COMPETENCY STANDARDS

MANGO PROCESSING LEVEL II

PROCESSED FOODS & BEVERAGES SECTOR

TECHNICAL EDUCATION AND SKILLS DEVELOPMENT AUTHORITY
East Service Road, South Luzon Expressway (SLEX), Taguig City, Metro Manila

Technical Education and Skills Development Act of 1994
(Republic Act No. 7796)

Section 22, "Establishment and Administration of the National Trade Skills Standards" of the RA 7796 known as the TESDA Act mandates TESDA to establish national occupational skill standards. The Authority shall develop and implement a certification and accreditation program in which private industry group and trade associations are accredited to conduct approved trade tests, and the local government units to promote such trade testing activities in their respective areas in accordance with the guidelines to be set by the Authority.

The Competency Standards (CS) serve as basis for the:

1 Institutional Competency assessment and training certification;
2 Registration and delivery of training programs; and
3 Development of curriculum and assessment instruments.

Each CS has 3 sections:

Section 1 **Definition of Competency Standards** - refers to the group of competencies that describes the different functions of the qualification.

Section 2 **The Competency Standards** - gives the specifications of competencies required for effective work performance.

Section 3 **Training Arrangements** - contains information and requirements in designing training program for competency standards. It includes trainee entry requirements, trainer's qualification and list of tools, materials and equipment.

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MANGO PROCESSING LEVEL II

COMPETENCY STANDARDS FOR MANGO PROCESSING LEVEL II

SECTION 1 COMPETENCY STANDARDS DESCRIPTION

MANGO PROCESSING LEVEL II COMPETENCY STANDARDS

The **MANGO PROCESSING LEVEL II** competency standards consists of competencies that a person must have in order to process mangoes by fermentation and pickling; process mangoes by sugar concentration and process mangoes by drying and dehydration. Inclusive to each of the aforementioned competencies, is the task of packing the processed food and operating simple packing equipment such as sealer**.** The person must also have competencies in practicing Food Safety Act 2013, cGMP, HACCP, OSHS and 7S of Good Housekeeping, including following relevant environmental rules and regulations.

It also includes competencies of a person in the production line of manufacturing processed mangoes responsible doing routinary works such as inspection of simple defects of packing materials, seal integrity and correct product label. It also comprises the calibrating, assembling and operating of basic food processing tools and equipment such as salinometer, refractometer, food processor and weighing scale.

The Units of Competency comprising this Competency Standards include the following:

Code	BASIC COMPETENCIES
400311210	Participate in workplace communication
400311211	Work in team environment
400311212	Solve/address general workplace problems
400311213	Develop career and life decisions
400311214	Contribute to workplace innovation
400311215	Present relevant information
400311216	Practice occupational safety and health policies and procedures
400311217	Exercise efficient and effective sustainable practices in the workplace
400311218	Practice entrepreneurial skills in the workplace
Code	**COMMON COMPETENCIES**
PFB751210	Apply Food Safety and Sanitation
PFB751211	Use Standard Measuring Devices / Instruments
PFB751212	Use Food Processing Tools, Equipment and Utensils
PFB751213	Perform Mathematical Computation
PFB751214	Implement Good Manufacturing Practice Procedure
PFB751215	Implement Environmental Policies and Procedures
Code	**CORE COMPETENCIES**
PBFXXXXXX	Process Mangoes by Fermentation and Pickling
PBFXXXXXX	Process Mangoes by Sugar Concentration
PBFXXXXXX	Process Mangoes by Drying and Dehydration

A person who has achieved this Competency Standards is competent to be:

- **Food Processing Worker**
- **Food Production Worker/Staff**
- **Packing Staff /Packer**
- **Quality Control Staff**

May also be known by specific products:

- **Mango processor**
- **Fruit-candy Maker**

SECTION 2 COMPETENCY STANDARDS

This section gives the details of the contents of the basic, common and core units of competency required in **MANGO PROCESSING LEVEL II.**

BASIC COMPETENCIES

UNIT OF COMPETENCY : PARTICIPATE IN WORKPLACE COMMUNICATION

UNIT CODE : 400311210

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to gather, interpret and convey information in response to workplace requirements.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE AND ATTITUDE	REQUIRED SKILLS
1. Obtain and convey workplace information	1.1 Specific and relevant information is accessed from ***appropriate sources*** 1.2 Effective questioning, active listening and speaking skills are used to gather and convey information 1.3 Appropriate ***medium*** is used to transfer information and ideas 1.4 Appropriate non-verbal communication is used 1.5 Appropriate lines of communication with supervisors and colleagues are identified and followed 1.6 Defined workplace procedures for the location and ***storage*** of information are used 1.7 Personal interaction is carried out clearly and concisely	1.1 Effective verbal and nonverbal communication 1.2 Different modes of communication 1.3 Medium of communication in the workplace 1.4 Organizational policies 1.5 Communication procedures and systems 1.6 Lines of Communication 1.7 Technology relevant to the enterprise and the individual's work responsibilities 1.8 Workplace etiquette	1.1 Following simple spoken language 1.2 Performing routine workplace duties following simple written notices 1.3 Participating in workplace meetings and discussions 1.4 Preparing work-related documents 1.5 Estimating, calculating and recording routine workplace measures 1.6 Relating/ Interacting with people of various levels in the workplace 1.7 Gathering and providing basic information in response to workplace requirements

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE AND ATTITUDE	REQUIRED SKILLS
			1.8 Basic business writing skills 1.9 Interpersonal skills in the workplace 1.10 Active-listening skills
2. Perform duties following workplace instructions	2.1 Written notices and instructions are read and interpreted in accordance with organizational guidelines 2.2 Routine written instruction are followed based on established procedures 2.3 Feedback is given to workplace supervisor based instructions/ information received 2.4 ***Workplace interactions*** are conducted in a courteous manner 2.5 Where necessary, clarifications about routine workplace procedures and matters concerning conditions of employment are sought and asked from ***appropriate sources*** 2.6 Meetings outcomes are interpreted and implemented	2.1 Effective verbal and non-verbal communication 2.2 Different modes of communication 2.3 Medium of communication in the workplace 2.4 Organizational/ Workplace policies 2.5 Communication procedures and systems 2.6 Lines of communication 2.7 Technology relevant to the enterprise and the individual's work responsibilities 2.8 Effective questioning techniques (clarifying and probing) 2.9 Workplace etiquette	2.1 Following simple spoken instructions 2.2 Performing routine workplace duties following simple written notices 2.3 Participating in workplace meetings and discussions 2.4 Completing work-related documents 2.5 Estimating, calculating and recording routine workplace measures 2.6 Relating/ Responding to people of various levels in the workplace 2.7 Gathering and providing information in response to workplace requirements 2.8 Basic questioning/querying 2.9 Skills in reading for information 2.10 Skills in locating
3. Complete relevant work related documents	3.1 Range of ***forms*** relating to conditions of employment are	3.1 Effective verbal and non-verbal communication	3.1 Completing work-related documents

ELEMENT	PERFORMANCE CRITERIA ***Italicized** terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE AND ATTITUDE	REQUIRED SKILLS
	completed accurately and legibly 3.2 Workplace data is recorded on standard workplace forms and documents 3.3 Errors in recording information on forms/ documents are identified and acted upon 3.4 Reporting requirements to supervisor are completed according to organizational guidelines	3.2 Different modes of communication 3.3 Workplace forms and documents 3.4 Organizational/ Workplace policies 3.5 Communication procedures and systems 3.6 Technology relevant to the enterprise and the individual's work responsibilities	3.2 Applying operations of addition, subtraction, division and multiplication 3.3 Gathering and providing information in response to workplace requirements 3.4 Effective record keeping skills

RANGE OF VARIABLES

VARIABLES	RANGE
1. Appropriate sources	May include: 1.1. Team members 1.2. Supervisor/Department Head 1.3. Suppliers 1.4. Trade personnel 1.5. Local government 1.6. Industry bodies
2. Medium	May include: 2.1. Memorandum 2.2. Circular 2.3. Notice 2.4. Information dissemination 2.5. Follow-up or verbal instructions 2.6. Face-to-face communication 2.7. Electronic media (disk files, cyberspace)
3. Storage	May include: 3.1. Manual filing system 3.2. Computer-based filing system
4. Workplace interactions	May include: 4.1. Face-to-face 4.2. Telephone 4.3. Electronic and two-way radio 4.4. Written including electronic means, memos, instruction and forms 4.5. Non-verbal including gestures, signals, signs and diagrams
5. Forms	May include: 5.1. HR/Personnel forms, telephone message forms, safety reports

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Prepared written communication following standard format of the organization 1.2 Accessed information using workplace communication equipment/systems 1.3 Made use of relevant terms as an aid to transfer information effectively 1.4 Conveyed information effectively adopting formal or informal communication
2. Resource Implications	**The following resources should be provided:** 2.1 Fax machine 2.2 Telephone 2.3 Notebook 2.4 Writing materials 2.5 Computer with Internet connection
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Demonstration with oral questioning 3.2 Interview 3.3 Written test 3.4 Third-party report
4. Context for Assessment	4.1 Competency may be assessed individually in the actual workplace or through an accredited institution

UNIT OF COMPETENCY : WORK IN A TEAM ENVIRONMENT

UNIT CODE : 400311211

UNIT DESCRIPTOR : This unit covers the skills, knowledge and attitudes to identify one's roles and responsibilities as a member of a team.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE AND ATTITUDE	REQUIRED SKILLS
1. Describe team role and scope	1.1 The ***role and objective of the team*** is identified from available ***sources of information*** 1.2 Team parameters, reporting relationships and responsibilities are identified from team discussions and appropriate external sources	1.1 Group structure 1.2 Group development 1.3 Sources of information	1.1 Communicating with others, appropriately consistent with the culture of the workplace 1.2 Developing ways in improving work structure and performing respective roles in the group or organization
2. Identify one's role and responsibility within a team	2.1 Individual roles and responsibilities within the team environment are identified 2.2 Roles and objectives of the team is identified from available ***sources of information*** 2.3 Team parameters, reporting relationships and responsibilities are identified based on team discussions and appropriate external sources	2.1 Team roles and objectives 2.2 Team structure and parameters 2.3 Team development 2.4 Sources of information	2.1 Communicating with others, appropriately consistent with the culture of the workplace 2.2 Developing ways in improving work structure and performing respective roles in the group or organization
3. Work as a team member	3.1 Effective and appropriate forms of communications are used and interactions undertaken with team members based on company practices. 3.2 Effective and appropriate contributions made to	3.1 Communication Process 3.2 Workplace communication protocol 3.3 Team planning and decision making 3.4 Team thinking	3.1 Communicating appropriately, consistent with the culture of the workplace 3.2 Interacting effectively with others 3.3 Deciding as an individual and as

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** *terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE AND ATTITUDE	REQUIRED SKILLS
	complement team activities and objectives, based on ***workplace context*** 3.3 Protocols in reporting are observed based on standard company practices. 3.4 Contribute to the development of team work plans based on an understanding of team's role and objectives	3.5 Team roles 3.6 Process of team development 3.7 Workplace context	a group using group think strategies and techniques 3.4 Contributing to Resolution of issues and concerns

RANGE OF VARIABLES

VARIABLE	RANGE
1. Role and objective of team	May include but not limited to: 1.1. Work activities in a team environment with enterprise or specific sector 1.2. Limited discretion, initiative and judgement maybe demonstrated on the job, either individually or in a team environment
2. Sources of information	May include but not limited to: 2.1. Standard operating and/or other workplace procedures 2.2. Job procedures 2.3. Machine/equipment manufacturer's specifications and instructions 2.4. Organizational or external personnel 2.5. Client/supplier instructions 2.6. Quality standards 2.7. OHS and environmental standards
3. Workplace context	May include but not limited to: 3.1. Work procedures and practices 3.2. Conditions of work environments 3.3. Legislation and industrial agreements 3.4. Standard work practice including the storage, safe handling and disposal of chemicals 3.5. Safety, environmental, housekeeping and quality guidelines

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Worked in a team to complete workplace activity 1.2 Worked effectively with others 1.3 Conveyed information in written or oral form 1.4 Selected and used appropriate workplace language 1.5 Followed designated work plan for the job
2. Resource Implications	**The following resources should be provided:** 2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place 2.2 Materials relevant to the proposed activity or tasks
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Role play involving the participation of individual member to the attainment of organizational goal 3.2 Case studies and scenarios as a basis for discussion of issues and strategies in teamwork 3.3 Socio-drama and socio-metric methods 3.4 Sensitivity techniques 3.5 Written Test
4. Context for Assessment	4.1 Competency may be assessed in workplace or in a simulated workplace setting 4.2 Assessment shall be observed while task are being undertaken whether individually or in group

UNIT OF COMPETENCY : SOLVE/ADDRESS GENERAL WORKPLACE PROBLEMS

UNIT COD : 400311212

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to apply problem-solving techniques to determine the origin of problems and plan for their resolution. It also includes addressing procedural problems through documentation, and referral.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE AND ATTITUDE	REQUIRED SKILLS
1. Identify routine problems	1.1 Routine **problems or procedural problem** areas are identified 1.2 Problems to be investigated are defined and determined 1.3 Current conditions of the problem are identified and documented	1.1 Current industry hardware and software products and services 1.2 Industry maintenance, service and helpdesk practices, processes and procedures 1.3 Industry standard diagnostic tools 1.4 Malfunctions and resolutions	1.1 Identifying current industry hardware and software products and services 1.2 Identifying current industry maintenance, services and helpdesk practices, processes and procedures. 1.3 Identifying current industry standard diagnostic tools 1.4 Describing common malfunctions and resolutions. 1.5 Determining the root cause of a routine malfunction

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** *terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE AND ATTITUDE	REQUIRED SKILLS
2. Look for solutions to routine problems	2.1 Potential solutions to problem are identified 2.2 Recommendations about possible solutions are developed, **documented**, ranked and presented to ***appropriate person*** for decision	2.1 Current industry hardware and software products and services 2.2 Industry service and helpdesk practices, processes and procedures 2.3 Operating systems 2.4 Industry standard diagnostic tools 2.5 Malfunctions and resolutions. 2.6 Root cause analysis	2.1 Identifying current industry hardware and software products and services 2.2 Identifying services and helpdesk practices, processes and procedures. 2.3 Identifying operating system 2.4 Identifying current industry standard diagnostic tools 2.5 Describing common malfunctions and resolutions. 2.6 Determining the root cause of a routine malfunction
3. Recommend solutions to problems	3.1 Implementation of solutions are ***planned*** 3.2 Evaluation of implemented solutions are planned 3.3 Recommended solutions are documented and submit to appropriate person for confirmation	3.1 Standard procedures 3.2 Documentation produce	3.1 Producing documentation that recommends solutions to problems 3.2 Following established procedures

RANGE OF VARIABLES

VARIABLE	RANGE
1. Problems/Procedural Problem	May include but not limited to: Routine/non – routine processes and quality problems Equipment selection, availability and failure Teamwork and work allocation problem Safety and emergency situations and incidents Work-related problems outside of own work area
2. Appropriate person	May include but not limited to: 2.1 Supervisor or manager 2.2 Peers/work colleagues 2.3 Other members of the organization
3. Document	May include but not limited to: 3.1 Electronic mail 3.2 Briefing notes 3.3 Written report 3.4 Evaluation report
4. Plan	May include but not limited to: 4.1 Priority requirements 4.2 Co-ordination and feedback requirements 4.3 Safety requirements 4.4 Risk assessment 4.5 Environmental requirements

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Determined the root cause of a routine problem 1.2 Identified solutions to procedural problems. 1.3 Produced documentation that recommends solutions to problems. 1.4 Followed established procedures. 1.5 Referred unresolved problems to support persons.
2. Resource Implications	2.1. Assessment will require access to a workplace over an extended period, or a suitable method of gathering evidence of operating ability over a range of situations.
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Case Formulation 3.2 Life Narrative Inquiry 3.3 Standardized test The unit will be assessed in a holistic manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations, which will include disruptions to normal, smooth operation. Simulation may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual workplace and will include walk through of the relevant competency components.
4. Context for Assessment	4.1 Competency may be assessed individually in the actual workplace or simulation environment in TESDA accredited institutions.

