

NSQF QUALIFICATION FILE GUIDANCE

Version 6: Draft of 08 March 2016

CONTACT DETAILS OF THE BODY SUBMITTING THE QUALIFICATION FILE

Name and address of submitting body:

Food Industry Capacity & Skill Initiative (FICSI)
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List of documents submitted in support of the Qualifications File

1. Career Map of Food Microbiologist - Annexure 1
2. Qualification Pack of Food Microbiologist - Annexure 2
3. List of QP/NOS validating companies – Annexure 3
4. NSDC Human Resource and Skill Requirement Study- Annexure 4

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SUMMARY

Qualification Title	Food Microbiologist
Qualification Code	FIC/Q7008
Nature and purpose of the qualification	Nature of the qualification - a Qualification Pack (QP) The main purpose of the qualification - to enable the candidate for ensuring quality of food products through microbiological analysis and monitoring of food safety and hygiene system
Body/bodies which will award the qualification	Mettl, Stamp, IQAG, Skills Mantra
Body which will accredit providers to offer courses leading to the qualification	Food Industry Capacity & Skill Initiative (FICSI)
Body/bodies which will carry out assessment of learners	Food Industry Capacity & Skill Initiative (FICSI)
Occupation(s) to which the qualification gives access	Food Microbiologist
Licensing requirements	N/A
Level of the qualification in the NSQF	Level 6
Anticipated volume of training/learning required to complete the qualification	240 hours
Entry requirements and/or recommendations	Bachelor's degree in Microbiology 2-3 years in food processing units handling microbiological analysis of food products
Progression from the qualification	Senior Manager (Level 7)
Planned arrangements for the	RPL arrangements and policies are under development.

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Recognition of Prior learning (RPL)	
International comparability where known	This qualification has been compared with courses being offered by the National Skills Academy (Food and Drink) of UK and no matching course has been found.
Date of planned review of the qualification.	30 th March 2019

Formal structure of the qualification			
Title of unit or other component (include any identification code used)	Mandatory/ Optional	Estimated size (learning hours)	Level
FIC/N7024 Prepare and maintain work area and lab equipment	Mandatory	16	6
FIC/N7025 Carry out microbiological analysis of food products	Mandatory	144	6
FIC/N7026 Monitor food safety system	Mandatory	32	6
FIC/N7027 Complete documentation and record keeping related to microbiological analysis of food products	Mandatory	32	6
FIC/N9001 Ensure food safety, hygiene and sanitation for processing food products	Mandatory	16	Common across levels
FIC/9004 Manage and lead a team	Mandatory	24	6

Please attach any document giving further detail about the structure of the qualification – eg a Curriculum Document or a Qualification Pack.

Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.

1. Qualification Pack of Food Microbiologist- Annexure 1

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SECTION 1 ASSESSMENT

Body/Bodies which will carry out assessment:

The assessment bodies include Mettl, Stamp, IQAG and Skills Mantra, Aspiring Mind

How will RPL assessment be managed and who will carry it out?

FICSI recognizes that there may be candidates who have prior learning experience in the FOOD PROCESSING Sector and are desirous of being certified. Such candidates can apply to FICSI for testing and certification of their skills, and they will be allotted a Training Provider / TC for being tested. Documentation for such candidates will be done by the Training Provider / TC. Certificates of successful candidates will be dispatched to the TP / TC for distribution to them.

Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, consistent and fair and show that these are in line with the requirements of the NSQF:

Assessment will be based on the concept of Independent Assessors empanelled with Assessment Agencies, identified, selected, trained and certified on Assessment techniques. These assessors would be aligned to assess as per the laid down criteria.

Assessment Agency would conduct assessment only at the training centres of Training Partner or designated testing centers authorized by FICSI.

Ideally, the assessment will be a continuous process comprising of three distinct steps:

A. Mid- term assessment

B. Term / Final Assessment

Each National Occupational Standard (NOS) in the respective QPs will be assigned weightage. Therein each Performance Criteria in the NOS will be assigned marks for theory and / or practical based on relative importance and criticality of function.

This will facilitate preparation of question bank / paper sets for each of the QPs. Each of these papers sets / question bank so created by the Assessment Agency will be validated by the industry subject matter experts through FICSI, especially with regard to the practical test and the defined tolerances, finish, accuracy etc.

The following tools are proposed to be used for final assessment:

i. *Written Test*: This will comprise of (i) True / False Statements (ii) Multiple Choice Questions (iii) Matching Type Questions. Online system for this will be preferred.

ii. *Practical Test*: This will comprise a test job to be prepared as per project briefing following appropriate working steps, using necessary tools, equipment and instruments. Through observation

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it will be possible to ascertain candidate's aptitude, attention to details, quality consciousness etc. The end product will be measured against the pre-decided MCQ filled by the Assessor to gauge the level of his skill achievements.

iii. *Structured Interview*: This tool will be used to assess the conceptual understanding and the behavioral aspects as regards the job role and the specific task at hand.

Please attach any documents giving further information about assessment and/or RPL. Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.

ASSESSMENT EVIDENCE

Complete a grid for each component as listed in "Formal structure of the the qualification" in the Summary.

NOTE: this grid can be replaced by any part of the qualification documentation which shows the same information – ie Learning Outcomes to be assessed, assessment criteria and the means of assessment.

