Model Curriculum

Milk Tester

SECTOR: AGRICULTURE & ALLIED
SUB-SECTOR: DAIRYING
OCCUPATION: MILK COLLECTION & HANDLING
REF ID: AGR/Q4203, V1.0
NSQF LEVEL: 4

Certificate

CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

AGRICULTURE SKILL COUNCIL OF INDIA

for the

MODEL CURRICULUM

Complying to National Occupational Standards of
Job Role/ Qualification Pack: 'Milk Tester' QP No. 'AGR/ Q4203 NSQF Level 4'

Date of Issuance: July 30th, 2017

Valid up to: March 31st, 2021

* Valid up to the next review date of the Qualification Pack

Authorised Signatory
(Agriculture Skill Council of India)

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Milk Tester

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a "Milk Tester", in the "Agriculture & Allied" Sector/Industry and aims at building the following key competencies amongst the learner

Program Name	**Milk Tester**		
Qualification Pack Name & Reference ID.	AGR/Q4203, v1.0		
Version No.	1.0	**Version Update Date**	
Pre-requisites to Training	Class 12		
Training Outcomes	**After completing this programme, participants will be able to:** • **Prepare and maintain work area and equipments for testing:** Introduction to milk testing, Prepare and maintain work area and lab equipment's for milk testing • **Prepare for quality analysis and manage housekeeping for milk testing:** Calibrate and maintain equipments, prepare reagents, manage housekeeping • **Manage Sampling and Quality Analysis for Milk Testing:** Chemistry of milk, qualitative and quantitative test, system and processes of milk analysis • **Maintain documentation and record keeping related to milk testing:** Basics of computer and ERP • **Maintain Safety Hygiene and Sanitation for Milk Testing:** Types of contamination, types of adulteration , prevention and control of contamination and adulterants, safety and hygiene procedure		

This course encompasses 5 out of 5 National Occupational Standards (NOS) of "Milk Tester" Qualification Pack issued by "Agriculture Skill Council of India".

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	**Introduction** **Theory Duration** (hh:mm) 05:00 **Practical Duration** (hh:mm) 00:00 **Corresponding NOS Code** Bridge Module	• Understand General Discipline in the class room (Do's & Don'ts) • Learn and Practice Basic skills of communication • Learn and Practice Basic reading capabilities to enable reading of signs, notices and/or cautions at site • Get acquainted with the Dairy Industry • Understand the process of milk procurement • Importance of milk testing • General awareness about types of synthetic milk and its effects on human health • Understand the Role of a Milk Tester and the progression pathway	Laptop, white board, marker, projector
2	**Prepare and maintain work area and equipments for milk testing** **Theory Duration** (hh:mm) 5:00 **Practical Duration** (hh:mm) 15:00 **Corresponding NOS Code** AGR /N4210	• Maintain cleanliness at the work area through approved sanitizers • Maintain safe and hygienic conditions for milk testing and analysis • Create cleanliness checklist and ensure all points are covered prior to quality test • Understand disposal of waste material as per defined SOPs and industry requirement • Identify and check the condition and performance of required equipments for milk testing and analysis • Undertake cleanliness of equipments and glass wares with recommended sanitizers • Organize equipments and glass wares for milk analysis	Laptop, white board, marker, projector, checklist format, weighing scale, Garbar fat testing machine , fat and SNF analyser lactometer, pH meter, moisture analyser, refractometer, sterilisers, flasks, refract meter, TDS meter, hot plate , sanitizers, glassware,
3	**Prepare for quality analysis and manage housekeeping for milk testing** **Theory Duration** (hh:mm) 05:00 **Practical Duration** (hh:mm) 20:00	• Understand, handle and manage calibration equipments and calibration of each equipment • Record the readings of calibration in the register • Manage calibration equipments • Maintain calibration reports • Check and maintain the performance of equipments • Maintain list of annual maintenance contracts • Record details of lab equipments in	Laptop, white board, marker, projector, dead weights, calibrated measuring jars, reagents