UNIT OF COMPETENCY : DEVELOP CAREER AND LIFE DECISIONS

UNIT CODE : 400311213

UNIT DESCRIPTOR : This unit covers the knowledge, skills, and attitudes in managing one's emotions, developing reflective practice, and boosting self-confidence and developing self-regulation.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE AND ATTITUDE	REQUIRED SKILLS
1. Manage one's emotion	1.1 ***Self-management strategies*** are identified 1.2 Skills to work independently and to show initiative, to be conscientious, and persevering in the face of setbacks and frustrations are developed 1.3 Techniques for effectively handling negative emotions and ***unpleasant situation*** in the workplace are examined	1.1 Self-management strategies that assist in regulating behavior and achieving personal and learning goals (e.g. Nine self-management strategies according to Robert Kelley) 1.2 Enablers and barriers in achieving personal and career goals 1.3 Techniques in handling negative emotions and unpleasant situation in the workplace such as frustration, anger, worry, anxiety, etc.	1.1 Managing properly one's emotions and recognizing situations that cannot be changed and accept them and remain professional 1.2 Developing self-discipline, working independently and showing initiative to achieve personal and career goals 1.3 Showing confidence, and resilience in the face of setbacks and frustrations and other negative emotions and unpleasant situations in the workplace
2. Develop reflective practice	2.1 Personal strengths and achievements, based on self-assessment strategies and teacher feedback are contemplated 2.2 Progress when seeking and responding to	2.1 Basic SWOT analysis 2.2 Strategies to improve one's attitude in the workplace 2.3 Gibbs' Reflective Cycle/Model (Description, Feelings,	2.1 Using the basic SWOT analysis as self-assessment strategy 2.2 Developing reflective practice through realization of limitations, likes/

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE AND ATTITUDE	REQUIRED SKILLS
	feedback from teachers to assist them in consolidating strengths, addressing weaknesses and fulfilling their potential are monitored 2.3 Outcomes of personal and academic challenges by reflecting on previous problem solving and decision making strategies and feedback from peers and teachers are predicted	Evaluation, Analysis, Conclusion, and Action plan)	dislikes; through showing of self-confidence 2.3 Demonstrating self-acceptance and being able to accept challenges
3. Boost self-confidence and develop self-regulation	3.1 Efforts for continuous self-improvement are demonstrated 3.2 Counter-productive tendencies at work are eliminated 3.3 Positive outlook in life are maintained.	3.1 Four components of self-regulation based on Self-Regulation Theory (SRT) 3.2 Personality development concepts 3.3 Self-help concepts (e. g., 7 Habits by Stephen Covey, transactional analysis, psycho-spiritual concepts)	3.1 Performing effective communication skills – reading, writing, conversing skills 3.2 Showing affective skills – flexibility, adaptability, etc. 3.3 Self-assessment for determining one's strengths and weaknesses

RANGE OF VARIABLES

VARIABLE	RANGE
1. Self-management strategies	**May include but not limited to:** 1.1 Seeking assistance in the form of job coaching or mentoring 1.2 Continuing dialogue to tackle workplace grievances 1.3 Collective negotiation/bargaining for better working conditions 1.4 Share your goals to improve with a trusted co-worker or supervisor 1.5 Make a negativity log of every instance when you catch yourself complaining to others 1.6 Make lists and schedules for necessary activities
2. Unpleasant situation	**May include but not limited to:** 2.1 Job burn-out 2.2 Drug dependence 2.3 Sulking

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Express emotions appropriately 1.2 Work independently and show initiative 1.3 Consistently demonstrate self-confidence and self-discipline
2. Resource Implications	**The following resources should be provided:** 2.1. Access to workplace and resource s 2.2. Case studies
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1. Demonstration or simulation with oral questioning 3.2. Case problems involving work improvement and sustainability issues 3.3. Third-party report
4. Context for Assessment	4.1. Competency assessment may occur in workplace or any appropriately simulated environment

UNIT OF COMPETENCY : CONTRIBUTE TO WORKPLACE INNOVATION

UNIT CODE : 400311214

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to make a pro-active and positive contribution to workplace innovation.

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify opportunities to do things better.	1.1 ***Opportunities for improvement*** are identified proactively in own area of work. 1.2 ***Information*** are gathered and reviewed which may be relevant to ideas and which might assist in gaining support for idea.	1.1 Roles of individuals in suggesting and making improvements. 1.2 Positive impacts and challenges in innovation. 1.3 Types of changes and responsibility. 1.4 Seven habits of highly effective people.	1.1 Identifying opportunities to improve and to do things better. Involvement. 1.2 Identifying the positive impacts and the challenges of change and innovation. 1.3 Identifying examples of the types of changes that are within and outside own scope of responsibility
2. Discuss and develop ideas with others	2.1 ***People who could provide input*** to ideas for improvements are identified. 2.2 Ways of approaching people to begin sharing ideas are selected. 2.3 Meeting is set with relevant people. 2.4 Ideas for follow up are review and selected based on feedback. 2.5 ***Critical inquiry method*** is used to discuss and develop ideas with others.	2.1 Roles of individuals in suggesting and making improvements. 2.2 Positive impacts and challenges in innovation. 2.3 Types of changes and responsibility. 2.4 Seven habits of highly effective people.	2.1 Identifying opportunities to improve and to do things better. Involvement. 2.2 Identifying the positive impacts and the challenges of change and innovation. 2.3 Providing examples of the types of changes that are within and outside own scope of responsibility 2.4 Communicating ideas for change through small group discussions and meetings.
3. Integrate ideas for change in the workplace	3.1 Critical inquiry method is used to integrate different ideas for change of key people. 3.2 Summarizing, analyzing and	3.1 Roles of individuals in suggesting and making improvements.	3.1 Identifying opportunities to improve and to do things better. Involvement. 3.2 Identifying the positive impacts and the

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	generalizing skills are used to extract salient points in the pool of ideas. 3.3 ***Reporting skills*** are likewise used to communicate results. 3.4 ***Current Issues and concerns*** on the systems, processes and procedures, as well as the need for simple innovative practices are identified.	3.2 Positive impacts and challenges in innovation. 3.3 Types of changes and responsibility. 3.4 Seven habits of highly effective people. 3.5 Basic research skills.	challenges of change and innovation. 3.3 Providing examples of the types of changes that are within and outside own scope of responsibility. 3.4 Communicating ideas for change through small group discussions and meetings. 3.5 Demonstrating skills in analysis and interpretation of data.

RANGE OF VARIABLES

VARIABLES	RANGE
1. Opportunities for improvement	May include: 1.1 Systems. 1.2 Processes. 1.3 Procedures. 1.4 Protocols. 1.5 Codes. 1.6 Practices.
2. Information	May include: 2.1 Workplace communication problems. 2.2 Performance evaluation results. 2.3 Team dynamics issues and concerns. 2.4 Challenges on return of investment 2.5 New tools, processes and procedures. 2.6 New people in the organization.
3. People who could provide input	May include: 3.1 Leaders. 3.2 Managers. 3.3 Specialists. 3.4 Associates. 3.5 Researchers. 3.6 Supervisors. 3.7 Staff. 3.8 Consultants (external) 3.9 People outside the organization in the same field or similar expertise/industry. 3.10 Clients
4. Critical inquiry method	May include: 4.1 Preparation. 4.2 Discussion. 4.3 Clarification of goals. 4.4 Negotiate towards a Win-Win outcome. 4.5 Agreement. 4.6 Implementation of a course of action. 4.7 Effective verbal communication. See our pages: Verbal Communication and Effective Speaking. 4.8 Listening. 4.9 Reducing misunderstandings is a key part of effective negotiation. 4.10 Rapport Building. 4.11 Problem Solving. 4.12 Decision Making. 4.13 Assertiveness. 4.14 Dealing with Difficult Situations.

VARIABLES	RANGE
5. Reporting skills	May include: 5.1 Data management. 5.2 Coding. 5.3 Data analysis and interpretation. 5.4 Coherent writing. 5.5 Speaking.

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Identified opportunities to do things better. 1.2 Discussed and developed ideas with others on how to contribute to workplace innovation. 1.3 Integrated ideas for change in the workplace. 1.4 Analyzed and reported rooms for innovation and learning in the workplace.
2. Resource Implications	The following resources should be provided: 2.1 Pens, papers and writing implements. 2.2 Cartolina. 2.3 Manila papers.
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Psychological and behavioral Interviews. 3.2 Performance Evaluation. 3.3 Life Narrative Inquiry. 3.4 Review of portfolios of evidence and third-party workplace reports of on-the-job performance. 3.5 Sensitivity analysis. 3.6 Organizational analysis. 3.7 Standardized assessment of character strengths and virtues applied.
4. Context for Assessment	4.1 Competency may be assessed individually in the actual workplace or simulation environment in TESDA accredited institutions.

UNIT OF COMPETENCY : PRESENT RELEVANT INFORMATION

UNIT CODE : 400311215

UNIT DESCRIPTOR : This unit of covers the knowledge, skills and attitudes required to present data/information appropriately.

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Gather data/ information	1.1 Evidence, facts and information are collected 1.2 Evaluation, terms of reference and conditions are reviewed to determine whether data/information falls within project scope	1.1 Organisational protocols 1.2 Confidentiality 1.3 Accuracy 1.4 Business mathematics and statistics 1.5 Data analysis techniques/procedures 1.6 Reporting requirements to a range of audiences 1.7 Legislation, policy and procedures relating to the conduct of evaluations 1.8 Organisational values, ethics and codes of conduct	1.1 Describing organisational protocols relating to client liaison 1.2 Protecting confidentiality 1.3 Describing accuracy 1.4 Computing business mathematics and statistics 1.5 Describing data analysis techniques/ procedures 1.6 Reporting requirements to a range of audiences 1.7 Stating legislation, policy and procedures relating to the conduct of evaluations 1.8 Stating organisational values, ethics and codes of conduct

ELEMENTS	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Assess gathered data/ information	2.1 Validity of data/ information is assessed 2.2 Analysis techniques are applied to assess data/ information. 2.3 Trends and anomalies are identified 2.4 ***Data analysis techniques*** and procedures are documented 2.5 Recommendations are made on areas of possible improvement.	2.1 Business mathematics and statistics 2.2 Data analysis techniques/ procedures 2.3 Reporting requirements to a range of audiences 2.4 Legislation, policy and procedures relating to the conduct of evaluations 2.5 Organisational values, ethics and codes of conduct	2.1 Computing business mathematics and statistics 2.2 Describing data analysis techniques/ procedures 2.3 Reporting requirements to a range of audiences 2.4 Stating legislation, policy and procedures relating to the conduct of evaluations 2.5 Stating organisational values, ethics and codes of conduct
3. Record and present information	3.1 Studied data/information are recorded. 3.2 Recommendations are analysed for action to ensure they are compatible with the project's scope and terms of reference. 3.3 Interim and final reports are analysed and outcomes are compared to the criteria established at the outset. 3.4 Findings are presented to stakeholders.	3.1 Data analysis techniques/ procedures 3.2 Reporting requirements to a range of audiences 3.3 Legislation, policy and procedures relating to the conduct of evaluations 3.4 Organisational values, ethics and codes of conduct	3.1 Describing data analysis techniques/ procedures 3.2 Reporting requirements to a range of audiences 3.3 Stating legislation, policy and procedures relating to the conduct of evaluations 3.4 Stating organisational values, ethics and codes of conduct practices

RANGE OF VARIABLES

VARIABLES	RANGE
1. Data analysis techniques	May include but not limited to: 1.1. Domain analysis 1.2. Content analysis 1.3. Comparison technique

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Determine data / information 1.2 Studied and applied gathered data/information 1.3 Recorded and studied studied data/information These aspects may be best assessed using a range of scenarios what ifs as a stimulus with a walk through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations that may have happened.
2. Resource Implications	**Specific resources for assessment** 2.1 Evidence of competent performance should be obtained by observing an individual in an information management role within the workplace or operational or simulated environment.
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Written Test 3.2 Interview 3.3 Portfolio The unit will be assessed in a holistic manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations, which will include disruptions to normal, smooth operation. Simulation may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual workplace and will include walk through of the relevant competency components.
4. Context for Assessment	4.1 In all workplace, it may be appropriate to assess this unit concurrently with relevant teamwork or operation units.

UNIT OF COMPETENCY : PRACTICE OCCUPATIONAL SAFETY AND HEALTH POLICIES AND PROCEDURES

UNIT CODE : 400311216

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to identify OSH compliance requirements, prepare OSH requirements for compliance, perform tasks in accordance with relevant OSH policies and procedures

ELEMENTS	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify OSH compliance requirements	1.1 Relevant ***OSH requirements, regulations, policies and procedures*** are identified in accordance with workplace policies and procedures 1.2 OSH activity non-conformities are conveyed to ***appropriate personnel*** 1.3 ***OSH preventive and control requirements*** are identified in accordance with OSH work policies and procedures	1.1. OSH preventive and control requirements 1.2. Hierarchy of Controls 1.3. Hazard Prevention and Control 1.4. General OSH principles 1.5. Work standards and procedures 1.6. Safe handling procedures of tools, equipment and materials 1.7. Standard emergency plan and procedures in the workplace	1.1. Communication skills 1.2. Interpersonal skills 1.3. Critical thinking skills 1.4. Observation skills
2. Prepare OSH requirements for compliance	2.1 OSH work activity material, tools and equipment requirements are identified in accordance with workplace policies and procedures 2.2. Required OSH materials, tools and equipment are acquired in accordance with	2.1. Resources necessary to execute hierarchy of controls 2.2. General OSH principles 2.3. Work standards and procedures 2.4. Safe handling procedures of tools, equipment and materials 2.5. Different OSH control measures	2.1. Communication skills 2.2. Estimation skills 2.3. Interpersonal skills 2.4. Critical thinking skills 2.5. Observation skills 2.6. Material, tool and equipment identification skills

ELEMENTS	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	workplace policies and procedures 2.3. Required OSH materials, tools and equipment are arranged/ placed in accordance with OSH work standards		
3. Perform tasks in accordance with relevant OSH policies and procedures	3.1 Relevant OSH work procedures are identified in accordance with workplace policies and procedures 3.2 Work Activities are executed in accordance with OSH work standards 3.3 ***Non-compliance work activities*** are reported to *appropriate personnel*	3.1. OSH work standards 3.2. Industry related work activities 3.3. General OSH principles 3.4. OSH Violations Non-compliance work activities	3.1 Communication skills 3.3 Interpersonal skills 3.4 Troubleshooting skills 3.5 Critical thinking skills 3.6 Observation skills

RANGE OF VARIABLES

VARIABLE	RANGE
1. OSH Requirements, Regulations, Policies and Procedures	May include: 1.1 Clean Air Act 1.2 Building code 1.3 National Electrical and Fire Safety Codes 1.4 Waste management statutes and rules 1.5 Permit to Operate 1.6 Philippine Occupational Safety and Health Standards 1.7 Department Order No. 13 (Construction Safety and Health) 1.8 ECC regulations
2. Appropriate Personnel	May include: 2.1 Manager 2.2 Safety Officer 2.3 EHS Offices 2.4 Supervisors 2.5 Team Leaders 2.6 Administrators 2.7 Stakeholders 2.8 Government Official 2.9 Key Personnel 2.10 Specialists 2.11 Himself
3. OSH Preventive and Control Requirements	May include: 3.1 Resources needed for removing hazard effectively 3.2 Resources needed for substitution or replacement 3.3 Resources needed to establishing engineering controls 3.4 Resources needed for enforcing administrative controls 3.5 Personal Protective equipment
4. Non OSH-Compliance Work Activities	May include non-compliance or observance of the following safety measures: 4.1 Violations that may lead to serious physical harm or death 4.2 Fall Protection 4.3 Hazard Communication 4.4 Respiratory Protection 4.5 Power Industrial Trucks 4.6 Lockout/Tag-out 4.7 Working at heights (use of ladder, scaffolding) 4.8 Electrical Wiring Methods 4.9 Machine Guarding 4.10 Electrical General Requirements 4.11 Asbestos work requirements 4.12 Excavations work requirements