Title of Component: Food Microbiologist

CRITERIA FOR ASSESSMENT OF TRAINEES

Job Role Food Microbiologist

Qualification Pack FIC/Q7008

Sector Skill Council Food Industry Capacity & Skill Initiative (FICSI)

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

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Assessable outcomes	Assessment criteria for outcomes	Marks Allocation			
		Total Marks	Out Of	Theory	Skills Practical
1. FIC/N7024 (Prepare and maintain work area and laboratory equipment)	PC1. clean laminar air flow cabinet or lab bench using approved disinfectants and sanitizers	100	15	5	10
	PC2. ensure cleanliness is maintained to keep it free from microbes to carry out microbiological analysis		15	5	10
	PC3. ensure that the work area is safe and hygienic for microbiological analysis of food products		15	5	10

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	PC4. ensure destruction of microbes from used culture media following SOP		10	4	6
	PC5. ensure the working and performance of all equipments and tools used for microbiological analysis of food products like weighing scale, homogeniser, autoclave, laminar air flow chamber, vacuum pump, bunsen burner, inoculation loop, incubator, refrigerator, microscope etc		15	5	10
	PC6. clean the equipments and glass wares used with recommended sanitizers following specifications and organisation standards		10	4	6
	PC7. attend minor adjustments of equipments, if required		5	2	3
	PC8. organize glass wares and equipment for analysis		15	5	10
			100	35	65
2. FIC/N7025 (Carry out microbiological analysis of food products)	PC1. read and understand standard operating procedures for preparing culture media	100	2	1	1

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	PC2. weigh required chemicals, solvents in calibrated instruments, prepare liquid and solid culture media (nutrient broth and nutrient agar) following SOP		3	1	2
	PC3. transfer prepared broth, culture media, solvent etc in glass wares, plug with cotton plug, wrap with paper and prepare for sterilization		3	1	2
	PC4. place the broth, culture media, solvent, glassware etc in the autoclave, set control parameters like temperature, time etc of autoclave, and start equipment for sterilization		4	1.5	2.5
	PC5. remove sterilized items from autoclave and transfer to sterile area, cool and store at suitable temperature following SOP		3	1	2
	PC6. prepare solid culture media like slopes/slants, plates from nutrient agar in sterile area		3	1	2
	PC7. maintain inventory of all lab chemicals, glass wares, consumables etc for microbiological analysis		3	1	2

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	PC8. read and understand sampling requirement from the production schedule and discuss with the manager on the sampling plan		2	1	1
	PC9. read and understand sampling procedure and sample raw materials, packaging materials, online production samples, finished products, shelf life samples, market samples, customer/consumer complaint samples, following SOP		2	1	1
	PC10. take swab test samples from employees hand and cloth for evaluating personnel hygiene, on equipments and machineries in the production line, in the premises for evaluating sanitation, collect air samples, following SOP		4	1.5	2.5
	PC11. label the samples with details like sample type, date and time of sampling, batch/manufacture /expiry details (as applicable), record sample details in		2	0.5	1.5

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	the lab register				
	PC12. transfer the samples to microbiology lab for analysis and store following SOP until analysis		2	0.5	1.5
	PC13. read and understand the standard operating procedures (SOP) for analysis of microbes in all types of sample		2	1	1
	PC14. prepare the work space (Laminar Air Flow Cabinet) or lab bench by wiping with disinfectant, clean glass ware, tools and equipments		3	1	2
	PC15. dilute samples following SOP to prepare for testing (or) start vacuum pump and filter sample through thin membrane (as applicable)		3	1	2
	PC16. label liquid broth , solid culture media plates with sample details, organism details and date		2	0.5	1.5
	PC17. inoculate samples aseptically in labeled liquid and solid culture media (through suitable techniques like broth inoculation, pour plate, direct plating, streak plate, spread plate, membrane filtration etc), as		4	1.5	2.5

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	applicable following SOP				
	PC18. set controls of incubator like temperature, time etc and place inoculated media in it for microbial growth		3	1	2
	PC19. remove plates from the incubator after incubation period, transfer to the sterile atmosphere, and prepare for counting the microbes		3	1	2
	PC20. adjust controls of microscope, place petri dish under microscope and count the microbes directly and record counts (or)		3	1	2
	PC21. carry out serial dilution of sample in sterile media in sterile condition for counting microbes, following SOP		4	1.5	2.5
	PC22. plate the diluted samples and incubate following incubation conditions for the organism		4	1.5	2.5
	PC23. count the micro-organisms and colonies under the microscope and record counts		3	1	2
	PC24. calculate the concentration of micro-organisms in original sample		3	1	2
	PC25. destroy microbes in used culture media following SOP		4	1.5	2.5

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	before disposal or cleaning of glassware				
	PC26. perform test to identify the type and characteristics of microbes from the colonies of microbes grown in the petri plates plated through serial dilution		4	1.5	2.5
	PC27. prepare enrichment media, plate, inoculate and incubate micro organism of selected type and characteristics (like those required as starter culture for fermentation of food products) to prepare pure culture, following SOP		4	1.5	2.5
	PC28. preserve pure culture through refrigeration, paraffin method, freeze drying etc maintaining the parameters like temperature, anaerobic condition, pressure etc, following SOP		4	1.5	2.5
	PC29. transfer pure culture into a fresh medium at specified intervals, to allow continuous growth and viability of microorganisms, for sub-culturing of microbes		4	1	3
	PC30. compile the results of microbiological		2	0.5	1.5

