

Consultancy for Setting up a
Model Test Lab of Jaggery
(Export Quality)



INDIAN INDUSTRIES ASSOCIATION

AN APEX BODY OF MICRO, SMALL & MEDIUM ENTERPRISES

(IN THE SERVICE OF MSME SINCE 1985)

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Ref. No. IIA/ RD/ 2017/25

Date: 12.01.2017

To

Dr Manoj Mittal
Department of Basic Science
Shri Ram College
Muzaffarnagar

Dear Sir,

This is with reference to your research proposal on "Consultancy for setting up a model test lab of Jaggery (Export Quality)" and our letter of interest on the subject. We are herewith sanctioning an amount of Rs. 20,000/- as fund to conduct research work.

Kindly note that you have to fulfil all the conditions mentioned in our earlier letter dated 20.12.2016 and complete the work within stipulated time.

Thanks & regards,
For Indian Industries Association, Muzaffarnagar

Kush Puri

(Kush Puri)
Chairman

CERTIFIED

Manoj Mittal
Co-ordinator
IQAC, Shri Ram College,
Muzaffarnagar

KG
Principal
Shri Ram College
Muzaffarnagar

Utilization Certificate

S.N.	Detail of sanction of Fund with Project name and Duration	Amount
1.	90-Days project on Consultancy for setting up a model Test Lab of Jaggery (Export Quality), Date of Sanction of Fund- 20.12.2016 as per Sanction Letter	20000.00/-
	TOTAL	20000.00/-

It is Certified that out of Rs. 20000.00/- (Twenty Thousands Only) of grants sanctioned by IIA, Muzaffarnagar during the year 2016-17 in favor of Shri Ram College, Muzaffarnagar, a sum of Rs. 20000.00 has been utilized for the purpose of the project for which it was sanctioned and that the balance of Rs. Nil remaining unutilized at the end of the year has been surrendered. The Extra amount (If any) is met out by Shri Ram College.

2. Certified that we have satisfied our self that the conditions on which the grant was sanctioned have been duly fulfilled/are being fulfilled and that we have exercised the following checks to see that the money was actually utilized for the purpose for which it was

sanctioned.

Kinds of checks exercise-

1. Checking of cash book
2. Checking of payment vouchers.
3. Checking of expenses bills.

For Shri Ram College


Secretary

Place: Muzaffarnagar
Date: 25.05.2017

For Goel Rakesh & Co.
Chartered Accountants




Rakesh Kumar Goel
(Proprietor)
M.NO. : 071858
FRN : 003374C

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Objectives of the study

The study was conducted with some specific objectives.

1. To provide knowledge of standardized parameters of Jaggery testing as set up by FSSAI.
2. To give consultancy for setting up a Jaggery testing lab in IIA premises.

Duration of Study

One year (Dec 2016 to November 2017)

Sanctioned Amount of Project

Rs. 20,000/-

Supervisor

Dr. Manoj Mittal, Faculty of Basic Science, Shri Ram College

Students engaged in project

2 students were involved in research and data collection for the project.

Internship paid to them-Rs. 5,000/-each

Major Recommendations

In India, it is essential to comply -The Food Safety and Standards of Authority of India(FSSAI) under the Food Safety Standards Act, 2006 for manufacturing of food products. During discussion with the stake holders of Khandsari Sugar and Gur/Jaggery manufacturing across U.P. M.P. and Maharashtra setting up of common testing facilities in various regions came up as an important issue. These labs could be set in PPP mode with one time assistance from Govt. of India and respective State Govts

Although quality of Khandsari sugar and Gur products is assured through the testing for various parameters as mandated under FSSAI but it also depends upon the customer's requirements. For holistic quality checks, there is need to have the complete facilities of quality evaluations. Such laboratories are also required to be recognized by National Accreditation Board for Testing and Calibration Laboratories (NABL) or an equivalent accreditation agency as recognized by the Food Authority.

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A. Land Building:

The infrastructure to be created depends upon the need and scope of testing. The basic requirements of the laboratories are given below:

1. Sensory Laboratory
2. Physical Laboratory
3. Chemical Laboratory
4. Microbiological Laboratory
5. Toxic substance analysis Laboratory
6. Pesticides residues Laboratory

Laboratory having the competency to carry out the complete testing as per the food safety standards regulations 2011 and Food Safety and Standards (contaminants, Toxins and Residues) for Khandsari sugar & Gur udyog and such type of laboratory is called referral Food Laboratory.

B. Technical Requirements

i. **Chemicals and Glassware** - All the laboratories need laboratory/analytical grade chemicals, Glassware and other essential materials needed in the laboratory.

ii. **Instruments** - Khandsari and gur products may have elements contamination due to many stages of processing of the end products. This contamination may also occur due to agro practices of cultivation. To carry out the instrumental testing specially metal, microbiological, pesticides residual etc. needs highly sophisticated instruments (chromatographic and spectroscopy etc.) with PPB level accuracy.

iii. **Traceable Standards for Testing**- To maintain the credibility of the testing laboratory, accuracy is the prime factor for which laboratory need to have NIST / or other standards for in house calibration as per the accreditation body norms is mandatory.

iv. Requirements of Calibration:

Laboratory can get their equipments/ instruments and glassware etc, calibrated from the National Metrological Laboratory in the knowledge that the calibration is of internationally traceable.

