being tested for the final product and test methods being used;
 - f) Marking and labelling; and
 - g) Packaging practices.
 - ii) Discussion with relevant persons of industry regarding:
 - a) Quality and safety specifications of raw material and finished product along with the process control parameters;
 - b) Sustainability practices being implemented;
 - c) Buyers/users of the of neutral spirits for alcoholic drinks manufactured at their unit; and
 - d) Collection of samples for all varieties of neutral spirits for alcoholic drinks manufactured in the unit.
- 5.5** Identify users of neutral spirits for alcoholic drinks. Contact the users and collect information using a structured questionnaire.
- 5.6** Identify laboratories for testing of neutral spirits for alcoholic drinks. Conduct visits to the laboratories, observe characteristics being tested and test methods being followed. Preferably one government laboratory and one NABL accredited private laboratory should be covered in the visits. Explore NABL accredited laboratories where complete testing of samples of neutral spirits for alcoholic drinks for characteristics identified at **4.7** and **4.8**.
- 5.7** Undertake testing of the collected samples for the characteristics identified at **4.7** and **4.8** using recommended test methods. If the manufacturer has claimed any additional properties, the same should also be tested as per the test method declared by the manufacturer. For new parameters like limit of heavy metals, study the available methods and identify the relevant test methods. Test report for each sample shall have complete information on source of the sample (manufacturer/importer), physicochemical parameters mentioned at **4.7** and **4.8**, manufacturing process, reported values, and test method used.
- 5.8** Based on the test reports and information collected through questionnaires, visits and discussion, analyze and establish levels and limits of quality and safety parameters and submit project report.

6 Expected Deliverables:

- 6.1 Project report, in hard copy and digital formats, covering all aspects mentioned in scope
- 6.2 Questionnaires, discussion and visit reports, test reports, to be appended with the project report

7 Timeline and Method of Progress Review

7.1 Timeline for the project is 5 months from the date of award of the project.

7.2 Stages for Review:

7.2.1 **Stage I:** At the end of 1st month, project allottee shall prepare a comprehensive plan identifying the following:

- a) Details of literature review carried out and summarized report;
- b) Identified manufacturers, exporters, importers, laboratories, and users;
- c) Information obtained through questionnaires from the above-mentioned stakeholders and visits to be carried out;
- d) Laboratory where testing is to be carried out; and
- e) Test method proposed to be used for characteristics listed in 4.8 and any additional characteristics, associated sample volume and sampling plan.

7.2.2 **Stage II** – At the end of 4th month, project allottee to submit draft report covering all aspects mentioned in scope including the following information:

- a) Details of visits carried out to manufacturing units and laboratories;
- b) Details of physico-chemical characteristics of neutral spirit and manufacturing processes being used;
- c) Number of samples collected with information related to source of the sample (manufacturer/importer);
- d) Test reports and analysis of data collected/generated;

Sectional Committee will evaluate the interim report and provide feedback/recommend changes, if required. At the end of 5th month, project allottee to submit final project report incorporating recommendations/feedback of Committee.

Note: The timelines given above are indicative and calculation of time will start from the date of award of sanction letter for the project to the Project leader.

8 Support from BIS

- 8.1 Access to Indian and International Standards
- 8.2 Letters from BIS to concerned stakeholders, wherever required for support in research project.

9 Nodal Officer

Ms. Lavika Singh, Sc. B/Assistant Director, FAD, BIS, may be contacted at fad-alc@bis.gov.in for any queries on the research project.