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Corresponding NOS Code AGR/N4211	the register and ERP • Understand reagents and undertake the preparation and supervision of each reagents • Maintain and manage the inventory of all chemicals, lab equipments, glass wares etc • Prepare purchase requisition of all the inventories and process requisition • Undertake cleanliness and maintenance of equipments as per maintenance procedures for equipments • Understand the SOP and checklist of housekeeping • Visit all processing units and follow the process of housekeeping including corrective actions as suggested • Maintain and file all documents pertaining to housekeeping	
4	**Sampling and Quality Analysis for Milk Testing** **Theory Duration** (hh:mm) 10:00 **Practical Duration** (hh:mm) 25:00 **Corresponding NOS Code** AGR/N4212	• Sample the milk: ▪ Procured milk ▪ Finished milk and milk products • Collect pre-shipment sample • Disperse milk fat before chemical test of milk • Use plunger, dipper for taking milk sample • Use autoclave/pressure cooker for sterilization of dipper • Undertake labelling of samples • Cool the sample at correct temperature prior to testing • Transfer the sample for analysis • Carry out analysis of each sample • Collect, file and maintain all the documents • Verify certificate of analysis • Monitor and maintain storage condition • Inform any discrepancy to the supervisor • Understand disposal procedure as per organization standards • Record the results in the register and ERP • Maintain the cleanliness of the glass wares and other equipments and follow the maintenance procedures for equipments	Laptop, white board, marker, projector, plunger, dipper, autoclave

Sr. No.	Module	Key Learning Outcomes	Equipment Required
5	**Complete Documentation and record keeping related to the milk testing** **Theory Duration** (hh:mm) 05:00 **Practical Duration** (hh:mm) 15:00 **Corresponding NOS Code** AGR/N4213	• Document and maintain records of procured milk and containers sampled. For example, place of sampling, batch number, sampling procedure • Document and maintain records procured milk and container analyzed such as method of analysis, parameters analyzed • Maintain records of observations, if any • Record the analysis in ERP • Document and maintain the equipments used for analysis. • Document and maintain records related to calibration equipments	Laptop, white board, marker, projector, Record book
6	**Safety, hygiene and sanitation for milk testing** **Theory Duration** (hh:mm) 05:00 **Practical Duration** (hh:mm) 15:00 **Corresponding NOS Code** AGR/N4213	• Understand contamination and adulteration • Follow safety and hygiene procedure as per organization standards • Use gloves, hairnets, appropriate shoes to maintain personal hygiene • Create hygienic environment for milk production by inspecting procured milk and finished milk products as per various defined parameters • Clean milk processing equipments periodically • Follow appropriate safety procedures • Follow housekeeping practices • Attend training on hazard management • Convey supervisor regarding any rodents and pest problem. Record the data • Document and record data as per Dairy Safety control system • Determine the quality of milk based on set criterion • Prevent cross contamination by appropriate storage of procured milk, finished products and allergens • Follow safe food practices by labelling milk and finished products	Laptop, white board, marker, projector, Sanitizer, disinfectants, extinguisher, Personal protective equipment Like: safety gloves, Safety boots, hairnet First Aid Kit: Bandages, Adhesive bandages, Betadine Solution / ointment, Pain relief spray / ointment, Antiseptic liquid; Antidote, Phone directory, Search lights, fire extinguisher,
	Total Duration: **Theory Duration** (hh:mm) **35:00** **Practical Duration**	**Unique Equipment Required:** Laptop, white board, marker, projector, Audio-visual aids, checklist format, weighing scale, Garbar fat testing machine , fat and SNF analyser lactometer, pH meter, sterilisers, flasks, refractometer, TDS meter, hot plate , sanitizers, glassware, dead weights, calibrated measuring jars, reagents, plunger, dipper, autoclave, Record book, fire extinguisher, PPEs	