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1. Convey OSH work non-conformities to appropriate personnel 1.2. Identify OSH preventive and control requirements in accordance with OSH work policies and procedures 1.3. Identify OSH work activity material, tools and equipment requirements in accordance with workplace policies and procedures 1.4. Arrange/Place required OSH materials, tools and equipment in accordance with OSH work standards 1.5. Execute work activities in accordance with OSH work standards 1.6. Report OSH activity non-compliance work activities to appropriate personnel
2. Resource Implications	**The following resources should be provided:** 2.1 Facilities, materials tools and equipment necessary for the activity
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Observation/Demonstration with oral questioning 3.2 Third party report
4. Context for Assessment	4.1 Competency may be assessed in the work place or in a simulated work place setting

UNIT OF COMPETENCY : EXERCISE EFFICIENT AND EFFECTIVE SUSTAINABLE PRACTICES IN THE WORKPLACE

UNIT CODE : 400311217

UNIT DESCRIPTOR : This unit covers knowledge, skills and attitude to identify the efficiency and effectiveness of resource utilization, determine causes of inefficiency and/or ineffectiveness of resource utilization and Convey inefficient and ineffective environmental practices

ELEMENTS	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify the efficiency and effectiveness of resource utilization	1.1 Required resource utilization in the workplace is measured using appropriate techniques 1.2 Data are recorded in accordance with workplace protocol 1.3 Recorded data are compared to determine the efficiency and effectiveness of resource utilization according to established ***environmental work procedures***	1.1. Importance of Environmental Literacy 1.2. Environmental Work Procedures 1.3. Waste Minimization 1.4. Efficient Energy Consumptions	1.1 Recording Skills 1.2 Writing Skills 1.3 Innovation Skills
2. Determine causes of inefficiency and/or ineffectiveness of resource utilization	2.1 Potential causes of inefficiency and/or ineffectiveness are listed 2.2 Causes of inefficiency and/or ineffectiveness are identified through deductive reasoning 2.3 Identified causes of inefficiency and/or ineffectiveness are validated thru established environmental procedures	2.1 Causes of environmental inefficiencies and ineffectiveness	2.1 Deductive Reasoning Skills 2.2 Critical thinking 2.3 Problem Solving 2.4 Observation Skills
3. Convey inefficient and ineffective environmental practices	3.1 Efficiency and effectiveness of resource utilization are reported to	3.1 Appropriate Personnel to address the environmental hazards	3.1 Written and Oral Communication Skills 3.2 Critical thinking

	appropriate personnel 3.2 Concerns related resource utilization are discussed with appropriate personnel 3.3 Feedback on information/ concerns raised are clarified with appropriate personnel	3.2 Environmental corrective actions	3.3 Problem Solving 3.4 Observation Skills 3.5 Practice Environmental Awareness

RANGE OF VARIABLES

VARIABLE	RANGE
1. Environmental Work Procedures	May include: 1.1 Utilization of Energy, Water, Fuel Procedures 1.2 Waster Segregation Procedures 1.3 Waste Disposal and Reuse Procedures 1.4 Waste Collection Procedures 1.5 Usage of Hazardous Materials Procedures 1.6 Chemical Application Procedures 1.7 Labeling Procedures
2. Appropriate Personnel	May include: 2.1 Manager 2.2 Safety Officer 2.3 EHS Offices 2.4 Supervisors 2.5 Team Leaders 2.6 Administrators 2.7 Stakeholders 2.8 Government Official 2.9 Key Personnel 2.10 Specialists 2.11 Himself

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Measured required resource utilization in the workplace using appropriate techniques 1.2 Recorded data in accordance with workplace protocol 1.3 Identified causes of inefficiency and/or ineffectiveness through deductive reasoning 1.4 Validate the identified causes of inefficiency and/or ineffectiveness thru established environmental procedures 1.5 Report efficiency and effectives of resource utilization to appropriate personnel 1.6 Clarify feedback on information/concerns raised with appropriate personnel
2. Resource Implications	**The following resources should be provided:** 2.1 Workplace 2.2 Tools, materials and equipment relevant to the tasks 2.3 PPE 2.4 Manuals and references
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Demonstration 3.2 Oral questioning 3.3 Written examination
4. Context for Assessment	4.1 Competency assessment may occur in workplace or any appropriately simulated environment 4.2 Assessment shall be observed while task are being undertaken whether individually or in-group

UNIT OF COMPETENCY : PRACTICE ENTREPRENEURIAL SKILLS IN THE WORKPLACE

UNIT CODE : 400311218

UNIT DESCRIPTOR : This unit covers the outcomes required to apply entrepreneurial workplace best practices and implement cost-effective operations

ELEMENTS	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Apply entrepreneurial workplace best practices	1.1 ***Good practices*** relating to workplace operations are observed and selected following workplace policy. 1.2 Quality procedures and practices are complied with according to workplace requirements. 1.3 Cost-conscious habits in ***resource utilization*** are applied based on industry standards.	1.1 Workplace best practices, policies and criteria 1.2 Resource utilization 1.3Ways in fostering entrepreneurial attitudes: 1.3.1 Patience 1.3.2 Honesty 1.3.3 Quality-consciousness 1.3.4 Safety-consciousness 1.3.5 Resourcefulness	1.1 Communication skills 1.2 Complying with quality procedures
2. Communicate entrepreneurial workplace best practices	2.1 Observed good practices relating to workplace operations are communicated to ***appropriate person***. 2.2 Observed quality procedures and practices are communicated to appropriate person 2.3 Cost-conscious habits in resource utilization are communicated based on industry standards.	2.1 Workplace best practices, policies and criteria 2.2 Resource utilization 2.3 Ways in fostering entrepreneurial attitudes: 2.3.1 Patience 2.3.2 Honesty 2.3.3 Quality-consciousness	2.1 Communication skills 2.2 Complying with quality procedures 2.3 Following workplace communication protocol

		2.3.4 Safety-consciousness 2.3.5 Resourcefulness	
3. Implement cost-effective operations	3.1 Preservation and optimization of workplace resources is implemented in accordance with enterprise policy 3.2 Judicious use of workplace tools, equipment and materials are observed according to manual and work requirements. 3.3 Constructive contributions to office operations are made according to enterprise requirements. 3.4 Ability to work within one's allotted time and finances is sustained.	3.1 Optimization of workplace resources 3.2 5S procedures and concepts 3.3 Criteria for cost-effectiveness 3.4 Workplace productivity 3.5 Impact of entrepreneurial mindset to workplace productivity 3.6 Ways in fostering entrepreneurial attitudes: 4. Quality-consciousness 5. Safety-consciousness	3.1 Implementing preservation and optimizing workplace resources 3.2 Observing judicious use of workplace tools, equipment and materials 3.3 Making constructive contributions to office operations 3.4 Sustaining ability to work within allotted time and finances

RANGE OF VARIABLES

VARIABLE	RANGE
1.Good practices	May include: 1.1 Economy in use of resources 1.2 Documentation of quality practices
2.Resources utilization	May include: 2.1 Consumption/ use of consumables 2.2 Use/Maintenance of assigned equipment and furniture 2.3 Optimum use of allotted /available time

EVIDENCE GUIDE

3.1 Critical aspects of competency	**Assessment requires evidence that the candidate:** 1.1 Demonstrated ability to identify and sustain cost-effective activities in the workplace 1.2 Demonstrated ability to practice entrepreneurial knowledge, skills and attitudes in the workplace.
3.2 Resource Implications	The following resources should be provided: 2.1 Simulated or actual workplace 2.2 Tools, materials and supplies needed to demonstrate the required tasks 2.3 References and manuals 2.3.1 Enterprise procedures manuals 2.3.2 Company quality policy
3.3 Methods of Assessment	**Competency in this unit should be assessed through:** 3.1 Interview 3.2 Third-party report
4.Context of Assessment	4.1 Competency may be assessed in workplace or in a simulated workplace setting 4.2 Assessment shall be observed while tasks are being undertaken whether individually or in-group

COMMON COMPETENCIES

UNIT OF COMPETENCY : APPLY FOOD SAFETY AND SANITATION

UNIT CODE : PFB751210

UNIT DESCRIPTOR : This unit covers skills and attitude required to apply food safety and sanitation in the workplace

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Wear Personal Protective Equipment	1.1 Personal protective equipment are checked according to ***manufacturer's specifications*** 1.2 Personal protective equipment are worn according to the job requirement	1.1 Personal protective equipment (PPE) 1.2 Procedures in wearing in PPE 1.3 Good Food Manufacturing Practices 1.4 Parts and functions of personal protective equipment	1.1 Checking PPE 1.2 Practicing GMP
2. Observe Personal Hygiene and Good Grooming	2.1 Personal hygiene and good grooming is practiced in line with ***workplace health and safety requirements***	2.1 Good grooming and personal hygiene 2.2 Workplace health and safety requirements	2.1 Practicing good grooming and personal hygiene practices
3. Implement Food Sanitation Practices	3.1 Sanitary food handling practices are implemented in line with workplace sanitation regulations 3.2 Safety measures are observed in line with workplace safety practices.	3.1 Proper waste disposal 3.2 Environmental protection and concerns 3.3 Food safety principles and practices 3.4 TQM and other food quality system principles	3.1 Managing wastes 3.2 Implementing sanitary food handling practices 3.3 Practicing workplace safety

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
4. Render Safety Measures and First Aid Procedures	4.1 ***Safety measures*** are applied according to workplace rules and regulations 4.2 ***First aid procedures*** are applied and coordinated with concerned personnel according to workplace standard operating procedures.	4.1 First aid procedures 4.2 Parts and functions of personal protective equipment 4.3 First Aid Kit	4.1 Applying safety measures 4.2 Applying first aid treatment 4.3 Practicing PPE 4.4 Coordinating with concerned personnel
5. Implement housekeeping activities	5.1 Work area and surroundings are cleaned in accordance with workplace health and safety regulations 5.1 Waste is disposed according to organization's waste disposal system 5.2 ***Hazards*** in the work area are recognized and reported to designated personnel according to workplace procedures	5.1 Hazards in work area 5.2 Waste disposal 5.3 Housekeeping / 7's 5.4 Proper waste disposal	5.1 Implementing housekeeping activities 5.2 Practicing proper waste disposal 5.3 Coordination skills

RANGE OF VARIABLES

VARIABLE	RANGE
1. Manufacturer's Specifications	**Manufacturer's specifications may include but not limited to:** 1.1 Handling 1.2 Operating 1.3 Discharge Label 1.4 Reporting 1.5 Testing 1.6 Positioning 1.7 Refilling
2. Personal Protective Equipment	**Personal Protective Equipment may include but not limited to:** 2.1 Apron/laboratory gown 2.2 Mouth masks 2.3 Gloves 2.4 Rubber boots/safety shoes 2.5 Head gears such as caps, hair nets, earl plug
3. Workplace Health and Safety Requirements	**Workplace and Safety Requirements may include:** 3.1 Health/Medical Certificate 3.2 DOLE requirements 3.3 BFAD requirements 3.4 Personal Hygiene and good grooming 3.5 Plant Sanitation and waste management
4. Safety Measures	**Safety measures may include but not limited to:** 4.1 Labeling of chemicals and other sanitizing agents 4.2 Installation of firefighting equipment in the work area 4.3 Installation of safety signage and symbols 4.4 Implementation of 5S in the work area 4.5 Removal of combustible material in the work area
5. First Aid Procedures	**First Aid Procedures may include but not limited to:** 5.1 Mouth to mouth resuscitation 5.2 CPR 5.3 Application of tourniquet 5.4 Applying pressure to bleeding wounds or cuts 5.5 First aid treatment for burned victims
6. Hazards	**Hazards in the workplace may include but not limited to:** 6.1 Physical 6.2 Biological 6.3 Chemical

EVIDENCE GUIDE

1. Critical aspects of competency	**Assessment requires evidence that the candidate:** 1.1 Cleaned, checked and sanitized personal protective equipment 1.2 Practiced proper personal hygiene and good grooming 1.3 Implemented workplace food safety practices 1.4 Applied first aid measures to victims 1.5 Implemented good housekeeping activities in the work area
2. Resource implications	**The following resources MUST be provided:** 2.1 Work area/station 2.2 First Aid kit 2.3 PPE relevant to the activities 2.4 Fire extinguisher 2.5 Stretcher 2.6 Materials, tools and equipment relevant to the unit of competency
3. Method of assessment	**Competency may be assessed through:** 3.1 A combination of direct observation and questioning of a candidate processing foods.
4. Context of assessment	4.1 Assessment should occur on the job or in a simulated workplace

UNIT OF COMPETENCY : USE STANDARD MEASURING DEVICES AND INSTRUMENTS

UNIT CODE : PFB751211

UNIT DESCRIPTOR : This unit covers skills and attitude required to use standard measuring devices, instruments in the workplace

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify Standard Measuring Devices and Instruments	1.1 ***Standard measuring devices and instruments*** are identified according to manufacturer's specifications 1.2 Devices and instruments for measuring are properly checked, sanitized and calibrated prior to use	1.1 Safe handling of measuring devices and instruments 1.2 Specifications and functions of measuring devices and instruments 1.3 Defects and breakages of measuring devices and instruments 1.4 Procedures in sanitizing and calibrating and stowing equipment and instruments	1.1 Communication skills 1.2 Sanitary handling of devices and instruments 1.3 Calibrating skills
2. Review the Procedures in Using Standard Measuring Devices and Instruments	2.1 Procedures in using the ***standard measuring devices*** and instruments are recalled according to manufacturer's specifications 2.2 Printed procedures/ brochures/ catalogues are consulted according to specified ***food processing methods***	2.1 Procedures in using different standard measuring devices 2.2 Different food processing methods	2.1 Reading and following printed manuals and brochures 2.2 Using standard measuring devices

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Follow Procedures of Using Measuring Devices and Instruments	3.1 Methods/practices of using measuring devices and instruments are strictly observed according to manufacturer's specifications and workplace requirements 3.2 Measuring devices and instruments are cleaned, wiped dry and stowed after use to ensure conformity with workplace requirements	3.1 Methods/practice of using measuring devices and instruments 3.2 Procedures in cleaning, and stowing equipment and instruments	3.1 Applying methods/practices in using measuring devices and instruments 3.2 Cleaning and stowing measuring devices and instruments

RANGE OF VARIABLES

VARIABLE	RANGE
1. Standard Measuring Devices	**Standard Measuring Devices may include but not limited to the following:** 1.1 Weighing scales and balances of various capacities and sensitivities 1.2 Measuring cups of varying capacities for dry ingredients 1.3 Measuring cups of varying capacities for liquid ingredients
2. Standard Measuring Instruments	**Standard Measuring Instruments may include but not limited to the following:** 2.1 Salinometer 2.2 Thermometers of varying temperature range (0-300 C) 2.3 Refractometer of varying range (0 – 90 B) 2.4 Glasswares like cylinders, beakers, flasks) of varying graduations
3. Food Processing Methods	**Food Processing Methods include the following:** 3.1 Process foods by Salting, Curing and Smoking 3.2 Process foods by Fermentation and Pickling 3.3 Process foods by Canning and Bottling 3.4 Process foods by Sugar Concentration 3.5 Process foods by Drying and Dehydration

EVIDENCE GUIDE

1. Critical aspects of competency	**Assessment requires evidence that the candidate:** 1.1 Identified, prepared and calibrated standard measuring devices and instruments 1.2 Followed correctly the procedures in using standard measuring devices and instruments 1.3 Followed proper cleaning and sanitizing and stowing procedures of measuring devices and equipment before and after use
2. Resource implications	**The following resources MUST be provided:** 2.1 Work area/station 2.2 Materials, tools and equipment relevant to the Unit of Competency
3. Method of assessment	**Competency may be assessed through:** 3.1 Direct observation and questioning of a candidate using measuring devices and instruments
4. Context of assessment	4.1 Assessment should occur on the job or in a simulated workplace