The Essential list of instruments/ equipments, apparatus used in analysis are as followed:-

1	Anemometer	22	Homogenizer
2	Bomb Calorimeter	23	Vacuum Oven
3	Laminar flow	24	Muffle Furnace
4	Atomic Absorption	25	Refrigerator
5	Spectrometer	26	Rotary Meter
6	Polarimeter	27	Shaking Incubator
7	Digital Refractometer	28	Mixer Grinder

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8	pH Meter	29	Sonicator
9	Moisture analyzer	30	Soxhlet apparatus
10	Viscometer	31	Incubator
11	LC MSMS	32	Colony counter
12	Texture Analyzer	33	Laboratory crusher
13	Color Meter	34	Elisa Reader washer
14	Crude fiber assembly	35	Auto clave Centrifuge
15	Distillation assembly	36	Hot air oven
16	Deep freezer	37	Hunter cooler lab
17	Band Sealer with Nitrogen flushing	38	Weighing Balance(Sensitivity according to the requirements)
18	Mechanical Jaggery drier	39	Laboratory sterilization equipments
19	Titration assembly	40	Environment control chamber
20	Laboratory Hoods	41	Dehumidify fire
21	Laboratory Pumps	42	Water activity Meter

C. Quality related Requirements:

i) Standard Operating Procedure/ Indian Standard (BIS):

To carry out the complete testing of Khandsari sugar and gur etc. Indian standard specification or Standard Operating Procedure (SOP) manual is required. The present method IS 13953: 1994 Khandsari, Amendment No.1 July 2002 is applicable. Clause 5.2.1 in the said standard under the BIS Certification Marking, product may also be IS Marked as per the 5.2.1.1 clause. The details of conditions under which the license for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards. The other related BIS are given below:

IS 13953 : 1994	Khandsari
IS 12923 : 1990	Jaggery
IS 8124 : 1976	Code for hygienic conditions for sale of sugar cane juice
IS 1973 : 1999	Sugar cane crushers (Third Revision)
IS 11204 : 1985	Sugar Cane Harvesting
IS 11201 : 1985	Cane crushing roller for sugar industries

Laboratory should have sufficient qualified, trained and experienced staff to carry out the testing jobs under the testing scope. Similarly, there should have sufficient and suitable instruments / equipments and related accessories to carrying out the analysis as per the standard procedure.

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ii) Testing Parameters:

Testing details of the Khandsari Sugar and Gur products depend upon the taste of customer but over all following parameters will be taken in to consideration.

Khandsari Sugar Testing
General Parameters
Physical examination for moulds, living and dead insects, insect fragments and rodent contamination(hair, excreta) visible to the naked eye
Test for iron filings
Test for added color (Natural and Synthetic)
Quality Parameters
Extraneous matter
Khandsari Sugar (Sulphur Sugar)
Moisture (when heated at $105^{\circ} \pm 1^{\circ} \text{C}$ for 3 hours)
Ash insoluble in dilute hydrochloric acid
Sucrose
Test for sulphur dioxide
Khandsari Sugar (Desi)
Moisture (when heated at $105^{\circ} \pm 1^{\circ} \text{C}$ for 3 hours)
Ash insoluble in dilute hydrochloric acid
Sucrose
Test for sulphur di oxide
Khandsari Sugar can be distinguished from plantation White Sugar on the Following Characteristics, Namely:
Khandsari Sugar (Sulphur Sugar)
Conductivity (106 mho/cm ²)
Calcium oxide (mg/100gms)
Khandsari Sugar (Desi)
Conductivity (106 mho/cm ²)
Calcium oxide (mg/100gms)
Jaggery (Gur) Testing Details

General Parameters


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Physical examination for moulds, living and dead insects, insect fragments and rodent contamination (hair, excreta) visible to the naked eye
Test for added colour (Natural and Synthetic)
Test for sulphur dioxide
Quality Parameters
Moisture
Total sugars expressed as invert sugar
Extraneous matter insoluble in water
Total ash
Ash insoluble in hydrochloric acid (HCl)
Metal Contaminants
Lead
Copper
Arsenic
Mercury
Methyl Mercury calculated as the element
Tin
Zinc
Crop Contaminants and Notes
Total aflatoxin
Agaric acid
Hydrocyanic acid
Hypericine
Saffroie

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D. Cost of setting of Laboratory -

S. No.	Particulars	Cost (in Lakh)
A	Infra structure	
i	Land & Building Built up Area – 500 Sqr. mtrs	150
B	Technical	
i	Instrument and Equipments	200
ii	Consumable (Glassware's and chemicals)	15
iii	Manpower : 1 Chemist/Sugar Technologist : 2 Lab Assistant : 2 Assistant : 1 Accountant/Store : 1 Computer Operator : 1 Security Guard	20
iv	NIST Traceable Standards (all testing) etc.	20
	Total cost (in Lakhs)	405.00

Conclusion

All parameters and criteria is given to IIA for setting up a Jaggery Testing lab including financial and infrastructure requirements.


(Dr. Manoj Mittal)
Project Supervisor

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