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	tests and prepare microbiological data				
	PC31. analyze microbiological data and compare with food safety standards of the organisation, national and international regulations		3	1	2
	PC32. establish implications of test results with respect to food safety standards and draw conclusions		2	0.5	1.5
	PC33. document test results, conclusions and recommendations and share with manager for immediate corrective actions		3	1	2
			100	35	65
3. FIC/N7026 (Monitor food safety system)	PC1. read and understand standard operating procedures (SOP) and checklist for housekeeping	100	2	1	1
	PC2. visit the warehouses (raw materials, packaging materials, finished goods warehouse), process/production area, packaging area, laboratory at regular intervals and perform checks based on the housekeeping checklist to ensure food safety		6	2	4

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	PC3. ensure workplace is maintained in a clean and tidy order to meet workplace standards, waste is disposed following industry standards		4	1.5	2.5
	PC4. inform the department supervisor in case of any deviation, suggest/ recommend corrective actions		4	1.5	2.5
	PC5. ensure recommended corrective action has been implemented		5	2	3
	PC6. carryout internal audit on housekeeping to ensure safety and hygiene system are in place		5	2	3
	PC7. identify food safety requirements in the food products production process based on microbial analysis results of production line, premises and food products		5	2.5	2.5
	PC8. identify microbiological hazards in production process, and its critical control point to minimize or prevent those hazards		5	2.5	2.5
	PC9. take swab sample of work area, materials, equipment, products and		6	2	4

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	personnel routinely for microbiological analysis, to monitor and ensure compliance with food safety requirements				
	PC10. discuss test reports and findings with reporting manager and department managers with possible recommendations to establish preventive control measures		5	2.5	2.5
	PC11. carry out audits on processes and practices to identify gap in organisation food safety system, to monitor the effectiveness of the implemented preventive controls, and to ensure corrective actions are implemented		6	2	4
	PC12. share audit findings with manager, reanalyze the preventive measures based on the audit findings, and arrive at additional preventive controls to address the hazards identified		5	2.5	2.5
	PC13. monitor premises of the food processing unit, processing machineries, drainage system to ensure it meets food hygiene		5	2	3

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	standards of the processing unit				
	PC14. monitor storage area for raw materials, packaging materials, finished goods to ensure quality standards are met and food products are fit for human consumption		6	2	4
	PC15. ensure chemicals, disinfectants etc are stored separately and `away from food manufacturing / storing / handling areas		5	2	3
	PC16. ensure pest control system is in place in the food processing unit		5	2	3
	PC17. monitor the personnel hygiene and health condition of employees to ensure hygiene system of the organisation are met		5	2	3
	PC18. monitor and ensure clothing, footwear etc complies with the food safety and hygiene standards of the organisation and Government regulations		5	2	3
	PC19. carry out swab test on personnel to check their personal hygiene, share the findings		6	2	4

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	with them, educate on the consequences, and train to follow hygiene methods				
	PC20. provide training to employees of all department on personnel hygiene, food safety and hygiene requirements and standards, and the need to follow them		5	2	3
			100	35	65
4. FIC/N7027(Complete documentation and record keeping related to microbiological analysis)	PC1. document and maintain records on details of raw materials and packaging materials sampled for microbiological analysis like name of raw material, sampling date and time, sampling point, sampling procedure, details of sample like supplier information, batch number, receiving date/ date of manufacture, expiry date, supplier quality document, condition of the transport vehicle (or) storage area, condition of raw material etc. as per organisation standards	100	10	6	4
	PC2. document and maintain records on details of		5	3	2

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	microbiological analysis of raw materials and packaging material like storage of sample until analysis, date of microbiological analysis, method of analysis, microbiological analysis report, results and findings, recommendations etc, as per organisation standards				
	PC3. document and maintain records on deviations on microbiological standards of raw materials and packaging materials from organisation standards, and corrective actions taken		5	3	2
	PC4. load the microbiological analysis result and report on raw materials and packaging materials in ERP for future reference		5	3	2
	PC5. verify the documents and track from finished product to microbiological analysis details and report of raw materials and packaging materials, in case of quality concerns and during quality		5	3	2

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	management system audits				
	PC6. document and maintain records on details of on-line production sample drawn for microbiological analysis like production stage/sampling area (in the process line), sampling date and time, sampling procedure, details of sample, sample condition, storage of sample until analysis, date of microbiological analysis, method of analysis, microbiological analysis report, results and findings, recommendations etc. as per organisation standards		10	6	4
	PC7. document and maintain records on details of finished product and control sample drawn for microbiological analysis like name of product, sampling date and time, sampling procedure and sampling condition, batch number, date of manufacture, expiry date, label details, sample condition, storage of sample until		10	6	4

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	analysis, date of microbiological analysis, method of analysis, microbiological analysis report, results and findings, recommendations etc. as per organisation standards				
	PC8. document and maintain records on details of market complaint samples received for microbiological analysis like name of product, sampling location (in market), type of outlet, display condition, storage condition, sampling methods and sampling condition, method of transfer of sample to lab, physical condition of sample (package and product), date of manufacture, expiry date, storage of sample until analysis, date of microbiological analysis, method of analysis, microbiological analysis report, results and findings, recommendations etc. as per organisation standards		10	6	4
	PC9. document and maintain records of deviations on		5	3	2

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	microbiological standards of on-line production sample, finished product, control sample, market complaint sample from organisation standards, and corrective actions taken				
	PC10. load the microbiological analysis result and report on production sample, finished product, control sample, market complaint sample in ERP for future reference		5	3	2
	PC11. verify the documents and track microbiological analysis details and report of finished product to production sample, finished product, control sample, in case of quality concerns and during quality management system audits		5	3	2
	PC12. document and maintain records on audits carried out on housekeeping, processing area, premises etc		6	4	2
	PC13. document and maintain records on food safety system like HACCP implemented in the organisation like		7	4	3