UNIT OF COMPETENCY : USE FOOD PROCESSING TOOLS, EQUIPMENT AND UTENSILS

UNIT CODE : PFB751212

UNIT DESCRIPTOR : This unit covers skills and attitude required to operate food processing tools, equipment and instruments in the workplace.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** **are elaborated in the Range of Variables**	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Perform pre-operation activities	1.1 Appropriate tools and equipment/utensils are assembled according to ***food processing method*** 1.2 ***Food processing tools and equipment/utensils*** are inspected and checked according to manufacturer's specifications 1.3 Food processing equipment is set up, adjusted and readied according to job requirements	1.1 Procedures in assembling equipment/utensils 1.2 Methods in inspecting food processing tools and equipment / utensils 1.3 Procedures in setting-up and adjusting equipment 1.4 Equipment, tools and instruments: Parts and Functions 1.5 Written and oral communication 1.6 Interpreting manufacturer's specifications Following manufacturer's manual	1.1 Assembling equipment/ utensils 1.2 Inspecting and checking condition of equipment/ machines 1.3 Setting-up and adjusting food processing equipment 1.4 Reporting equipment/ machine, tools, instruments breakdown and recording same in standard forms 1.5 Communication skills

2. Operate food processing equipment	1.1 Food processing equipment is switched on according to ***manufacturer's specifications*** 1.2 Performance of food processing equipment is checked to ensure conformity with specified output 1.3 Operation of food processing equipment is managed to achieve planned outcomes 1.4 Minor trouble shooting on food processing tools, equipment and utensils is performed when necessary	2.1 Procedures on operating food processing equipment 2.2 Inspection of equipment with conformity with required output 2.3 Equipment/ machine wear and tear process 2.4 Minor trouble shooting of food processing tools, equipment and utensils 2.5 Following manufacturer's manual 2.6 PPE 2.7 OSHS	2.1 Inspecting and checking condition of equipment/ machines 2.2 Performing minor troubleshooting

3.Perform post-operation activities	3.1 Food processing equipment is switched off and unplugged after operation in accordance with manufacturer's specifications 3.2 Food processing tools, equipment and instruments are cleaned, sanitized and stowed as required according to manufacturer's specifications and workplace policies and regulations 3.3 ***Minor preventive maintenance*** on equipment is performed in line with organization's maintenance system 3.4 Main machine parts are inspected and checked in line with organization's policy 3.5 ***Condition of machine*** is monitored to ensure serviceability in accordance with workplace rules and regulations	3.1 Procedures of shutting down food processing equipment 3.2 Inspection machine main parts 3.3 Main machine parts 3.4 Minor preventive maintenance 3.5 Monitoring procedures for condition of machine 3.6 Monitoring checklist 3.7 PPE 3.8 OSHS 3.9 Environmental rules and regulations 3.10 Sanitizing agents: Uses and Specification 3.11 Proper cleaning and stowing of tools and equipment/ instruments	3.1 Shutting down food processing equipment 3.2 Sanitizing, cleaning and stowing measuring devices and instruments 3.3 Checking main machine parts 3.4 Performing minor preventive maintenance 3.5 Monitoring machine condition 3.6 Accomplishing monitoring checklist 3.7 Wearing PPE 3.8 Applying OSHS 3.9 Performing regular maintenance

RANGE OF VARIABLES

VARIABLES	RANGE
1. Food processing methods	**Food Processing Methods include:** 1.1 Salting 1.2 Curing 1.3 Smoking 1.4 Fermentation 1.5 Pickling 1.6 Canning 1.7 Bottling 1.8 Sugar concentration 1.9 Drying 1.10 Dehydration
2. Food processing tools, equipment and utensils	**Tools, equipment and utensils may include but not limited to:** **2.1 Tools** o Cutting implements such as: o Knives o Slicer o Vegetable cutter o Cutter o Peeler o Measuring spoons and cups o Scalers o wire basket o Blow torch o steam jacketed kettle o lifter o Exhaust box o Cooking tools like: o Syringe and needle o Saucepans o Non-stick pan o Containers for Fermentation o large stoneware crocks o food-grade plastic containers o large glass jars o a heavy plate or glass lid that fits down inside the container

VARIABLES	RANGE
	2.2 Equipment, o Cold storage equipment like: o refrigerators o Chiller o Freezer o Oven o Smoke house o Pressure cooker o Food processor o Plastic protect cap sealer o Sealers (can & plastic) o wheelers o Jack lifts o Stove/burner o Soaking vat o Tumbler o Meat grinder/chopper o Octo clam o Meat slicer o Trolleys o Sausage stuffer o Impulse sealer o Vacuum packaging machine o blanching machine o Machine sealer o Fermentation vat o Soaking container o Sterilizer mixer o Grinder o Enamel kettle/vat **2.3 Apparatus/Instruments** o Salinometer o Polyscalers o Weighing scales of varying capacities & sensitivities o Refractometer o Jelly thermometer o Politer o Candy thermometer **2.4 Utensils** o Kitchen utensils like: o Casserole o Colanders o Food tongs o Wooden ladle o Chopping boards o Mixing bowls o Spoon ladder o Wooden spoon o Bowls made from: o Stoneware o Aluminum o Unchipped enamelware. o Glass o Stainless steel o Funnel o Strainer o Strainers o Exhauster o Juice extractor o Steamer o Basting spoons paddle o Sorting tray o Smoking trays o Utility trays o Food tray
3. Manufacturer's specifications	**Manufacturer's specifications may include but not limited to:** 3.1 Handling requirements 3.2 Operating requirements

VARIABLES	RANGE
	3.3 Discharge Label 3.4 Reporting 3.5 Testing 3.6 Positioning 3.7 Refilling
4. Minor preventive machine maintenance	**Minor Preventive Machine Maintenance may include but not limited to checking of the following:** 4.1 Machine temperature 4.2 Hydraulic fluid 4.3 Wear and surface condition 4.4 Crack 4.5 Leak detection 4.6 Vibration 4.7 Corrosion/erosion 4.8 Electric insulation
5. Condition of machine	5.1 Serviceable 5.2 Repairable 5.3 Defective

EVIDENCE GUIDE

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Assembled, inspected, checked and sanitized appropriate tools and equipment/instruments 1.2 Set-up, adjusted and readied tools and equipment and instruments according to requirements 1.3 Operated and monitored performance of equipment to ensure specified output 1.4 Performed post operation activities 1.5 Performed minor trouble shooting on food processing tools, equipment and utensils
2. Methods of Assessment	**Competency in this unit must be assessed through**: 2.1 Direct observation and questioning of a candidate operating food processing tools and equipment/instruments 2.2 Submission of written report on the performance and condition of equipment/machine, tools, instruments used.
3. Resource Implications	**The following resources must be provided:** 3.1 Work area/station 3.2 Materials, tools and equipment relevant to the Unit of Competency
4. Context of Assessment	4.1 Assessment should occur on the job or in a simulated workplace

UNIT OF COMPETENCY : PERFORM MATHEMATICAL COMPUTATIONS

UNIT CODE : PFB751213

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitude to perform mathematical computations in the workplace.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Gather and tabulate the recorded data	1.1 Records of ***weights and measurements*** of raw materials and ingredients are gathered and summarized according to workplace standard operating procedures 1.2 Records of weights and measurements of finished processed products are gathered and summarized according to workplace standard operating procedures 1.3 Summarized data are tabulated according to enterprise requirements	1.1 Data gathering 1.2 Record keeping 1.3 Data summary and analysis 1.4 Basic Mathematical Operations	1.1 Gathering data 1.2 Keeping of records 1.3 Summarizing and analyzing data 1.4 Basic Mathematical skills 1.5 Basic Accounting skills
2. Review the various formulations	2.1 Raw materials and ingredients and percentage formulations are checked/counter checked according to approved specifications and enterprise requirements 2.2 Finished products and percentage formulations are reviewed according to approved specifications and enterprise requirements	2.1 Percentages and formulations of raw materials and ingredient and finished products 2.2 Procedures in checking raw materials and finished products formulation and percentages 2.3 Basic Mathematical Operations	2.1 Checking percentages formulations of raw materials and ingredient 2.2 Reviewing percentages and formulations of finished products 2.3 Numeracy skills

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Calculate production input and output	3.1 Data on raw material consumption and corresponding percentage equivalent are calculated in line with enterprise requirements 3.2 Data on actual spoilage and rejects and corresponding percentage equivalents are calculated according to enterprise requirements 3.3 Data on actual yields and recoveries and corresponding percentage equivalents are calculated according to enterprise requirements 3.4 All calculated data are recorded according to enterprise requirements	3.1 Record keeping 3.2 Mensuration 3.3 Fraction, ratios and proportions 3.4 Basic Mathematical Operations 3.5 Conversion factors 3.6 Percentage formulation	3.1 Basic Mathematical skills 3.2 Recording skills
4. Compute production cost	4.1 ***Costs of production*** are computed according to organization's standard procedures 4.2 Computed costs of production are reviewed and validated according to organization's production requirements	4.1 Cost of production 4.2 Validation procedures for computer costs 4.3 Basic Mathematical Operations	4.1 Basic Mathematical skills 4.2 Basic Accounting skills 4.3 Reviewing and validating computed costs

RANGE OF VARIABLES

VARIABLES	RANGE
1. Weights and measurements	**Weights and measurements may include:** 1.1 Gravimetric 1.2 Volumetric 1.3 Lengths, diameters, widths 1.4 Seam measurements 1.5 Hotness/coldness (temperature) 1.6 Concentrations of solutions
2. Costs of production	**Costs of production are computed using the following:** 2.1 Ingredient formulation 2.2 Percentage formulation 2.3 Conversion 2.4 Ratios and proportion 2.5 Spoilage and rejects and corresponding percentages 2.6 Recoveries and yields and corresponding percentages

EVIDENCE GUIDE

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate:** 2.1 Gathered the records of weights and measurements of raw materials/ingredients and finished processed products 2.2 Summarized and tabulated all raw data gathered 2.3 Calculated the production inputs and outputs 2.4 Computed the costs of production 2.5 Reviewed all formulations and concentrations of solutions according to specifications and standards of the enterprise
2. Methods of Assessment	**Competency in this unit must be assessed through:** 2.1 A combination of direct observation and questioning of a candidate computing costs of production 2.2 Submission of a written report showing a record of production data including raw data
3. Resource Implications	**The following resources should be provided:** 3.1 Work area/station 3.2 Materials relevant to recording and documentation of production data 3.3 Computer with printer and software 3.4 Calculator 3.5 Work table
4. Context of Assessment	4.1 Assessment should occur on the job or in a simulated workplace

UNIT OF COMPETENCY : IMPLEMENT GOOD MANUFACTURING PRACTICE AND PROCEDURES

UNIT CODE : PFB751214

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to comply with relevant Good Manufacturing Practice (GMP) codes through the implementation of workplace GMP and quality procedures

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify requirements of GMP related to own work	1.1 Sources of information on GMP requirements are located 1.2 GMP requirements and responsibilities related to own work are identified	1.1 GMP Requirements 1.2 GMP Codes of practice, policies and procedures 1.3 GMP Role of internal and external auditors 1.4 Contamination events and performance improvement processes procedures 1.5 Personal clothing and footwear requirements at work areas 1.6 Use of personal clothing, storage and disposal requirements 1.7 Micro biological, physical and chemical contaminants 1.8 Basic concepts of quality assurance 1.9 Control methods and procedures used in GMP	1.1 Planning and organizing work (time management) 1.2 Working with others and in teams 1.3 Practicing GMP 1.4 Following contamination investigation procedures

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		1.10 GMP responsibilities and requirements relating to work role 1.11 Basic properties, handling and storage requirements of raw materials, packaging components and final product 1.12 Standards for materials, equipment and utensils used in the work area 1.13 Recall and traceability procedures relevant to work role 1.14 Procedures for identifying or isolating materials or product of unacceptable quality 1.15 Record keeping and the recording requirements of GMP.	

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Observe personal hygiene and conduct to meet GMP requirements	2.1 Personal hygiene meets GMP requirements 2.2 Clothing is prepared, used, stored and disposed of according to GMP and workplace procedures 2.3 Personal movement around the workplace complies with area entry and exit procedures	2.1 Workplace entry and exit procedures 2.2 Personal hygiene 2.3 PPE	2.1 Following workplace entry and exit procedures 2.2 Practicing OSHS 2.3 Practicing GMP
3. Implement GMP requirements when carrying out work activities	3.1 GMP requirements are identified 3.2 ***Work area***, materials, equipment and product are routinely monitored to ensure compliance with GMP requirements 3.3 Raw materials, packaging components and product are handled according to GMP and workplace procedures 3.4 Workplace procedures to control resource allocation and process are followed to meet GMP requirements 3.5 Common forms of contamination are identified and appropriate control measures are followed according to GMP requirements 3.6 The workplace is maintained in a clean and tidy order to meet GMP housekeeping standard	3.1 Monitoring methods of work area, materials and equipment 3.2 Handling of raw materials, packaging components and product 3.3 Control resource allocation and processes in the workplace 3.4 Contaminants 3.5 Good Manufacturing Practices (GMP)	3.1 Identifying GMP requirements 3.2 Monitoring routinely of work area, materials equipment and product 3.3 Handling of raw materials, packaging components and product 3.4 Maintaining cleanliness in the workplace

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
4. Participate in improving GMP	4.1 Processes, practices or conditions which could result in non-compliance with GMP are identified and reported according to workplace reporting requirements 4.2 Corrective action is implemented within level of responsibility 4.3 GMP issues are raised with designated personnel	4.1 Non-compliance and corrective action in GMP 4.2 Corrective actions	4.1 Practicing GMP 4.2 Reporting workplace condition 4.3 Implementing corrective measures
5. Participate in validation processes	5.1 Validation procedures are followed to GMP requirements 5.2 Issues arising from validation are raised with designated personnel 5.3 Validation procedures are documented to meet GMP requirements	5.1 Validation procedures in GMP 5.2 Issues arising from validation 5.3 Documentation of validation procedures	5.1 Following validation procedures 5.2 Reporting issues arising from validation 5.3 Documenting validation procedures
6. Complete workplace documentation to support GMP	6.1. Documentation and recording requirements are identified 6.2. Information is recorded according to ***workplace reporting procedures*** to meet GMP requirements	6.1. Documentation and workplace reporting procedures in GMP 6.2. Information and workplace reporting procedures	6.1. Keeping records 6.2. Recording information

RANGE OF VARIABLES

VARIABLES	RANGE
1. OH&S requirements may include:	1.1. OH&S legal requirements 1.2. Enterprise OH&S policies, procedures and programs
2. Work in carried out in accordance with regulations. Regulatory requirements may include:	2.1. Relevant regulations regarding food processing and food safety regulations 2.2. Department of Health – Food Establishments – Code of Sanitation of the Philippines (P.D.856) 2.3. Environment Management Bureau regulations regarding emissions, waste treatment, noise and effluent treatment and control
3. Hygiene and sanitation requirements may include:	3.1. Department of Health – Food Establishments – Code of Sanitation of the Philippines (P.D.856) 3.2. Requirements set out by Bureau of Food and Drugs 3.3. Workplace requirements
4. Workplace requirements may include:	4.1. Work instructions 4.2. Standard operating procedures 4.3. OH&S requirements 4.4. Quality assurance requirements 4.5. Equipment manufacturers' advice 4.6. Material Safety Data Sheets 4.7. Codes of Practice and related advice
5. Products may include	5.1. Products, raw materials, packaging components and consumables, part-processed product, finished product and cleaning materials
6. Responsibility and reporting systems	6.1. Responsibility for applying Good Manufacturing Practice relates to the person's work area 6.2. Reporting systems may include electronic and manual data recording and storage systems

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidences that the candidate:** 1.1 Located and followed workplace information relating to GMP responsibilities 1.2 Maintained personal hygiene consistent with GMP 1.3 Followed workplace procedures when moving around the workplace and/or from one task to another to maintain GMP 1.4 Used, stored and disposed of appropriate clothing/footwear as required by work tasks and consistent with GMP 1.5 Identified and reported situations that do or could compromise GMP