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	(hh:mm) **90:00**		

Grand Total Course Duration: **125 Hours, 0 Minutes**

*(This syllabus/ curriculum has been approved by **Agriculture Skill Council of India)***

Trainer Prerequisites for Job role: "Milk Tester" mapped to Qualification Pack: "AGR/Q4203, v1.0"

Sr. No.	Area	Details
1	**Description**	Trainer is responsible for educating the trainees – Ensuring practical training of milk testing, informative sessions on identification and functions of laboratory apparatus/equipments that are prerequisite for milk testing.
2	**Personal Attributes**	Trainer should be Subject Matter Expert. He/ she should have good communication, leadership, observation and practical oriented skills.
3	**Minimum Educational Qualifications**	Diploma in Veterinary /Animal Husbandry / Dairying
4a	**Domain Certification**	Certified for Job Role: "Milk Tester" mapped to QP: "AGR/Q4203, v1.0". Minimum accepted score is 80%.
4b	**Platform Certification**	Certified for the Job Role: "Trainer", mapped to the Qualification Pack: "MEP/Q0102". Minimum accepted % as per respective SSC guidelines is 80%.
5	**Experience**	• B. Tech (Dairy) with 2 years relevant • B. SC Agriculture with 2 years of relevant experience • Any Graduate with 3 years of relevant experience • Diploma in veterinary /Animal Husbandry / Dairying with 4 years of relevant work experience

Annexure: Assessment Criteria

Assessment Criteria	
Job Role	Milk Tester
Qualification Pack	AGR/Q4203, v1.0
Sector Skill Council	Agriculture

Guidelines for Assessment

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC
3. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below)
4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criteria
5. To pass the Qualification Pack , every trainee should score a minimum of 70% in aggregate.
6. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack

		Marks Allocation			
Assessable outcomes	**Assessment criteria for outcomes**	**Total Marks**	**Out Of**	**Theory**	**Skills Practical**
1. AGR/Q4210 Prepare and maintain work area and equipments for milk testing	PC1. Clean and maintain the cleanliness of the work area using approved sanitizers and keep it free from dust, waste, and spillage	**100**	25	5	20
	PC2. Ensure that the work area is safe and hygienic for milk analysis and testing		10	3	7
	PC3. Prepare a cleanliness checklist and ensure that all points are covered before starting the quality tests		15	5	10
	PC4. Dispose waste materials as per defined SOPs and industry requirements		15	5	10
	PC5. Check the working and performance of all equipmetns and tools used for process such as weighing scales, pH meter, lactometers, moisture analyser, sterilizer, flasks, refractometer, TDS (total dissolved solvents) meter, equipments for testing containers, etc.		15	6	9
	PC6. Clean the equipments and glass wares used with recommended sanitizers following specifications and organisation standards		10	3	7
	PC7. Organize glass wares and equipments for analysis		10	3	7
			100	**30**	**70**
2. AGR/Q4211 Prepare for quality analysis and manage housekeeping for milk testing	PC1. Handle and maintain tools (deadweights, calibrated measuring jars) and reagents (standard solutions) used for calibration of equipments following laboratory procedures and standards	**100**	5	1	4
	PC2. Read and understand the standard operating procedures (SOP) for calibration of each equipment		4	2	2
	PC3. Record the reading in the calibration register		3	1	2
	PC4. Maintain list of all equipments along with its calibration frequency		3	1	2
	PC5. Maintain record/file of external calibration reports		3	1	2
	PC6. Check the working and performance of all equipments on regular basis		3	1	2
	PC7. Report any malfunction/repairs to the supervisor		3	1	2
	PC8. Inform the supplier/manufacturer on the malfunction/repairs and get it		3	1	2