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	critical control points identified, monitoring control points, microbiological analysis on the critical control points, deviations identifies, recommended corrective actions, corrective actions taken, report on the effectiveness of the system etc, as per the organisation standards				
	PC14. document and maintain records on food safety hygiene system like tests carried out to assess the personal hygiene of the employees, test findings, recommendations, follow up audit reports on compliance to the recommendations		7	4	3
	PC15. document and maintain records on training provided to the employees on food safety and hygiene system like date of training, attendance, group trained, training assessment, ratings on trainings etc as per organisation standards		5	3	2
			100	60	40
5. FIC/N9001 (Ensure food	PC1. comply with food safety and hygiene		5	3	2

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safety hygiene and sanitation for processing food products)	procedures followed in the organisation	100			
	PC2. ensure personal hygiene by use of gloves, hairnets, masks, ear plugs, goggles, shoes, etc.		5	1	4
	PC3. ensure hygienic production of food by inspecting raw materials, ingredients, finished products, etc. for compliance to physical, chemical and microbiological parameters		5	1	4
	PC4. ensure products are packed in appropriate packaging materials, labelled and stored in designated area, free from pests, flies and infestations		10	2	8
	PC5. ensure cleanliness in work area and processing machineries, and monitor to ensure use of processing machineries only for specified purpose		5	2	3
	PC6. use safety equipment such as fire extinguisher, first aid kit and eye-wash station when		10	2	8

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	required				
	PC7. follow housekeeping practices by having designated area for materials/tools, and ensure it is being followed		5	2	3
	PC8. follow and ensure following of industry standards like GMP, HACCP and product recall process		10	4	6
	PC9. attend training on hazard management to understand types of hazards such as physical, chemical and biological hazards and measures to control and prevent them		5	2	3
	PC10. identify, document and report problems such as rodents and pests to management		5	2	3
	PC11. conduct workplace checklist audits before and after work to ensure safety and hygiene		5	2	3
	PC12. document and maintain records on raw materials, packaging materials, process and finished products for the credibility and effectiveness of the		5	2	3

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	food safety control system				
	PC13. determine the quality of food using criteria such as odour, appearance, taste and best before date, and take immediate measures to prevent spoilage		5	2	3
	PC14. ensure storage of raw materials, finished products, allergens separately to prevent cross-contamination		5	2	3
	PC15. ensure labelling of raw materials and finished products, and storage in designated areas according to safe food practices		5	3	2
	PC16. follow and ensure storage of stock rotation based on FEFO/ FIFO		10	3	7
			100	35	65

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SECTION 2

EVIDENCE OF LEVEL

Awarding bodies will enter a proposed NSQF level for the qualification in the Qualification File Summary. This section asks for the evidence on which that proposal is based. The evidence must refer to the level descriptors of the NSQF.

NSDA recommends an approach to working out the level of qualifications which starts with the level descriptor domains (Process, Professional knowledge, Professional skill, Core skill and Responsibility: see annex A). Two variants for providing the evidence of level are offered here: Option A and Option B in the following pages. Awarding bodies should choose the option which best suits the qualification.

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OPTION B

Title/Name of qualification/component: Food Microbiologist		Level: 6	
NSQF Domain	Key requirements of the job role	How the job role relates to the NSQF level descriptors	NSQF Level
Process	A Food Microbiologist is responsible for ensuring quality of food products through microbiological analysis and monitoring of food safety and hygiene system.	<p>The job holder is expected to ensure quality of food products through microbiological analysis and monitoring food safety and hygiene system. The individual is responsible for preparing and maintaining work area, carrying out microbiological analysis of food products, monitoring food safety system, completing documentation and record keeping related to microbiological analysis of food products, ensuring food safety, hygiene and sanitation for processing food products.</p> <p>Since this does not require a command of wide ranging theoretical and practical skill, it does not qualify as a level 7 role.</p> <p>As the job demand wide range of specialized technical skills, clarity of knowledge and practice broad range of activities involving standard , non- standard practices, the job holder is expected to weigh required chemicals, solvents in calibrated instruments, prepare liquid and solid culture media, transfer the samples to microbiology lab for analysis and store following SOP until analysis, dilute samples, inoculate samples, adjust controls of microscope, perform test to identify the type and characteristics of microbes, analyze microbiological data and compare with food safety standards of the</p>	6

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		organisation, national and international regulations . Therefore, it cannot be pegged at level 5.	
Professional knowledge	A Food microbiologist on the job must be able to know and understand hygiene requirements and standards relevant to microbiology laboratory, standards and procedures followed in the organisation for cleaning and disinfecting equipment/ tools in microbiology laboratory , job responsibilities/duties to maintain lab hygiene standards , dress code to be followed , whom to approach for support in order to obtain work related instructions, clarifications and support, importance of following hygiene, safety and quality standards and the impact of not following the standards.	The job holder is expected to have factual and theoretical knowledge in broad contexts within a field of work or study. For example, the job holder is expected to have strong understanding and knowledge of principles of food microbiology and microbiology terminologies, classification, characteristics and types of micro-organisms, microbiological techniques for analysis of food products, significance of micro-organisms in preservation, production and spoilage of food. Since all the above mentioned areas are not related to wide ranging factual knowledge, this role qualifies as a level 6 role. As the job requires factual and theoretical knowledge in broad context within a field of work or study, the job holder is expected to have knowledge of microbiological techniques for analysis of food products , identification of microbes, various lab equipments for microbiological analysis and methods to handle and maintain them , production process for products produced in the organisation, quality audit methods and procedures, complex mathematical computations and use of statistical techniques to compute data, interpret results and apply to findings. Therefore, it cannot be pegged at level 5.	6
Professional skill	A Food microbiologist on the job must have some professional skills for performing the job which includes decision making, planning and organising, customer	The job holder is expected to possess a range of cognitive and practical skills required to generate solutions to specific problems in a field of work. For instance, the job holder has to support the manager in solving problems by	6