	1.6 Applied appropriate control measures to control contamination 1.7 Recorded results of monitoring, and maintain records as required by GMP 1.8 Followed validation procedures within level of responsibility 1.9 Identified and responded to out-of-specification or unacceptable raw materials, packaging components, final or part processed product within level of responsibility 1.10 Followed procedures to isolate or quarantine non-conforming product 1.11 Handled, cleaned and stored equipment, utensils, raw materials, packaging components and related items according to GMP and workplace procedures 1.12 Maintained GMP for own work 1.13 Handled and/or disposed of out-of-specification or contaminated materials, packaging components/consumables and product, waste and recyclable material according to GMP as required by work responsibilities 1.14 Maintained the work area in a clean and tidy state 1.15 Identified and reported signs of pest infestation
2. Resource Implication	**The following resources should be provided:** 2.1 Workplace location and access to workplace policies 2.2 Materials relevant to the proposed activity and tasks
3. Methods of Assessment	**Competency in this unit must be assessed using at least two (2) of the following methods:** 3.1 A combination of direct observation and oral questioning 3.2 Written report 3.3 Written Test Portfolio
4. Context of Assessment	Assessment should occur on the job or in a simulated workplace

UNIT OF COMPETENCY : IMPLEMENT ENVIRONMENTAL POLICIES AND PROCEDURES

UNIT CODE : PFB751215

UNIT DESCRIPTOR : This unit covers skills and attitude required to implement environmental policies and procedures when carrying out work responsibilities

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Conduct work in accordance with environmental policies and procedures	1.1. Immediate work area is routinely checked to ensure compliance with environmental requirements 1.2. ***Hazards*** and unacceptable performance are identified, removed and/or reported to appropriate personnel according to workplace procedures 1.3. Workplace procedures and work instructions are followed 1.4. Where control requirements are not met, incidents are promptly reported and corrective action is taken 1.5. Measures used to minimize and handle waste are followed 1.6. Environmental data is recorded in required format according to workplace reporting requirements	1.1 Workplace approach to managing environmental issues 1.2 Responsibilities of self and employer to manage environmental issues on site 1.3 Sources of advice on environmental issues in the workplace 1.4 Environmental hazards and risks associated with the work 1.5 Work procedures as they relate to environmental responsibilities 1.6 Procedures used to prevent or control environmental risks associated with own work 1.7 Basic concepts of hazard identification, risk	1.1 Planning and organizing work (time management) 1.2 Working with others and in teams 1.3 Practicing environmental skills environmental skills

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		assessment and control options 1.8 Identifying and responding to hazards 1.9 Impact of work practices on resource utilization and wastage 1.10 Procedures used to handle and dispose of waste 1.11 The difference between trade waste and storm water drains 1.12 Consequences of inappropriate waste handling and disposal 1.13 Procedures for responding to unplanned incidents such as spills and leaks 1.14 Emergency response system and procedures 1.15 Responsible use of resources in own work area 1.16 Reporting procedures and responsibilities 1.17 Consultative processes in the workplace for raising issues/ suggestions on	

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		environmental issues.	
2. Participate in improving environmental practices at work	2.1 Processes or conditions which could result in an unacceptable environmental outcome are identified and reported according to workplace reporting requirements. 2.2 Corrective action is taken in accordance with the environmental management and emergency response plans as required. 2.3 Contributions are made to participative arrangements for managing environmental issues in the workplace within workplace procedures and level of responsibility.	2.1 Unacceptable environmental outcomes 2.2 Corrective action 2.3 Emergency response plan 2.4 Improvement in environmental practices 2.5 Report preparation	2.1 Identifying and reporting unacceptable environmental outcomes 2.2 Implementing corrective actions 2.3 Participating in improvement of environmental practices 2.4 Practicing written communication skills
3. Respond to an environmental emergency	3.1 Emergency situations are identified and reported according to workplace reporting requirements 3.2 Emergency procedures are followed as appropriate to the nature of the emergency and according to workplace procedures	3.1 Emergency situations 3.2 Emergency procedures	3.1 Identifying emergency situations 3.2 Following emergency procedures 3.3 Practicing written communication skills

RANGE OF VARIABLES

VARIABLE	RANGE
1. OH&S requirements may include:	1.1. OH&S legal requirements 1.2. Enterprise OH&S policies, procedures and programs
2. Work in carried out in accordance with regulations. Regulatory requirements may include:	2.1. Relevant regulations regarding food processing and food safety regulations 2.2. Department of Health – Food Establishments – Code of Sanitation of the Philippines (P.D.856) 2.3. Environment Management Bureau regulations regarding emissions, waste treatment, noise and effluent treatment and control
3. Hygiene and sanitation requirements may include:	3.1. Department of Health – Food Establishments – Code of Sanitation of the Philippines (P.D.856) 3.2. Requirements set out by Bureau of Food and Drugs 3.3. Workplace requirements
4. Workplace requirements may include:	4.1. Work instructions 4.2. Standard operating procedures 4.3. OH&S requirements 4.4. Quality assurance requirements 4.5. Equipment manufacturers' advice 4.6. Material Safety Data Sheets 4.7. Codes of Practice and related advice

5. Identification and control of hazards may include:	5.1. Procedures are available that outline appropriate response to environmental incidents, accidents and emergencies 5.2. At this level identification and control of environmental hazards relates to own work. Corrective action typically involves recognizing any event which occurs as part of the work process and presents an unacceptable environmental risk or outcome, taking corrective action within level of responsibility, and/or reporting to the appropriate person in the work area 5.3. Work responsibilities may involve handling of hazardous waste 5.4. An environmental hazard is any activity, product or service that has the potential to affect the environment. This may also be referred to as an environmental aspect 5.5. An environmental risk is the likelihood that the hazard can cause harm to the environment 5.6. A control measure is a method or procedure used to prevent or minimize environmental risks 5.7. Responsibility for identifying and controlling environmental risks relates to immediate work responsibilities 5.8. Participating in improvement may involve participation in structured improvement programs, one-off projects and day-to-day problem solving and consultative groups

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidences that the candidate:** 1.1 Accessed and apply workplace information on environmental policies and procedures relating to own work 1.2 Fitted and used appropriate personal protective clothing and equipment 1.3 Checked own work area to identify environmental hazards 1.4 Reported hazards according to workplace procedure in a clear and timely manner 1.5 Followed work procedures to control or minimize environmental risk. This may include monitoring parameters set for environmental aspects such as airborne particulate, noise, and water quality. It may also include demonstrating use of emergency equipment according to work role requirements 1.6 Recorded environmental information as required by the environmental management program 1.7 Participated in processes to raise issues and suggestions to improve environmental issues management. This requires appropriate communication skills to structure and present information and interact with others 1.8 Followed procedures to collect, deposit, recycle and/or dispose of waste in own work area

	1.9 Followed procedures to respond to environmental emergencies such as spills and emissions. This may include following procedures to alert the appropriate emergency services 1.10 Maintained housekeeping standards in work area
2. Resource Implication	**The following resources should be provided:** 2.1 Workplace location and access to workplace policies 2.2 Materials relevant to the proposed activity and tasks
3. Methods of Assessment	**Competency in this unit must be assessed using at least two (2) of the following methods:** 3.1 A combination of direct observation and oral questioning 3.2 Written report 3.3 Written Test 3.4 Portfolio
4. Context of Assessment	4.1 Assessment should occur on the job or in a simulated workplace

CORE COMPETENCIES

UNIT OF COMPETENCY : **PROCESS MANGO BY FERMENTATION AND PICKLING**

UNIT CODE : **PFBXXX**

UNIT DESCRIPTOR : This unit deals with the knowledge, skills and attitudes required to prepare equipment, tools, materials and utensils, prepare raw materials, perform alcoholic and acetic acid fermentation, pack fermented products and perform post-production activities to produce products such as sweet and sour mangoes, pickled mangoes, mango wine and vinegar.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Prepare equipment, tools, materials and utensils	1.1 ***Equipment and tools*** are prepared in accordance with manufacturer's specifications 1.2 ***Processing materials*** are sourced-out and made available according to work requirements 1.3 ***Kitchen utensils*** are checked and sanitized in accordance with manufacturer's specifications. 1.4 Safety measures are applied in accordance with Occupational Safety and Health Standards (OSHS)	1.1 Uses and functions of equipment, tools and utensils. 1.2 Inspection and checking procedures of various equipment, tools and utensils 1.3 Calibration of quality control tools 1.4 Calibration of weighing scales 1.5 Testing methods of equipment 1.6 Cleaning procedures of weighing scales 1.7 Sanitation methods of kitchen utensils 1.8 Procedures on reporting of conditions and defects/ breakdown of equipment, tools and utensils to	1.1 Inspecting and checking skills 1.2 Calibrating of weighing scales and quality control tools such as pH meter. 1.3 Testing of equipment 1.4 Cleaning and sanitizing skills 1.5 Recording and reporting skills on the condition and defects of tools, utensils and equipment. 1.6 Practicing communication skills 1.7 Interpersonal skills 1.8 Oral communication 1.9 Writing skills, accomplishing forms and checklist in line with preparation activities

		immediate head/supervisor 1.9 Methods of accomplishing inspection forms and checklists for preparation of equipment, tools and kitchen utensils 1.10 Basic components of a report 1.11 Proper waste disposal 1.12 Occupational Safety and Health Standards (OSHS) 1.13 Current Good Manufacturing Practices 1.14 Sanitation Standard Operating Procedures (SSOP) for preparation of equipment, tools and kitchen utensils Guidelines 1.15 7S (sort, systematize, sweep, standardize, self-discipline, safety and security) of Good Housekeeping 1.16 Halal guidelines 1.17 Can understand and follow instructional manuals 1.18 Parts and functions of equipment, quality control tools/ instruments and utensils 1.19 Where to source good quality supplies and materials in line	1.10 Following environment rules and regulations in segregating and disposing wastes 1.11 Practicing OSHS such as wearing PPE Personal Protective Equipment) 1.12 Practicing cGMP, SSOP and 7S 1.13 Practicing sanitation in preparing various equipment, tools and utensils 1.14 Maintaining various equipment, tools and utensils such as cleaning and sanitizing 1.15 Sourcing of quality supplies and materials according to specifications.

		with preparation activities. 1.20 Maintenance 1.21 Regular upkeep of various equipment, tools and utensils 1.22 Preventive maintenance of various equipment and tools **Values:** • Self- esteem • Time conscious/ punctual • Flexible/ adaptable • Honest • Dependable • Self-starter • Alert • Systematic and organized • Committed • Good team worker • Good listener and fast learner • Creative • Nationalistic and patriotic	
2. Prepare the raw material	2.6 Mangoes are ***sorted and graded*** in accordance with product specifications and standards. 2.7 Raw materials are ***prepared*** based on specified procedures and methods of processing. 2.8 Cleaned raw materials are weighed in accordance with approved specifications. 2.9 Tools and utensils for raw materials	2.1 Different raw materials use in fermentation and pickling 2.2 Accepts and rejects 2.3 Methods of preparing raw materials 2.4 Procedures of sorting and grading for raw materials 2.5 Steps in using tools and operating equipment (weighing scales, food processor and cutter)	2.1 Segregating reject raw materials 2.2 Preparing raw materials 2.3 Sorting and grading of raw materials 2.4 Using tools and utensils to be used in fermentation and pickling 2.5 Operating equipment such as food processor, cutter and weighing scales

	are used based on work requirements and manuals. 2.10 Equipment are operated following manufacturer's manual.	2.6 Functions and uses of tools and utensils for raw material preparation 2.7 Trimmings of raw materials 2.8 Methods of accomplishing forms and checklists of raw materials as received and rejects 2.9 Procedures on reporting of defects, breakdown and other irregularities during the activities to immediate head/supervisor 2.10 Recording and reporting of inputs 2.11 Four fundamental operations (addition, subtraction, multiplication and division) 2.12 Conversions (metric and English system) for weights and measures 2.13 Ratio and proportions for formulation of 2.14 Percentages 2.15 Food safety principles and practices on raw materials preparations 2.16 Food handling practices on raw materials preparations for fermentation and pickling 2.17 Proper waste disposal 2.18 Occupational Safety and Health	2.6 Utilizing raw material trimmings for fermentation and pickling 2.7 Reading process flow charts for preparation of raw materials of fermentation and pickling process. 2.8 Recording through accomplishing forms and checklist of raw materials as received and rejects including other inputs 2.9 Recording and reporting skills on the condition and defects of tools, utensils and equipment. 2.10 Interpersonal skills 2.11 Oral communication skills 2.12 Performing basic mathematical skills in line with preparation of raw materials to be used in fermentation and pickling 2.13 Performing conversions 2.14 Practicing of sanitary food handling for raw materials preparations 2.15 Following environment rules and regulations in segregating and disposing wastes 2.16 Practicing OSHS such as wearing of PPE

		Standards (OSHS) for raw materials preparations 2.19 Current Good Manufacturing Practices 2.20 Hazard Analysis & Critical Control Points (HACCP) basic principles 2.21 SSOP for raw materials preparation during fermenting and pickling Guidelines 2.22 7S of Good Housekeeping 2.23 Halal guidelines 2.24 Kosher and organic food processing guidelines 2.25 Can understand and follow instructional manuals 2.26 Parts and functions of equipment, quality control tools/ instruments and utensils 2.27 Sourcing of quality raw materials and ingredients to be used for fermentation and pickling 2.28 Maintenance 2.29 Regular upkeep of various equipment, tools and utensils 2.30 Preventive maintenance of various equipment and tools use for preparing raw materials, ingredients an spices of	2.17 Practicing cGMP, 7S HACCP and SSOP on preparing raw materials 2.18 Practicing sanitation in preparing raw materials 2.19 Maintaining various equipment, tools and utensils such as cleaning and sanitizing 2.20 Sourcing of quality raw materials and ingredients

		fermentation and pickling 2.31 Attitudes 2.32 Same as element # 1	
3. Perform alcoholic and acetic acid fermentation	3.1 Prepared raw materials mixed with water according to specifications 3.2 Mixture is allowed to boil and juice is extracted in accordance with specifications and enterprise requirements 3.3 Extracted juice is cooled and mixed with other ingredients like sugar and yeast in accordance with specifications 3.4 ***Fermentation procedures*** are done according to required period. 3.5 ***Post fermentation procedures*** are performed according to enterprise procedures 3.6 ***Fermented products*** are evaluated using ***sensory testing*** according to enterprise procedures	3.1 Fermentation methods and techniques 3.2 Acetous heating methods and procedures 3.3 Sensory testing (visual, smell and taste) 3.4 Juice extraction procedures and techniques 3.5 Post fermentation procedures 3.6 Operating steps for equipment (stove) 3.7 Different raw materials for fermentation 3.8 Proper set-up for acetic acid determination (titration set-up) 3.9 Using ebulliometer for alcohol 3.10 Preparation of daily production output (yield, recoveries and variances) 3.11 Recording and documenting of production data 3.12 Reporting of defects, breakdown and other irregularities during alcoholic and acetic acid fermentation to immediate head/ supervisor 3.13 Four fundamental operations (addition,	3.1 Performing fermentation methods and techniques 3.2 Demonstrating acetous heating methods and procedures 3.3 Conducting sensory testing 3.4 Extracting juices 3.5 Performing post fermentation procedures 3.6 Using tools and utensils for alcoholic and acetic acid fermentation 3.7 Operating equipment for alcoholic and acetic acid fermentation 3.8 Calibrating skills for equipment and tools for alcoholic and acetic acid fermentation 3.9 Reading process flow charts for alcoholic and acetous fermentation 3.10 Preparing daily production output 3.11 Accomplishing enterprise forms for documenting production data 3.12 Recording and reporting skills on the defects and breakdowns of tools, utensils and equipment during the alcoholic and acetous fermentation

		subtraction, multiplication and division) 3.14 Conversions (metric and English system) for weights and measures 3.15 Ratio and proportions for formulation 3.16 Percentages 3.17 Food safety principles and practices on alcoholic and acetic acid fermentation 3.18 Food handling practices on alcoholic and acetic acid fermentation 3.19 Proper waste disposal 3.20 Occupational Safety and Health standards on alcoholic and acetic acid fermentation 3.21 HACCP 3.22 International Organization for Standardization (ISO) for alcoholic and acetic acid fermentation 3.23 Environmental management systems (EMS) 3.24 Current Good Manufacturing Practices (cGMP) 3.25 SSOP Guidelines 3.26 7S of Good Housekeeping 3.27 Halal guidelines 3.28 Kosher and organic for food processing	3.13 Interpersonal skills 3.14 Oral communication skills 3.15 Performing basic mathematical skills for alcoholic and acetic acid fermentation(percentage and formulation) 3.16 Computing for recovery/yields 3.17 Performing conversions 3.18 Practicing of sanitary food handling for alcoholic and acetic acid fermentation 3.19 Following environment rules and regulations in segregating and disposing wastes 3.20 Practicing OSHS such as wearing of PPE 3.21 Practicing cGMP, 7S HACCP, ISO, EMS and SSOP on alcoholic and acetic acid fermentation 3.22 Practicing sanitation on alcoholic and acetic acid fermentation 3.23 Maintaining various equipment, tools and utensils such as cleaning and sanitizing 3.24 Sourcing of quality raw materials and ingredients