repaired immediately				
PC9. Maintain list of all equipments along with the details of annual maintenance contract		3	1	2
PC10. Record all details on lab equipment like performance, faults, repairs, annual maintenance etc in the equipment register and in ERP		5	1	4
PC11. Read and understand the SOPs for preparing each reagent		3	1	2
PC12. Ensure availability of distilled water and standard solutions at all times		3	1	2
PC13. Weigh required chemicals and measure solvents in calibrated instruments and measuring jars		3	1	2
PC14. Mix solvents and chemicals and maintain required conditions following the procedure for preparing the reagents		3	1	2
PC15. Prepare standards solutions for calibration of equipments		3	1	2
PC16. Store the chemicals, solvents, acids, reagents etc following manufacturer's instructions (from the label) or following laboratory procedures and standards		5	1	4
PC17. Ensure and maintain inventory of all lab chemicals, glass wares, consumables, equipment spares etc		3	1	2
PC18. Maintain list of all chemicals, solvents, acids, reagents, glass wares, consumables, equipment spares etc used in the laboratory		3	1	2
PC19. Check the inventory of lab chemicals, glass wares, consumables, equipment spares at regular intervals in the register and ERP and update lab technician on the inventory status		5	1	4
PC20. Prepare purchase requisition for lab chemicals, glass wares, consumables, equipment spares with the approval of superiors, and process requisition		5	1	4
PC21. Clean the glassware used for analysis with recommended detergents, disinfectants and sanitizers		3	1	2
PC22. Clean and maintain equipments used following the maintenance procedures for equipments		3	1	2
PC23. Read and understand the SOP and checklist for housekeeping		3	1	2
PC24. Visit the processing unit (procured milk, milk at various stages, milk products), process/production area,		5	1	4

	transportation area, transportation vehicle, laboratory at regular intervals and perform checks based on the housekeeping checklist				
	PC25. Inform the supervisor in case of any deviation		3	1	2
	PC26. Understand the suggested corrective action		3	1	2
	PC27. Ensure to implement the corrective action immediately		3	1	2
	PC28. File the housekeeping checklist		3	1	2
	PC29. Maintain records on all documents related to the housekeeping activity		3	1	2
			100	**30**	**70**
3. AGR/Q4212 Sampling and quality analysis for milk testing	PC1. Sample the procured milk (milk procured directly from farmers) from the delivery truck/warehouse/storage area following SOP	**100**	3	1	2
	PC2. Sample the finished milk and milk product(s) from the milk collection center or production storage area/warehouse		3	1	2
	PC3. Collect the pre-shipment samples sent by the milk producers/milk product vendors from MCC or processing unit		5	1	4
	PC4. Ensure that the liquid milk in cans and bulk tanks is thoroughly mixed to disperse the milk fat before a milk sample is taken for any chemical control test		5	1	4
	PC5. Use plungers and dippers to take out the sampling milk from milk cans		3	1	2
	PC6. Ensure that the dippers used to take the sampling milk has been sterilized in an autoclave or pressure cooker for at least 15 mm at 120 degree celcius before hand in order to avoid contamination of the sample		10	3	7
	PC7. Label the samples with details like name of farmer/milk producer, records of dates and place of procurement		3	1	2
	PC8. Cool the sample to near freezing point quickly and keep it cool till the quality testing begins		3	1	2
	PC9. Collect all documents pertaining to incoming lab samples like copy of procurement order, invoice, certificate of analysis etc for verification and records		10	3	7
	PC10. Transfer the samples to milk and place in the designated area for analysis		3	1	2