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	<p>centricity, analytical thinking, critical thinking and problem solving, for example, analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue, handle issues in case the manager is not available, plan and organize the work order and jobs received , organize raw materials and packaging materials required for all products , plan and prioritize the work based on the instructions received , plan to utilise time and equipment's effectively, organize all process/ equipment manuals so as to access information easily, support the manager in scheduling tasks for helper, understand customer requirements and their priority and respond as per their needs, support manager in solving problems by detailing out problems, discuss the possible solutions with the manager for problem solving, apply domain information about maintenance processes and technical knowledge about tools and equipment, use common sense and make judgments on day to day basis, use reasoning skills to identify and resolve basic problems, use intuition to detect any potential problems which could arise during operation, use acquired knowledge of the process for identifying and handling issues.</p>	<p>detailing out problems, discuss possible solutions with manager for problem solving, inform department supervisor in case of any deviation, suggest/recommend corrective action, identify microbiological hazards, in production process and its critical control point to minimize or prevent those hazards.</p> <p>Hence this role qualifies for a Level 6. As the job requires a range of cognitive and practical skills required to generate solutions to specific problems of field of work or study, the job holder is expected to identify food safety requirements in the food products production process based on microbial analysis results of production line, premises and food products, monitor premises of the food processing unit, processing machineries, drainage system to ensure it meets food hygiene standards of the processing unit, inform the department supervisor in case of any deviation, suggest/recommend corrective actions, discuss test reports and findings with reporting manager and department managers with possible recommendations to establish preventive control measures, share audit findings with manager, reanalyze the preventive measures based on the audit findings, and arrive at additional preventive controls to address the hazards identified.</p> <p>Therefore, it cannot be pegged at level 5.</p>	
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<p>Core skill</p>	<p>A Food microbiologist on the job should have some core skills for performing the job which includes: Writing skills, Reading skills, and Oral and Communication skill, For example, note the information communicated , note the raw materials used for production and the finished products produced, note the readings of the process parameters and provide necessary information to fill the process chart, note down observations (if any) related to the process, write information documents to internal departments/ internal teams, note down the data for online ERP or as per applicability in the organization, read and interpret the process required for producing various types of products, read and interpret and process flowchart for all products produced, read equipment manuals and process documents to understand the equipments operation and process requirement, read internal information documents sent by internal teams, discuss task lists, schedules and activities , effectively communicate with team members ,question in order to understand the nature of the problem and to clarify queries, attentively listen and comprehend the information given by the speaker, communicate clearly on the issues being faced.</p>	<p>The job holder is expected to be reasonably good in mathematical calculation, data collection, and logical communication, understand political and social environment well. For instance, s/he should be able to count the micro-organisms and colonies under the microscope and record counts, calculate the concentration of micro-organisms in original sample, compile the results of microbiological tests and prepare microbiological data, document test results, conclusions and recommendations and share with manager for immediate corrective actions, effectively communicate with team members, methods of minimizing environmental damage.</p> <p>Hence, this role qualifies for Level 6.</p> <p>As the job requires reasonably good in mathematical calculations, understanding of social, political and reasonably good in data collecting, organizing information and logical communication, the job holder is expected to read and understand SOPs for preparing culture media , read and understand sampling requirement from the production schedule and discuss with the manager on the sampling plan, read and understand sampling procedure and sample raw materials, packaging materials, online production samples, finished products, label the samples with details such as sample type, date and time of sampling, batch/manufacture /expiry details, read and understand the SOP for analysis of microbes in all types of sample , label liquid broth , solid culture media plates</p>	<p>6</p>
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		<p>with sample details, organism details and date, count the micro-organisms and colonies under the microscope and record counts, calculate the concentration of micro-organisms in original sample, document test results, conclusions and recommendations and share with manager for immediate corrective actions.</p> <p>Therefore, it cannot be pegged at level 5.</p>	
Responsibility	<p>A Food Microbiologist is responsible for ensuring quality of food products through microbiological analysis of raw materials, packaging materials, finished products, shelf-life samples and market complaint samples through microbiological procedures such as sampling, preparing culture media, sterilization of culture media, etc.</p>	<p>The job holder is responsible for his own work and learning and full responsibility for other's work and learning. S/he preparing culture media for microbiological analysis, sample for microbiological analysis, inoculate and incubate samples for microbiological analysis, estimate and calculate microbial count, analyse results and provide recommendations, ensures that the team undergoes periodic training, ensures participation of team in various engagement activities organized by the organisation, shares knowledge of processes, techniques with the team to enhance their skill levels.</p> <p>Hence, this role qualifies for Level 6.</p> <p>As the job requires Responsibility of own work and learning and full responsibility of other's work and learning, the job holder is expected to prepare and maintain work area for microbiological analysis of food products, prepare and maintain laboratory equipment for microbiological analysis of food products, prepare culture media for microbiological analysis, sample for microbiological analysis, Inoculate and incubate samples for microbiological analysis, estimate and calculate</p>	6

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		microbial count , isolate and preserve pure microbial culture, analyze results and provide recommendations. Therefore, it cannot be pegged at level 5.	
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SECTION 3 EVIDENCE OF NEED

What evidence is there that the qualification is needed?