		(pickling and fermentation) 3.29 Can understand and follow instructional manuals 3.30 Parts and functions of equipment, tools and utensils 3.31 Sourcing of quality raw materials and ingredients to be used for alcoholic and acetic acid fermentation 3.32 Maintenance 3.33 Regular upkeep of various equipment, tools and utensils 3.34 Preventive maintenance of various equipment and tools for alcoholic and acetic acid fermentation 3.35 Attitudes 3.36 Same as element # 1	
4. Perform pickling activities	4.1 ***Ingredients*** for pickling mixture are prepared following enterprise procedures. 4.2 Raw materials are prepared and combined with pickling mixture according to the specified ***pickling procedure*** 4.3 Equipment are operated in accordance with manufacturer's specifications requirements 4.4 Perform ***product*** evaluation according to	4.1 Preparation of pickling mixture 4.2 Pickling procedures and techniques 4.3 Fermentation methods and techniques 4.4 Calibration of weighing scale, refractometer, pH meter, salinometer 4.5 Procedures in equipment operation for pickling 4.6 Product evaluation method through sensory testing	4.1 Preparing pickling mixtures 4.2 Demonstrating fermentation and pickling techniques 4.3 Calibrating scale, pH meter, refractometer and salinometer 4.4 Using tools such as pH meter, refractometer and salinometer 4.5 Operating weighing scale 4.6 Conducting product evaluation of pickled products

	enterprise procedures.	4.7 Preparation of daily production output (yield, recoveries and variances) 4.8 Recording and documenting of production data 4.9 Reporting of defects, breakdown and other irregularities during pickling activities to immediate head/ supervisor 4.10 Four fundamental operations (addition, subtraction, multiplication and division) 4.11 Conversions (metric and English system) for weights and measures 4.12 Ratio and proportions for formulation of pickling mixtures 4.13 Percentages 4.14 Food safety principles and practices on pickling activities 4.15 Food handling practices for pickling activities 4.16 Proper waste disposal 4.17 Occupational Safety and Health standards for pickling activities 4.18 HACCP on alcoholic and acetic acid fermentation 4.19 International Organization for Standardization	through sensory testing 4.7 Reading process flow charts for pickling activities 4.8 Preparing daily production output 4.9 Accomplishing enterprise forms for documenting production data 4.10 Recording and reporting skills on the defects and breakdowns of tools, utensils and equipment during pickling activities 4.11 Interpersonal skills 4.12 Oral communication skills 4.13 Performing basic mathematical skills for conversion, percentage and formulation of pickling mixtures 4.14 Computing for recovery/yields 4.15 Performing mathematical conversions of measures and weights 4.16 Practicing of sanitary food handling for alcoholic and acetic acid fermentation 4.17 Following environment rules and regulations in segregating and disposing wastes 4.18 Practicing OSHS such as wearing of PPE 4.19 Practicing cGMP, 7S HACCP, ISO, EMS and SSOP on alcoholic and

		(ISO) for pickling activities 4.20 Environmental management systems (EMS) in a workplace for pickling activities 4.21 Current Good Manufacturing Practices (cGMP) 4.22 SSOP for pickling activities Guidelines 4.23 7S of Good Housekeeping 4.24 Halal guidelines 4.25 Kosher and organic for food processing (pickling and fermentation) 4.26 Can understand and follow instructional manuals 4.27 Parts and functions of equipment, tools and utensils 4.28 Sourcing of quality raw materials and ingredients to be used for pickling 4.29 Maintenance 4.30 Regular upkeep of various equipment, tools and utensils 4.31 Preventive maintenance of various equipment and tools for pickling 4.32 Attitudes 4.33 Same as element # 1	acetic acid fermentation 4.20 Practicing sanitation on alcoholic and acetic acid fermentation 4.21 Maintaining various equipment, tools and utensils such as cleaning and sanitizing 4.22 Sourcing of quality raw materials and ingredients for pickling activities

5. Pack processed products	5.1 Fill products in appropriate packing material and required temperature 5.2 Labelling is done according to FDA regulations (allergen program) 5.3 Integrity of seal is checked according to company standard/manual 5.4 Air cool and/or water spray is use according to required cooling temperature	5.1 Different packing materials 5.2 Packing techniques and methods for fermented products 5.3 Correct processing procedure and significance of TSS ad filling temperature 5.4 Correct sealing methods and techniques 5.5 Sealing integrity/ standards: 5.6 Checking headspace 5.7 Checking leakage 5.8 Labelling methods and labeling information 5.9 Cooling methods for processed product 5.10 Operation of packing equipment 5.11 Preparation of daily production output (yield, recoveries and variances) 5.12 Recording and documenting of production data 5.13 Reporting of defects, breakdown and other irregularities during packing activities to immediate head/ supervisor 5.14 Recording and reporting	5.1 Packing of fermented products 5.2 Demonstrating visual determination of correct head space 5.3 Reading temperature 5.4 Performing appropriate sealing technique/ method 5.5 Testing seal integrity of packed products 5.6 Labelling of packed products 5.7 Cooling of packed products 5.8 Operating packing equipment 5.9 Reading process flow charts for packing activities 5.10 Preparing daily production output 5.11 Accomplishing enterprise forms for documenting production data 5.12 Recording and reporting skills on the defects and breakdowns of tools, utensils and equipment during packing activities 5.13 Interpersonal skills 5.14 Oral communication skills 5.15 Performing basic mathematical skills for packing activities (conversion and percentages, such as for labeling and packaging purposes) 5.16 Computing for recovery/yields

		methods for fermented products based on rejects and non-conformance products 5.15 Four fundamental operations (addition, subtraction, multiplication and division) 5.16 Conversions (metric and English system) for weights and measures 5.17 Food safety principles and practices for packing activities 5.18 Food handling practices for packing activities 5.19 Proper disposal wastes of packing activities 5.20 Occupational Safety and Health standards for packing activities 5.21 HACCP on packing activities 5.22 International Organization for Standardization (ISO) for packing activities 5.23 Environmental management systems (EMS) in a workplace for packing activities 5.24 Current Good Manufacturing	5.17 Performing mathematical conversions of measures and weights 5.18 Practicing of sanitary food handling for packing activities 5.19 Following environment rules and regulations in segregating and disposing wastes 5.20 Practicing OSHS such as wearing of PPE 5.21 Practicing cGMP, 7S, HACCP, ISO, EMS and SSOP on packing activities 5.22 Practicing sanitation on packing activities 5.23 Maintaining various equipment, tools and utensils such as cleaning and sanitizing 5.24 Sourcing of quality raw materials and ingredients for packing activities 5.25 Cleaning and stowing of equipment, tools and utensils

		Practices (cGMP) on packing activities 5.25 SSOP for packing activities Guidelines 5.26 7S of Good Housekeeping 5.27 Halal guidelines 5.28 Kosher and organic for packing activities 5.29 Can understand and follow instructional manuals 5.30 Parts and functions of equipment, tools and utensils 5.31 Sourcing of quality raw materials and ingredients to be used for packing activities 5.32 Maintenance 5.33 Regular upkeep of various equipment, tools and utensils 5.34 Preventive maintenance of various equipment, tools, and utensils packing activities 5.35 Proper cleaning and stowing of equipment, tools and utensils used in packing activities 5.36 Attitudes 5.37 Same as element # 1	

6 Conduct post-production activities	6.1 Packed finished food products are stored according to required ***storage condition*** 6.2 Tools, materials and equipment are cleaned and stored based on workplace procedures 6.3 Proper disposal of wastes are practiced according to environmental rules and regulations 6.4 ***Production data*** checklist is accomplished according to enterprise protocol.	6.1. Different storage conditions 6.2. Operation of storage equipment (chiller/freezer) 6.3. Storing procedures and techniques for packed products 6.4. Cleaning and storing methods for equipment, tools and utensils 6.5. Storing procedures for excess materials and ingredients 6.6. Production data 6.7. Recording of storage time and temperature. 6.8. Preparation of daily production input report (spoilage and rejects) 6.9. Recording procedures of production data using enterprise forms 6.10. Reporting procedures on conditions of tools, equipment and utensils to immediate head/ supervisor. 6.11. Inventory of excess materials and ingredients 6.12. Basic arithmetical operations like multiplication, division,	6.1. Storing packaged food products 6.2. Cleaning and storing of equipment, tools and utensils 6.3. Storing excess materials and ingredients 6.4. Recording of storage time and temperature for finished products 6.5. Recording of spoilage and rejects 6.6. Recording of production data 6.7. Accomplishing/completing enterprise forms and checklist on packing activities 6.8. Practicing interpersonal skills 6.9. Demonstrating oral communication skills 6.10. Accomplishing inventory forms 6.11. Demonstrating basic mathematical skills for production data recording 6.12. Following environmental rules and regulations such as wastes segregating and disposals. 6.13. Practicing sanitary food handling upon storing finished products 6.14. Practicing OSHS such as wearing PPE during post

		addition and subtraction 6.13. Inventory of equipment, tools, utensils and materials 6.14. Environmental protection and concern 6.15. Food safety principles and practices for storage of finished products 6.16. Proper waste disposal 6.17. Occupational Safety and Health Standards on post production activities 6.18. HACCP basic principles on storage of finished products 6.19. Current Good Manufacturing practices 6.20. SSOP of post-production activities 6.21. PNS on storage of finished products 6.22. Guidelines 6.23. 7S of Good Housekeeping 6.24. Halal guidelines 6.25. Can understand and follow instructional manuals 6.26. Parts and functions of all equipment, tools and utensils used in salting, curing and smoking operations, including	production activities 6.15. Practicing cGMP, 7S, SSOP, PNS and HACCP 6.16. Maintaining various equipment, tools and utensils such as cleaning and sanitizing 6.17. Stowing of equipment, tools, utensils and materials 6.18. Sourcing of cleaning materials 6.19. Maintaining working areas and storage facilities

		storage equipment 6.27. Sourcing of cleaning materials during shutting down operations 6.28. Maintenance 6.29. Regular upkeep of various equipment, tools, utensils and packing facilities 6.30. Preventive maintenance of equipment, tools and utensils use in post-production activities 6.31. Maintenance of storage facilities and room 6.32. Attitudes 6.33. Same as element # 1	

RANGE OF VARIABLES

VARIABLE	RANGE
1. Equipment and tools	**Equipment and tools may include the following:** **Equipment:** 1.1 Refrigerator 1.2 Weighing scale of various capacities and sensitivities 1.3 Cooking vat 1.4 Food processor 1.5 Plastic impulse sealer 1.6 Trolley **Tools and instruments** 1.7 Probe thermometer 1.8 Timer 1.9 Calculator 1.10 Fermentation vats 1.11 pH meter
2. Processing materials	**Processing materials may include:** 2.1 Water 2.2 Sugar 2.3 Salt 2.4 Chlorinated water (200 ppm) 2.5 Mother vinegar 2.6 Yeast
3. Kitchen utensils	**Kitchen utensils may include the following:** 3.1 Casserole 3.2 Colanders 3.3 Bowls 3.4 Food tongs 3.5 Strainers 3.6 Basting spoon 3.7 Wire baskets 3.8 Knives 3.9 Peelers 3.10 Chopping boards
4. Sorting and grading criteria	**Sorting and grading criteria may include:** 4.1.1 size 4.1.2 shape 4.1.3 maturity 4.1.4 degree of ripeness 4.1.5 presence or absence of defects on mango fruit
5. Preparation of raw materials	**Preparation of raw materials includes:** 5.1 Removal of foreign matters 5.2 Cleaning and washing

	5.3 Peeling 5.4 Slicing
6. Fermentation procedures	**Fermentation procedures include:** 6.1 Alcoholic fermentation for wine 6.2 Acetic acid fermentation for vinegar
7. Post fermentation procedures	**Post fermentation procedures include:** 7.1. Siphoning and ageing 7.2. Clarifying of mixture 7.3. Heating of fermented products 7.4. Addition of food grade alcohol (optional) 7.5. Pasteurization
8. Sensory testing	**Sensory testing may include:** 8.1. Visual (color and appearance) 8.2. Smell (aroma) 8.3. Flavor
9. Fermented products	Fermented products include: 9.1 Wine 9.2 Vinegar
10. Ingredients	**Ingredients may include:** 10.1. Refined sugar 10.2. Salt 10.3. Water 10.4. Chlorinated water
11. Pickling procedure	**Pickling procedure include:** 11.1 Desalination 11.2 Pasteurization
12. Products	**Products may include:** 12.1Sweet sour mango 12.2Pickled mango 12.3 Mango wine 12.4Mango vinegar
13. Integrity of seal	**Integrity of seal includes:** 13.1 Absence of leaks 13.2 Absence of pin holes 13.3 Absence of fold and creases
14. Production data	**Production data include:** 14.1 Production schedule 14.2 Production target 14.3 Production input a. Raw Materials b. Ingredients c. Processing materials d. Packaging materials 14.4 Production output a. Quantity of finished goods b. Rejects c. Yields

EVIDENCE GUIDE

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Prepared equipment, tools, materials and utensils 1.2 Prepared the raw materials 1.3 Performed alcoholic and acetic acid fermentation 1.4 Performed pickling activities 1.5 Packed fermented products 1.6 Conducted post- production activities 1.7 Practiced cGMP, HACCP, 7S of Good Housekeeping, SSOP and OSHS
2. Resource Implications	**The following resources should be provided:** 2.1 Work area/ station 2.2 Unripe and ripe mangoes 2.3 Equipment, tools and utensils to prepare and to process green and ripe mangoes by fermentation and pickling 2.4 Materials, supplies and ingredients relevant to the proposed activity 2.5 Manuals and references
3. Methods of Assessment	**Competency in this unit must be assessed using at least two (2) of the following methods:** 3.1 Written test 3.2 Demonstration with oral questioning 3.3 Direct observation with oral questioning
4. Context of Assessment	4.1 Competency maybe assessed in actual workplace or at the designated TESDA Accredited Assessment Center.