	PC11. Verify the certificate of analysis (COA) against organisation standards		3	1	2
	PC12. File and maintain all documents related to sample along with the test report		3	1	2
	PC13. Monitor and maintain the storage conditions (like temperature, humidity, cleanliness etc) of the control sample		3	1	2
	PC14. Dispose the control sample and shelf-life sample after the control period following disposal procedures and as per organisation standards		3	1	2
	PC15. Read and understand the standard operating procedures (SOP) for analysis of each sample		3	1	2
	PC16. Carry out analysis in calibrated equipments following standard operating procedure		3	1	2
	PC17. Perform basic tests on physical parameters like colour, appearance, texture, weight etc on milk and milk product samples collected		5	2	3
	PC18. Perform basic chemical analysis like moisture content, bulk density, pH, total soluble solids (TSS) using refractometer, etc on milk and milk product samples collected		10	3	7
	PC19. Inform the supervisor of any discrepancies in the analysis result		3	1	2
	PC20. Record the results in the quality analysis register		4	1	3
	PC21. Enter the results in the ERP system (in case a computerized system is used)		4	1	3
	PC22. Clean the glassware used with recommended detergents, disinfectants and sanitizers		4	1	3
	PC23. Clean and maintain equipments used, following maintenance procedures for equipments		4	1	3
			100	**30**	**70**
4. AGR/Q4213 Complete documentation and record keeping related to milk testing	PC1. Document and maintain records of procured milk and containers sampled such as • Place of sampling • Sampling procedure • Supplier information • Batch number • Receiving date/ date of procurement	**100**	15	10	5

	• Supplier documents (P.O., invoice, certificate of analysis, etc.)				
	• Condition of the transport vehicle				
	• Condition of procured milk				
	PC2. Document and maintain records on procured milk and container analysis such as		15	10	5
	• Parameters analyzed				
	• Method of analysis				
	• Tests performed on the milk				
	• Storage of sample				
	• Equipments used for analysis				
	• Analysis results				
	• Certificate of analysis				
	PC3. Maintain record of observations (if any) related to procured milk, containers		10	5	5
	PC4. Load the analysis details in ERP for future reference (in case a computerized system is used)		10	5	5
	PC5. Document and maintain records on equipments used for analysis, condition of the equipment, control used for analysis, equipment parameter, equipment performance, time taken for analysis, etc. as per company standards		15	10	5
	PC6. Document and maintain records of equipment calibration such as date of calibration, procedure and method used for calibration, errors/variations observed, calibration readings, internal and external calibration reports, reagents/standards/tools used for calibration condition of the equipment, etc. as per company standards		15	10	5
	PC7. Maintain record of observations or deviations (if any)		10	5	5
	PC8. Load the details in ERP for future reference		10	5	5
			100	**60**	**40**
5. AGR/Q4214 Safety, hygiene and sanitation for milk testing	PC1. Comply with safety and hygiene procedures followed in the organisation	**100**	5	1	4
	PC2. Ensure personal hygiene by use		10	3	7

	of gloves, hairnets, shoes, etc.				
	PC3. Ensure hygienic production of milk by inspecting procured milk, finished milk products, etc. for compliance to physical, chemical and microbiological parameters		10	3	7
	PC4. Clean, maintain and monitor milk processing equipment periodically, using it only for the specified purpose		10	3	7
	PC5. Use safety equipment such as fire extinguisher, first aid kit and eye-wash station when required		10	3	7
	PC6. Follow housekeeping practices by having designated area for materials/tools		5	1	4
	PC7. Attend training on hazard management to understand types of hazards such as physical, chemical and biological hazards and measures to control and prevent them		10	3	7
	PC8. Identify, document and report problems such as rodents and pests to supervisors		5	2	3
	PC9. Conduct workplace checklist audits before and after work to ensure safety and hygiene		5	1	4
	PC10. Document and maintain procured milk, container, process and finished products for the credibility and effectiveness of the Dairy safety control system		5	3	2
	PC11. Determine the quality of milk using criteria such as odour, appearance, taste and best before date, and take immediate measures to prevent spoilage		15	5	10
	PC12. Store procured milk, finished products, allergens separately to prevent cross-contamination		5	1	4
	PC13. Label procured milk and finished products and store them in designated storage areas according to safe food practices		5	1	4
			100	**30**	**70**
TOTAL		**500**	**500**	**180**	**320**