During the industry interactions carried out while creating occupational maps and prioritization of job roles for Qualification Pack development, the mentioned qualification was indicated as a key requirement by the industry. Governing Council of FICSI shared the final approval for the development of the role. The qualification has also been validated and its need has been endorsed by leading industry players such as HPMC, Keventer agro Ltd. and other players such as Costa Coffee, Vaango, Gayatri Dairy Products, etc.

In addition, the NSDC Human Resource and Skill Requirement study has indicated a fast growth in the impulse and indulgence products in India which was around 22 percent value growth in 2013. This growth was similar to that recorded in 2012. The gradual switching of consumers to packaged products and aggressive marketing campaigns by manufacturers to attract consumers to their brand have added to the growth.

The major growth drivers are increasing per capita income, growing urbanisation and busy lifestyles, which leads to greater demand for processed food products. This increased growth has fuelled the demand for managerial roles in with respect to food regulatory affairs in order to maintain and assure the quality of production along the value chain. Industry focus on compliance and safety is increasing and there is a greater need for this qualification, especially with regards to exports where stringent quality norms are followed.

Evidence of the qualification is supported by validations with representation largely from medium and small enterprises owing to the nature of this industry. The complete list of validating companies has been enclosed as an annexure to the Q file.

What is the estimated uptake of this qualification and what is the basis of this estimate?

As per the NSDC Human Resource and Skill Requirement study, the incremental human resource requirement in Testing and Quality function is expected to be 18,56,000 till 2022. Hence the estimated uptake for this qualification is expected to show a significant increase.

What steps were taken to ensure that the qualification(s) does (do) not duplicate already existing or planned qualifications in the NSQF?

The qualification discussed above is checked for any duplication across sectors. Given the qualification is niche to Food Processing sector, there is no duplication or pre-existing similar qualifications.

The QP for this role has been compared with NCVT courses and it has been found that NCVT does not have any specific course pertaining to microbiology of food, whereas FICSI has a separate qualification pack for "Food Microbiologist" and provides training on ensuring quality of food products through microbiological analysis and monitoring of food safety and hygiene system.

This QP has been developed keeping in mind the industry requirements.

What arrangements are in place to monitor and review the qualification(s)? What data will be used and at what point will the qualification(s) be revised or updated?

The comments, feedback and suggestions were collected through interaction with industry during December '14 to August'15. The same will be compiled and justifiable changes will be

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incorporated in the next/updated version of the QP. This QP is set to be revised post 15th September, 2016.

Please attach any documents giving further information about any of the topics above. Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.

SECTION 4

EVIDENCE OF PROGRESSION

What steps have been taken in the design of this or other qualifications to ensure that there is a clear path to other qualifications in this sector?

Career path in agri sector is generally in terms of activities done & ownership of responsibility because they are primarily self-wage employment/entrepreneurship roles.

However, there are occupations in the organized segment (Agri Industries) in which career pathway has been identified as illustrated below (Annexure 1)

Please attach any documents giving further information about any of the topics above. Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.

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Annexure 1: Career Map of Food Microbiologist



Annexure 2: Qualification Pack of Food Microbiologist (separate file)

Annexure 3: List of QP/NOS validating companies (separate file)

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ANNEX A

NSQF LEVEL DESCRIPTORS

LEVEL	Process required	Professional knowledge	Professional skill	Core skill	Responsibility
1	Prepares person to/carry out process that are repetitive on regular basis require no previous practice,	Familiar with common trade terminology, instructional words, meanings and understanding.	Routine and repetitive, takes safety and security measures.	Reading and writing; addition, subtraction; personal financing; familiarity with social and religious diversity, hygiene and environment.	No responsibility; always works under continuous instruction and close supervision.
2	Prepares person to/carry out processes that are repetitive, on a regular basis, with little application of understanding, more of practice.	Material, tools and applications in a limited context, understands context of work and quality.	Limited service skills used in limited context; select and apply tools; assist in professional works with no variables; differentiate good and bad quality.	Receive and transmit written and oral messages, basic arithmetic, personal financing, understanding of social, political, and religious diversity, hygiene and environment.	No responsibility; works under instruction and close supervision.
3	Person may carry out a job which may require limited range of activities routine and predictable.	Basic facts, process and principle applied in trade of employment.	Recall and demonstrate practical skill, routine and repetitive in narrow range of application	Communication written and oral, with minimum required clarity, skill of basic arithmetic and algebraic principles, personal banking, basic understanding of social and natural environment.	Under close supervision. Some responsibility for own work within defined limit.