UNIT OF COMPETENCY : PROCESS MANGOES BY SUGAR CONCENTRATION

UNIT CODE : PFBXXX

UNIT DESCRIPTOR : This unit deals with the knowledge, skills and attitudes required to process foods by sugar concentration which include to prepare equipment, tools, materials and utensils, prepare the raw materials, pack sugar concentrated products and perform post- production activities to produce products such as mango marmalade, mango jam, mango puree, mango nectar, mango juice and mango candied fruits.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Prepare equipment, tools, materials and utensils	1.1 ***Equipment and tools*** are prepared in accordance with manufacturer's specifications 1.2 ***Processing materials*** are sourced-out and made available according to work requirements. 1.3 ***Kitchen utensils*** are checked and sanitized in accordance with manufacturer's specifications. 1.4 Safety measures are applied in accordance with Occupational Safety and Health Standards (OSHS)	1.1 Types of equipment and tools for processing food by sugar concentration 1.2 Inspection and checking procedures of various equipment, tools and utensils 1.3 Calibration of quality control tools 1.4 Calibration of weighing scales 1.5 Procedures on reporting of conditions and defects/ breakdown of equipment, tools and utensils to immediate head/supervisor 1.6 Methods of accomplishing inspection forms and checklists for preparation of equipment, tools and kitchen utensils	1.1 Inspecting and checking skills 1.2 Calibrating of weighing scales and quality control tools such as thermometer, and refractometer 1.3 Recording and reporting skills on the condition and defects of tools, utensils and equipment. 1.4 Accomplishing of monitoring checklist 1.5 Sourcing of processing materials 1.6 Checking and sanitizing kitchen utensils 1.7 Communication skills 1.1.1 Interpersonal skills 1.1.2 Oral communication 1.1.3 Writing skills, accomplishing forms and checklist in line with preparation activities

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		1.7 Basic components of a report 1.8 Process materials sourcing 1.9 Sanitation of kitchen utensils 1.10 Proper waste disposal 1.11 Occupational Safety and Health Standards (**OSHS)** 1.12 Current Good Manufacturing Practices 1.13 Sanitation Standard Operating Procedures (SSOP) for preparation of equipment, tools and kitchen utensils 1.14 7S (sort, systematize, sweep, standardize, self-discipline, safety and security) of Good Housekeeping 1.15 OSHS 1.16 Halal guidelines 1.17 Kosher guidelines 1.18 Usage of instructional manuals 1.19 Parts and functions of equipment, quality control tools/ instruments and utensils	1.8 Following environment rules and regulations in segregating and disposing wastes 1.9 Practicing OSHS such as wearing PPE Personal Protective Equipment) 1.10 Practicing cGMP, SSOP and 7S 1.11 Practicing sanitation in preparing various equipment, tools and utensils 1.12 Maintaining various equipment, tools and utensils such as cleaning and sanitizing 1.13 Sourcing quality supplies and materials according to specifications

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		1.20 Source of good quality supplies and materials in line with preparation activities. 1.21 Regular upkeep of various equipment, tools and utensils 1.22 Preventive maintenance of various equipment and tools **Values:** • Self-esteem • Punctual/Time conscious • Cost conscious • Environmental and pollution conscious • Flexible/adaptable • Honest • Socially responsible • Dependable • Innovative • Alert • Systematic and organized • Committed • Good listener and fast learner • Creative • Resourceful • Self–starter • Nationalistic and patriotic	
2. Prepare the raw materials	2.1 ***Mangoes*** are sorted and graded in accordance with product specifications and standards. 2.2 Sorted fruits are ***prepared*** according to required forms and	2.1 Identifying acceptable quality raw materials and other ingredients used to preserve fruits by sugar concentration	2.1 Sorting and grading of raw materials 2.2 Segregating reject raw materials 2.3 Preparing sorted fruits

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	target finished product 2.3 Prepared fruits for marmalade making are boiled to obtain the juice extract 2.4 Required amounts raw material, sugar and citric acid are measured according to specifications 2.5 Tools and utensils for raw materials are used based on work requirements and manuals. 2.6 Equipment are operated following manufacturer's manual.	2.2 Preparing procedures of raw materials 2.3 Sorting and grading methods for raw materials 2.4 Preparation of sorted fruits 2.5 Marmalade making 2.6 Measurement of required pectin, sugar and citric acid 2.7 Steps in using tools and operating equipment (weighing scales, food processor, pH meter and cutter) 2.8 Functions and uses of tools and utensils for raw material preparation 2.9 Trimmings of raw materials 2.10 Procedure in testing pectin content, total soluble solids (TSS) and pH 2.11 Methods of accomplishing forms and checklists of raw materials as received and rejects 2.12 Procedures on reporting of defects, breakdown and other irregularities during the activities to	2.4 Performing jelly and marmalade making 2.5 Using tools and utensils 2.6 Operating equipment such as weighing scales, food processor, cutter 2.7 Practicing sanitation in preparation of raw materials 2.8 Utilizing raw material trimmings 2.9 Preparing Acid and Sugar Mixture and Pectin 2.10 Testing pectin concentration 2.11 Determining TSS and pH 2.12 Reading process flow charts for raw materials preparation 2.13 Recording through accomplishing forms and checklist of raw materials as received and rejects including other inputs 2.14 Recording and reporting skills on the condition and defects of tools, utensils and equipment. 2.15 Interpersonal skills 2.16 Oral communication skills 2.17 Computing brix/acid ratio

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		immediate head/supervisor 2.13 Recording and reporting of inputs 2.14 Four fundamental operations (addition, subtraction, multiplication and division) 2.15 Conversions (metric and English system) for weights and measures 2.16 Ratio and proportions for formulation of 2.17 Percentages 2.18 Food safety principles and practices on raw materials preparations 2.19 Food handling practices on raw materials preparations 2.20 Proper waste disposal 2.21 Occupational Safety and Health Standards (OSHS) for raw materials preparations 2.22 Current Good Manufacturing Practices 2.23 Hazard Analysis & Critical Control Points (HACCP) basic principles 2.24 Philippine Quality	2.18 Performing basic mathematical skills 2.19 Performing conversions 2.20 Acid ratio adjustment and computation 2.21 Practicing of sanitary food handling for raw materials preparations 2.22 Following environment rules and regulations in segregating and disposing wastes 2.23 Practicing OSHS such as wearing of PPE 2.24 Practicing cGMP, 7S HACCP, SSOP and AQL on preparing raw materials 2.25 Maintaining various equipment, tools and utensils such as cleaning and sanitizing 2.26 Sourcing quality raw materials and ingredients

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		Challenge (PQC) and 2.25 ISO, HACCP, EMS (Environmental Management System) 2.26 Acceptable Quality Level (AQL) of raw materials and ingredients 2.27 SSOP Guidelines 2.28 7S of Good Housekeeping 2.29 Halal guidelines 2.30 Kosher and organic food processing guidelines 2.31 Usage of instructional manuals 2.32 Parts and functions of equipment, quality control tools/ instruments and utensils 2.33 Sourcing of quality raw materials and ingredients 2.34 Regular upkeep of various equipment, tools and utensils 2.35 Preventive maintenance of various equipment and tools use for preparing raw materials **Values:** Same as element # 1	

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Cook sugar concentrates	3.1 Prepared fruits in any form are blended with sugar mixture 3.2 Mixture is cooked to required temperature and total soluble solids 3.3 Desired endpoint is checked using spoon test.	3.1 Blending, cooking and cooling procedures 3.2 Sugar Preserves Product Standards: • Marmalade • Puree • Nectar • Candied fruits 3.3 Methods of calibrating and using thermometer and refractometer 3.4 Spoon test 3.5 Methods of accomplishing enterprise forms for temperature and TSS monitoring 3.6 Procedures on reporting of defects, breakdown and other irregularities during the activities to immediate head/supervisor 3.7 Recording and reporting of inputs 3.8 Four fundamental operations (addition, subtraction, multiplication and division) 3.9 Conversions (metric and English system) for temperature and TSS	3.1 Performing blending, cooking and cooling procedures 3.2 Determining required temperature and TSS 3.3 Determining and checking correct endpoint of different product standards 3.4 Calibrating refractometer 3.5 Reading temperature and refractometer 3.6 Demonstrating spoon testing 3.7 Reading process flow charts for cooking sugar concentrates 3.8 Recording through accomplishing forms including other inputs 3.9 Recording and reporting skills on the condition and defects of tools, utensils and equipment. 3.10 Interpersonal skills 3.11 Oral communication skills 3.12 Performing basic mathematical skills 3.13 Performing conversions 3.14 Practicing of sanitary food handling during cooking of sugar concentrates

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		3.10 Food safety principles and practices on cooking of sugar concentrates 3.11 Food handling practices on cooking of sugar concentrates 3.12 Proper waste disposal 3.13 Occupational Safety and Health Standards (OSHS) for cooking of sugar concentrates 3.14 Current Good Manufacturing Practices 3.15 Hazard Analysis & Critical Control Points (HACCP) basic principles 3.16 Philippine Quality Challenge (PQC) and 3.17 HACCP, EMS (Environmental Management System) 3.18 Acceptable Quality Level (AQL) of raw materials and ingredients 3.19 SSOP Guidelines 3.20 7S of Good Housekeeping 3.21 Halal guidelines 3.22 Kosher and organic food processing guidelines	3.15 Following environment rules and regulations in segregating and disposing wastes 3.16 Practicing OSHS such as wearing of PPE 3.17 Practicing cGMP, 7S HACCP, SSOP and AQL on cooking sugar concentrates 3.18 Maintaining various equipment, tools and utensils such as cleaning and sanitizing 3.19 Sourcing quality raw materials and ingredients

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		3.23 Usage of instructional manuals 3.24 Parts and functions of equipment, quality control tools/ instruments and utensils 3.25 Sourcing of quality raw materials and ingredients 3.26 Regular upkeep of various equipment, tools and utensils 3.27 Preventive maintenance of various equipment and tools use for cooking sugar concentrates **Values:** Same as element # 1	
4. Pack sugar concentrated products	4.1 ***Sugar concentrated products*** are packed and weighed in accordance with product specifications and required filling temperature 4.2 Sugar concentrated products are sealed and labeled in accordance with product specifications 4.3 Air cooling is performed according to product requirements. 4.4 ***Packing equipment*** is operated in accordance with instructions manual 4.5 ***Finished product inspection*** is	4.1 Different packing materials 4.2 Packing procedures and techniques 4.3 Significance of TSS and filling temperature 4.4 Primary, secondary, and tertiary packaging 4.5 Labeling information • Name of products • Net weight • Ingredients • Production/expiry date • Manufacturer's address	4.1 Packing skills for sugar concentrated products 4.2 Labeling and sealing skills for sugar concentrated products 4.3 Performing air cooling procedures 4.4 Operating packing equipment such as sealer 4.5 Inspecting finished products for conformance to specifications 4.6 Determining correct headspace

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	performed following quality ***control parameters*** 4.6 Food safety practices are employed according to HACCP and cGMP 4.7 Work safety measures are applied in accordance with OSHS.	• Allergen Program 4.6 Sealing procedures and techniques 4.7 Sealing integrity/ standards: • Checking headspace • Checking leakage 4.8 Air-cooling procedures 4.9 Different packing equipment 4.10 Steps of operating packing equipment 4.11 Checking techniques for finished products 4.12 Quality control parameters 4.13 Reporting of defects, irregularities and breakdown during packing operations to immediate head/supervisor 4.14 Accomplishing enterprise forms for recording of products weights 4.15 Recording of non-conformance packed products 4.16 Four fundamental operations (addition, subtraction, multiplication and division) 4.17 Conversions (metric and English system)	through visual means 4.7 Reading temperature 4.8 Reading flow diagrams/flow charts 4.9 Recording of finished products weights using enterprise forms/checklist 4.10 Reporting of any equipment malfunction, product or process nonconformance during packing operations 4.11 Practicing oral communication 4.12 skills 4.13 Performing interpersonal skills 4.14 Performing basic mathematical skills 4.15 Performing conversions 4.16 Applying environmental rules and regulations such waste segregation and disposals 4.17 Practicing sanitary food handling during packing operations 4.18 Practicing OSHS such as wearing of PPE 4.19 Practicing cGMP, 7S, SSOP, PNS and HACCP 4.20 Maintaining various equipment, tools

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		for weights of packed products 4.18 Food safety principles and practices for packing operations 4.19 Food handling practices for packing operations 4.20 Proper waste disposal 4.21 Occupational Safety and Health standards for packing operations 4.22 HACCP basic principles 4.23 Current Good Manufacturing practices 4.24 SSOP of packing operations Guidelines 4.25 7S of Good Housekeeping 4.26 Halal guidelines 4.27 Usage of instructional manuals 4.28 Parts and functions of packing equipment 4.29 Sourcing of packing materials for finished products 4.30 Regular upkeep of various equipment, tools, utensils and packing facilities 4.31 Preventive maintenance of packing	and utensils such as cleaning and sanitizing 4.21 Sourcing packing materials 4.22 Maintaining packing areas and facilities

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		equipment and tools **Values:** Same as element # 1	
5. Perform post-production activities	5.1 Packed food products are incubated according to required storage period. 5.2 Tools, materials and equipment are cleaned and stored based on workplace procedures and operation manuals 5.3 Proper disposal of wastes are practiced according to environmental rules and regulations. 5.4 ***Production data*** checklist is accomplished according to enterprise protocol.	5.1 Incubation of packed products 5.2 Different storage conditions and period 5.3 Operation of storage equipment (chiller/freezer) 5.4 Storing procedures and techniques for packed products 5.5 Cleaning and storing methods for equipment, tools and utensils 5.6 Storing procedures for excess materials and ingredients 5.7 Production data 5.8 Recording of storage time and temperature. 5.9 Preparation of daily production input report (spoilage and rejects) 5.10 Recording procedures of production data using enterprise forms 5.11 Reporting procedures on conditions of tools, equipment and utensils to immediate head/ supervisor.	5.1 Incubating packed food products 5.2 Storing packaged food products 5.3 Cleaning and storing of equipment, tools and utensils 5.4 Storing excess materials and ingredients 5.5 Operating storage equipment 5.6 Recording of storage time and temperature for finished products 5.7 Recording of spoilage and rejects 5.8 Recording of storage time and temperature 5.9 Recording of production data 5.10 Accomplishing/ completing enterprise forms and checklist on packing activities 5.11 Practicing interpersonal skills 5.12 Demonstrating oral communication skills 5.13 Accomplishing inventory forms 5.14 Demonstrating basic mathematical skills for production data recording

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		5.12 Inventory of excess materials and ingredients 5.13 Basic arithmetical operations like multiplication, division, addition and subtraction 5.14 Inventory of equipment, tools, utensils and materials 5.15 Environmental protection and concern 5.16 Food safety principles and practices for storage of finished products 5.17 Proper waste disposal 5.18 Occupational Safety and Health Standards on post production activities 5.19 CHACCP basic principles on storage of finished products 5.20 Current Good Manufacturing practices 5.21 SSOP of post-production activities Guidelines 5.22 7S of Good Housekeeping 5.23 Halal guidelines 5.24 Kosher and organic guidelines 5.25 Usage of instructional manuals	5.15 Computation of yields, recoveries and rejects 5.16 Following environmental rules and regulations such as wastes segregating and disposals. 5.17 Practicing sanitary food handling upon storing finished products 5.18 Practicing proper wastes disposal 5.19 Practicing OSHS such as wearing PPE during post production activities 5.20 Practicing cGMP, 7S, SSOP, PNS and HACCP 5.21 Maintaining various equipment, tools and utensils such as cleaning and sanitizing 5.22 Stowing of equipment, tools, utensils and materials 5.23 Sourcing of cleaning materials 5.24 Maintaining working areas and storage facilities

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		5.26 Parts and functions of all equipment, tools and utensils used in processing food by sugar concentration, including storage equipment 5.27 Sourcing of cleaning materials during shutting down operations 5.28 Regular upkeep of various equipment, tools, utensils and packing facilities 5.29 Preventive maintenance of equipment, tools and utensils use in post-production activities 5.30 Maintenance of storage facilities and room **Values:** Same as element # 1	

RANGE OF VARIABLES

VARIABLES	RANGE
1. Equipment and tools	**Equipment, tools and kitchen utensils and materials may include but not limited to:** 1.1 Cold storage equipment like chiller, refrigerator, freezer 1.2 Refractometer, pH meter, candy thermometer, jelly thermometer/tester 1.3 Weighing scale of various capacities and sensitivities 1.4 Cooking equipment like stove/burner 1.5 Steam jacketed kettle, jar lifter, wire baskets, chopping boards, vegetable cutter, blender (stainless steel), food processor**,** juice extractor