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LEVEL	Process required	Professional knowledge	Professional skill	Core skill	Responsibility
4	Work in familiar, predictable, routine, situation of clear choice.	Factual knowledge of field of knowledge or study.	Recall and demonstrate practical skill, routine and repetitive in narrow range of application, using appropriate rule and tool, using quality concepts.	Language to communicate written or oral, with required clarity, skill to basic arithmetic and algebraic principles, basic understanding of social political and natural environment.	Responsibility for own work and learning.
5	Job that requires well developed skill, with clear choice of procedures in familiar context.	Knowledge of facts, principles, processes and general concepts, in a field of work or study.	A range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials and information.	Desired mathematical skill; understanding of social, political; and some skill of collecting and organising information, communication.	Responsibility for own work and learning and some responsibility for others' works and learning.
6	Demands a wide range of specialised technical skill, clarity of knowledge and practice in broad range of activity involving standard and non-standard practices.	Factual and theoretical knowledge in broad contexts within a field of work or study.	A range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study.	Reasonable good in mathematical calculation, understanding of social, political and reasonably good in data collecting organising information, and logical communication.	Responsibility for own work and learning and full responsibility for other's works and learning.
7	Requires a command of wide-ranging specialised theoretical and practical skills, involving	Wide-ranging factual and theoretical knowledge in broad contexts within a field of work or	Wide range of cognitive and practical skills required to generate solutions to specific	Good logical and mathematical skill understanding of social political and natural environment and organising	Full responsibility for output of group and development.

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LEVEL	Process required	Professional knowledge	Professional skill	Core skill	Responsibility
	variable routine and non-routine contexts.	study.	problems in a field of work of study.	information, communication and presentation skill.	
8	Comprehensive, cognitive, theoretical knowledge and practical skills to develop creative solutions to abstract problems. Undertakes self-study; demonstrates intellectual independence, analytical rigour and good communication.			Exercise management and supervision in the context of work/study having unpredictable changes; responsible for the work of others.	
9	Advanced knowledge and skill. Critical understanding of the subject, demonstrating mastery and innovation, completion of substantial research and dissertation.			Responsible for decision making in complex technical activities involving unpredictable work/study situations.	
10	Highly specialised knowledge and problem solving skill to provide original contribution to knowledge through research and scholarship.			Responsible for strategic decisions in unpredictable complex situations of work/study.	

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ANNEX B

NSQF LEVEL OUTLINES

NSQF levels related to the labour market

Level 1: Work requiring knowledge, skills and aptitudes at level 1 will be routine, repetitive, and focused on limited tasks carried out under close supervision. In some sectors, people carrying out these job roles may be described as “helpers”.

Individuals in jobs which require level 1 qualifications **may** be expected to be able to read, write, add and subtract, but will not normally be required to have any previous knowledge or skills relating to the work¹.

When employed, they will be instructed in their tasks and expected to learn and use the common terminology of the trade and acquire the basic skills necessary for the work.

Job holders at this level will be expected to carry out the tasks they are given safely and securely and to use hygienic and environmentally friendly practices. This means that they will be expected to take some responsibility for their own health and safety and that of fellow workers.

In working with others, they will be expected to respect the different social and religious backgrounds of their fellow workers.

Level 2: Work requiring knowledge, skills and aptitudes at level 2 will also be routine and repetitive, and tasks will be carried out under close supervision. The individuals will not be expected to deal independently with variables which affect the carrying out of the work. People carrying out these work roles may be described as “assistants” and the range of tasks they carry out will be limited.

Individuals in jobs which require level 2 qualifications will normally be expected to be able to read and write, add and subtract. Their work may involve taking and passing on messages.

They may also be expected to have some previous experience, knowledge and skills in the occupation. When employed, they will be instructed in their tasks and expected to acquire the practical skills necessary to assist skilled workers and/or give a limited service to customers. They will learn about, and use, the materials, tools and applications required to carry out basic tasks in an occupation. They may have to select the appropriate materials, tools and/or applications to carry out tasks.

They will be expected to understand what constitutes quality in their job role and distinguish between good and bad quality in the context of the tasks they are given. Job holders at this level will be expected to carry out the tasks they are given safely and securely and to use hygienic and environmentally friendly practices. This means that they will be expected to take some responsibility for their own health and safety and that of fellow workers and, where appropriate, customers.

In working with others, they will be expected to respect the different social and religious backgrounds of their fellow workers, but their contribution to team work may be limited.

¹ In practice many workers at this level will have limited literacy and NOS and qualifications at this levels should reflect this – eg in relation to assessment.

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Level 3: Work requiring knowledge, skills and aptitudes at level 3 will be routine and predictable. Job holders will be responsible for carrying out a limited range of jobs under close supervision. Their work may require the completion of a number of related tasks. People carrying out these job roles may be described as “partly-skilled workers”.

Individuals in jobs which require level 3 qualifications will normally be expected to be able to communicate clearly in speech and writing and may be required to use arithmetic and algebraic processes. They will be expected to have previous knowledge and skills in the occupation and should know the basic facts, processes and principles applied in the trade for which they are qualified and be able to apply the basic skills of the trade to a limited range of straightforward jobs in the occupation.

They will be expected to understand what constitutes quality in their job role and more widely in the sector or sub-sector and to distinguish between good and bad quality in the context of the jobs they are given. Job holders at this level will be expected to carry out the jobs they are given safely and securely. They will work hygienically and in ways which show an understanding of environmental issues. This means that they will be expected to take responsibility for their own health and safety and that of fellow workers and, where appropriate, customers and/or clients.

In working with others, they will be expected to conduct themselves in ways which show a basic understanding of the social environment. They should be able to make a good contribution to team work.

Level 4: Work requiring knowledge, skills and aptitudes at level 4 will be carried out in familiar, predictable and routine situations. Job holders will be responsible for carrying out a range of jobs, some of which will require them to make choices about the approaches they adopt. They will be expected to learn and improve their practice on the job. People carrying out these jobs may be described as “skilled workers”.

Individuals in jobs which require level 4 qualifications should be able to communicate clearly in speech and writing and may be required to use arithmetic and algebraic processes. They will be expected to have previous knowledge and skills in the occupation in which they are employed, to appreciate the nature of the occupation and to understand and apply the rules which govern good practice. They will be able to make choices about the best way to carry out routine jobs where the choices are clear.

They will be expected to understand what constitutes quality in the occupation and will distinguish between good and bad quality in the context of their job roles. Job holders at this level will be expected to carry out their work safely and securely and take full account of the health and safety on colleagues and customers. They will work hygienically and in ways which show an understanding of environmental issues.

In working with others, they will be expected to conduct themselves in ways which show a basic understanding of the social and political environment. They should be able to guide or lead teams on work within their capability.

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Level 5: Work requiring knowledge, skills and aptitudes at level 5 will also be carried out in familiar situations, but also ones where problems may arise. Job holders will be able to make choices about the best procedures to adopt to address problems where the choices are clear.

Individuals in jobs which require level 5 qualifications will normally be responsible for the completion of their own work and expected to learn and improve their performance on the job. They will require well developed practical and cognitive skills to complete their work. They may also have some responsibility for others' work and learning. People carrying out these jobs may be described as "fully skilled workers" or "supervisors".

Individuals employed to carry out these jobs will be expected to be able to communicate clearly in speech and writing and may be required to apply mathematical processes. They should also be able to collect and organise information to communicate about the work. They will solve problems by selecting and applying methods, tools, materials and information.

They will be expected to have previous knowledge and skills in the occupation, and to know and apply facts, principles, processes and general concepts in the occupation.

They will be expected to understand what constitutes quality in the occupation and will distinguish between good and bad quality in the context of their work. They will be expected to operate hygienically and in ways which show an understanding of environmental issues. They will take account of health and safety issues as they affect the work they carry out or supervise.

In working with others, they will be expected to conduct themselves in ways which show an understanding of the social and political environment.

Level 6: Work requiring knowledge, skills and aptitudes at level 6 will require the use of both standard and non-standard practices. Job holders will carry out a broad range of work which will require a wide range of specialised technical skills backed by clear factual and theoretical knowledge.

Individuals in jobs which require level 6 qualifications will normally be responsible for the completion of their own work and expected to learn and improve their performance on the job. They are likely to have full responsibility for others' work and learning. People carrying out these jobs may be described as "master technicians" and "trainers".

Individuals employed to carry out these job roles will be expected to be able to communicate clearly in speech and writing and may be required to carry out mathematical calculations. They should also be able to collect data, organise information, and communicate logically about the work. They will solve problems by selecting and applying methods, tools, materials and information.

They will be expected to have broad factual and theoretical knowledge applying to practice within the occupation, and a range of practical and cognitive skills. They will be able to generate solutions to problems which arise in their practice.

They will be expected to understand what constitutes quality in the occupation and to distinguish between good and bad quality in the context of all aspects of their work. They will be expected to work in ways which show an understanding of environmental issues. They will take account of health and safety issues as they affect the work they carry out or manage.

In working with others, they will be expected to conduct themselves in ways which show an understanding of the social and political environment.

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Level 7: Work requiring knowledge, skills and aptitudes at level 7 will take place in contexts which combine the routine and the non-routine and are subject to variations. Job holders will carry out a broad range of work which requires wide-ranging specialised theoretical and practical skills.

Individuals in jobs which require level 7 qualifications will normally be responsible for the output and development of a work group within an organisation. People carrying out these job roles are likely to be graduates. They may be described as “managers” or “senior technicians”.

Individuals employed to carry out these job roles will be expected to be able to communicate clearly in speech and writing and are likely to be required to carry out mathematical calculations as part of their work. They should also be skilful in collecting and organising information to communicate logically about the work.

They will be expected to have wide-ranging factual and theoretical knowledge of practice within the occupation, and a wide range of specialised practical and cognitive skills. They will be able to generate solutions to problems which arise in their work.

They will be expected to understand what constitutes quality in the occupation and distinguish between good and bad quality in all aspects of their work. They will be expected to work in ways which show a good understanding of environmental issues. They will take account of health and safety issues as they affect the work they carry out and manage.

In working with others, they will be expected to conduct themselves in ways which show a good understanding of the social and political environment.

Level 8: Individuals in jobs which require level 8 qualifications will normally be responsible for managing the work of a team and developing the team. The work will involve dealing with unpredictable circumstances affecting the work.

Their work will require the use of comprehensive knowledge and understanding of the occupational field and a commitment to self-development.

They will normally need an ability to develop creative solutions to problems requiring abstract thought. They will be required to show intellectual independence and a rigorous analytical ability. They will need to be good communicators.

Level 9: Individuals in jobs which require level 9 qualifications will normally be responsible for complex decision-making in unpredictable contexts.

They will have to exercise senior responsibility in an organisation and show mastery of the issues in the occupation and the ability to innovate.

Their work will require the use of advanced knowledge and skill. They may make contributions to knowledge in their field through research.

Level 10: Job Individuals in jobs which require level 10 qualifications will normally be responsible for strategic decision-making. The context of their work will be complex and unpredictable.

They are likely to be responsible for an organisation or a significant division of an organisation. They will have to provide leadership.

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Their work will require highly specialised knowledge and problem-solving skills. They may make original contributions to knowledge in their field through research, scholarship or innovative practice.