VARIABLES	RANGE
	1.6 Personal Protective Equipment (PPE) include apron, mouth masks, gloves and rubber boots, headgears such as caps, hairnets
2. Processing materials	**Processing materials include the following:** 2.1 Sugar 2.2 Water 2.3 Food additives
3. Kitchen utensils	**Kitchen utensils may include the following:** 3.1 Cutting implements such as: 3.1.1 knives 3.1.2 peelers 3.1.3 pulper finisher 3.1.4 slicer 3.1.5 cutter (for small scale) 3.2 Cooking utensils like: 3.2.1 stainless enameled plastic casserole 3.2.2 colanders 3.2.3 bowls 3.2.4 food tongs 3.2.5 steamer 3.2.6 strainer 3.2.7 basting spoon paddle 3.2.8 spatula 3.2.9 ladle
4. Preparation of sorted fruits	**Preparation of sorted fruits includes:** 4.1 Wash 4.2 Sanitize 4.3 Peel 4.4 Slice 4.5 Cut
5. Sugar concentrated products	**Sugar concentrated products may include:** 5.1 Mango marmalade 5.2 Mango puree 5.3 Mango nectar 5.4 Mango candied fruits 5.5 Mango juice 5.6 Mango halves with syrup
6. Packing equipment	**Packing equipment may include:** 6.1 Impulse sealer 6.2 Band sealer 6.3 Vacuum sealer 6.4 Plastic protect cap sealer 6.5 Plastic sealer 6.6 Hot blower
7. Finished product inspection	**Finished product inspection includes:** 7.1 Package integrity 7.2 Appropriateness of label 7.3 Conformance to product specifications

VARIABLES	RANGE
8. Quality control parameters	**Quality control parameters include:** 8.1 Raw material (TSS and condition of the raw material) 8.2 Inline processing (temperature and TSS) 8.3 Finish product (TSS and Titrable Acidity) 8.4 Cut Out Test (drained weight, net weight, vacuum)
9. Production data	**Production data include:** 9.1 Production schedule 9.2 Production target 9.3 Production input 9.3.1 Raw Materials 9.3.2 Ingredients 9.3.3 Processing materials 9.3.4 Packaging materials 9.4 Production output 9.4.1 Quantity of finished goods 9.4.2 Rejects 9.4.3 Yields

EVIDENCE GUIDE

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Prepared equipment, tools, materials and utensils 1.2 Prepared the raw materials 1.3 Cooked sugar concentrates 1.4 Packed sugar concentrated products 1.5 Performed post production activities 1.6 Practiced cGMP, HACCP, 7S of Good Housekeeping, SSOP, AQL and OSHS
2. Resource Implications	**The following resources should be provided:** 3.1 Specific work area/station 3.2 Equipment, tools and utensils to prepare and to process fruits and vegetables by sugar concentration. 3.3 Materials relevant to the proposed activity
3. Methods of Assessment	**Competency in this unit must be assessed using at least two (2) of the following methods:** 2.1 Written test 2.2 Demonstration with oral questioning 2.3 Direct observation with oral questioning
4. Context of Assessment	4.1 Competency maybe assessed in actual workplace or at the designated TESDA Accredited Assessment Center.

UNIT OF COMPETENCY : PROCESS MANGOES BY DRYING AND DEHYDRATION

UNIT CODE : PFBXXX

UNIT DESCRIPTOR : This unit deals with the knowledge, skills and attitudes required to prepare equipment, tools, materials and utensils, prepare the raw materials, dry pre-treated raw materials, cool and sweat dried products, pack dried products and perform post-production activities. It includes process foods by sun drying, dehydrator, and solar drying to produce products such as mango bar, dried mango and mango leather.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Prepare equipment, tools, materials and utensils	1.1 ***Equipment and tools*** are ***prepared*** in accordance with manufacturer's specifications 1.2 ***Processing materials*** are sourced-out and made available according to work requirements. 1.3 ***Kitchen utensils*** are checked and sanitized in accordance with manufacturer's specifications. 1.4 ***Ingredients*** are prepared according to product requirements. 1.5 Safety measures are applied in accordance with Occupational Safety and Health Standards (OSHS)	1.1 Types of equipment and tools for processing food by drying and dehydration 1.2 Preparation of equipment and tools 1.3 Inspection and checking procedures of various equipment, tools and utensils 1.4 Calibration of quality control tools 1.5 Calibration of weighing scales 1.6 Procedures on reporting of conditions and defects/ breakdown of equipment, tools and utensils to immediate head/supervisor 1.7 Methods of accomplishing inspection forms and checklists for preparation of equipment, tools and kitchen utensils 1.8 Basic components of a report 1.9 Preparation of processing materials	1.1 Preparing equipment and tools 1.2 Inspecting and checking skills 1.3 Calibrating of weighing scales and quality control tools such as thermometer, pH meter refractometer and salinometer 1.4 Recording and reporting skills on the condition and defects of tools, utensils and equipment. 1.5 Preparing processing materials 1.6 Practicing communication skills • Interpersonal skills • Oral communication • Writing skills, accomplishing forms and checklist in line

		1.10 Proper waste disposal 1.11 Occupational Safety and Health Standards (OSHS) 1.12 Current Good Manufacturing Practices 1.13 Sanitation Standard Operating Procedures (SSOP) for preparation of equipment, tools and kitchen utensils 1.14 7S (sort, systematize, sweep, standardize, self- discipline, safety and security) of Good Housekeeping 1.15 Halal guidelines 1.16 Usage of instructional manuals 1.17 Parts and functions of equipment, quality control tools/ instruments and utensils 1.18 Sources good quality supplies and materials in line with preparation activities. 1.19 Regular upkeep of various equipment, tools and utensils 1.20 Preventive maintenance of various equipment and tools **Values:** • Self- esteem • Time conscious/punctual • Flexible/adaptable • Honest • Dependable • Self-starter • Alert • Systematic and organized • Committed • Good team worker • Good listener and fast learner • Creative	with preparation activities 1.7 Following environment rules and regulations in segregating and disposing wastes 1.8 Practicing OSHS such as wearing Personal Protective Equipment (PPE) 1.9 Practicing cGMP, SSOP and 7S 1.10 Practicing sanitation in preparing various equipment, tools and utensils 1.11 Maintaining various equipment, tools and utensils such as cleaning and sanitizing 1.12 Sourcing quality supplies and materials according to specifications.

		• Nationalistic and patriotic	
2. Prepare the raw materials	*2.1* Mangoes are sorted and graded in accordance with product specifications. *2.2* Manoges are ***prepared*** based on specified procedures and methods of processing. *2.3* Cleaned raw materials are weighed in accordance with approved specifications. *2.4* Tools and utensils for raw materials are used based on work requirements and manuals. *2.5* Equipment are operated following manufacturer's manual. *2.6* Raw materials are ***pre-treated*** prior to drying. .	2.1 Different raw materials used in drying and dehydration 2.2 Sorting and grading methods for raw materials 2.3 Accepts and rejects 2.4 Preparation of raw materials 2.5 Steps in using tools and utensils and operating equipment (weighing scales, food processor and cutter) 2.6 Functions and uses of tools and utensils for raw material preparation 2.7 Trimmings of raw materials 2.8 Pre-treatment methods of raw materials prior to drying Blanching/ syruping 2.9 Methods of accomplishing forms and checklists of raw materials as received and rejects 2.10 Procedures on reporting of defects, breakdown and other irregularities during the activities to immediate head/supervisor 2.11 Recording and reporting of inputs 2.12 Four fundamental operations (addition, subtraction, multiplication and division) 2.13 Conversions (metric and English system) for weights and measures 2.14 Ratio and proportions for formulation of	2.1 Segregating reject raw materials 2.2 Preparing raw materials 2.3 Sorting and grading of raw materials 2.4 Using tools and utensils 2.5 Operating equipment such as weighing scales, food processor, cutter 2.6 Practicing sanitation in preparation of raw materials 2.7 Utilizing raw material trimmings 2.8 Pre-treating raw materials 2.9 Reading process flow charts for raw materials preparation 2.10 Recording through accomplishing forms and checklist of raw materials as received and rejects including other inputs 2.11 Recording and reporting skills on the condition and defects of tools, utensils and equipment. 2.12 Interpersonal skills 2.13 Oral communication skills 2.14 Performing basic mathematical skills 2.15 Performing conversions 2.16 Practicing of sanitary food handling for raw

		2.15 Percentages 2.16 Food safety principles and practices on raw materials preparations 2.17 Food handling practices on raw materials preparations 2.18 Proper waste disposal 2.19 Occupational Safety and Health Standards (OSHS) for raw materials preparations 2.20 Current Good Manufacturing Practices 2.21 Hazard Analysis & Critical Control Points (HACCP) basic principles 2.22 SSOP Guidelines 2.23 7S of Good Housekeeping 2.24 Halal guidelines 2.25 Kosher and organic food processing guidelines 2.26 Usage of instructional manuals 2.27 Parts and functions of equipment, quality control tools/ instruments and utensils 2.28 Sourcing of quality raw materials, spices and ingredients 2.29 Regular upkeep of various equipment, tools and utensils 2.30 Preventive maintenance of various equipment and tools use for preparing raw materials **Values:** Same as element # 1	materials preparations 2.17 Following environment rules and regulations in segregating and disposing wastes 2.18 Practicing OSHS such as wearing of PPE 2.19 Practicing cGMP, 7S HACCP and SSOP on preparing raw materials 2.20 Maintaining various equipment, tools and utensils such as cleaning and sanitizing 2.21 Sourcing quality raw materials, spices and ingredients
3. Dry pre-treated raw materials	3.1 Mangoes subjected to syruping are	3.1 Washing and draining procedures and techniques	3.1 Performing washing and

	washed and drained in accordance with standard operating procedures. 3.2 Pre-treated raw materials are dried in accordance with standard operating procedures 3.3 Operate equipment according to manufacturer's manual 3.4 Practice safety and good housekeeping in accordance to OHS, HACCP and cCGMP standards.	3.2 Different additives and preservatives to be used 3.3 Alternative tools and equipment 3.4 Different types of food dryer and dehydrators 3.5 Drying and dehydration procedures and techniques 3.6 Methods of accomplishing forms and checklists of drying pre-treated raw materials 3.7 Procedures on reporting of defects, breakdown and other irregularities during the activities to immediate head/supervisor 3.8 Recording and reporting of daily production input report (spoilage and rejects) 3.9 Four fundamental operations (addition, subtraction, multiplication and division) 3.10 Conversions (metric and English system) for weights and measures 3.11 Ratio and proportions for formulation 3.12 Percentages 3.13 Food safety principles and practices on drying pre-treated raw materials 3.14 Food handling practices on drying pre-treated raw materials 3.15 Proper waste disposal 3.16 Occupational Safety and Health Standards (OSHS) for raw	draining procedures 3.2 Performing drying and dehydration skills and techniques 3.3 Using additives, preservatives and alternative tools and equipment 3.4 Operating dryer and dehydrators 3.5 Reading process flow charts for drying pre-treated raw materials 3.6 Recording through accomplishing forms and checklist of drying pre-treated raw materials 3.7 Recording and reporting the time and temperature during drying 3.8 Recording and reporting skills on the condition and defects of tools, utensils and equipment. 3.9 Interpersonal skills 3.10 Oral communication skills 3.11 Performing basic mathematical skills for computing daily production inputs 3.12 Performing conversions 3.13 Practicing of sanitary food handling drying pre-treated raw materials 3.14 Following environment rules and regulations in segregating and disposing wastes 3.15 Practicing OSHS such as wearing of PPE

		materials preparations 3.17 Current Good Manufacturing Practices 3.18 Hazard Analysis & Critical Control Points (HACCP) basic principles 3.19 SSOP Guidelines 3.20 7S of Good Housekeeping 3.21 Halal guidelines 3.22 Kosher and organic food processing guidelines 3.23 Can understand and follow instructional manuals 3.24 Parts and functions of equipment, quality control tools/ instruments and utensils 3.25 Sourcing of quality raw materials and ingredients for drying pre-treated raw materials 3.26 Regular upkeep of various equipment, tools and utensils 3.27 Preventive maintenance of various equipment (weighing scales, dehydrators and solar dryer) and tools use for drying pre-treated raw materials. **Values:** Same as element # 1	3.16 Practicing cGMP, 7S HACCP and SSOP on preparing raw materials 3.17 Maintaining various equipment, tools and utensils such as cleaning and sanitizing 3.18 Sourcing quality raw materials and ingredients
4. Cool and sweat dried products	4.1 Dried products are removed from the dryer 4.2 Correct cooling and sweating procedures are done in accordance to standard operating procedures 4.3 Products are checked	4.1 Features of dried product prior to removal from dryer 4.2 Cooling and sweating procedures and techniques 4.3 Corrective measures for non-conforming products 4.4 Methods of checking dried products 4.5 Grading procedures of dried products	4.1 Performing cooling and sweating skills and techniques 4.2 Applying corrective measures for non-conforming products 4.3 Checking of dried products 4.4 Grading of dried products 4.5 Reading process flow charts for

	according to required specifications. 4.4 Extension of drying time is applied to under processed products. 4.5 Grading of dried products is performed following product specifications. 4.6 Current Good Manufacturing Practice (cCGMP) are followed.	4.6 Methods of accomplishing forms and checklists for cooling and sweating of dried products 4.7 Procedures on reporting of defects, breakdown and other irregularities during the activities to immediate head/supervisor 4.8 Recording and reporting of daily production input report (spoilage and rejects) 4.9 Four fundamental operations (addition, subtraction, multiplication and division) 4.10 Conversions (metric and English system) for weights and measures 4.11 Food safety principles and practices on cooling and sweating of dried products 4.12 Food handling practices on cooling and sweating of dried products 4.13 Proper waste disposal 4.14 Occupational Safety and Health Standards (OSHS) for raw materials preparations 4.15 Current Good Manufacturing Practices 4.16 Hazard Analysis & Critical Control Points (HACCP) basic principles 4.17 SSOP Guidelines 4.18 7S of Good Housekeeping 4.19 Halal guidelines	cooling and sweating of dried products 4.6 Recording through accomplishing forms and checklist of cooling and sweating of dried products 4.7 Recording and reporting skills on the condition and defects of tools, utensils and equipment. 4.8 Interpersonal skills 4.9 Oral communication skills 4.10 Performing basic mathematical skills for computing daily production inputs 4.11 Performing conversions 4.12 Practicing of sanitary food handling on cooling and sweating of dried products 4.13 Following environment rules and regulations in segregating and disposing wastes 4.14 Practicing OSHS such as wearing of PPE 4.15 Practicing cGMP, 7S HACCP and SSOP on cooling and sweating of dried products 4.16 Maintaining various equipment, tools and utensils such as cleaning and sanitizing 4.17 Sourcing quality raw materials and ingredients

		4.20 Kosher and organic food processing guidelines 4.21 Usage of instructional manuals 4.22 Parts and functions of equipment, tools/ instruments and utensils 4.23 Sourcing of quality raw materials and ingredients for cooling and sweating dried products 4.24 Regular upkeep of various equipment, tools and utensils 4.25 Preventive maintenance of various equipment and tools use for cooling and sweating of dried products **Values:** Same as element # 1	
5. Pack dried products	5.1 ***Dried products*** are packed and weighed in accordance with product specifications 5.2 Dried products are sealed and labeled in accordance with product specifications 5.3 Packing procedures are performed in accordance to cGMP 5.4 Packing equipment is operated in accordance with manual instructions 5.5 Work safety measures are applied in accordance with OSHS 5.6 ***Finished product***	5.1 Different packing materials for dried products 5.2 Packing procedures and techniques 5.3 Primary, secondary, and tertiary packaging 5.4 Sealing method and techniques 5.5 Sealing integrity/ standards 5.6 Labeling information • Name of products • Net weight • Ingredients • Production/expiry date • Manufacturer's • address • Allergen Program 5.7 Operating procedures of various packing equipment, 5.8 Different packing tools and utensils 5.9 Checking techniques for finished products	5.1 Packing and weighing of processed dried products 5.2 Labeling and sealing of processed dried products 5.3 Operating packing equipment such as sealer 5.4 Inspecting finished products for conformance to specifications 5.5 Reading flow diagrams/flow charts 5.6 Recording of finished products weights using enterprise forms/checklist 5.7 Reporting of any equipment malfunction, product or process non-conformance during packing operations

	inspection is performed following established industry procedures.	5.10 Segregation of non-conforming products 5.11 Reporting of defects, irregularities and breakdown during packing operations to immediate head/supervisor 5.12 Accomplishing enterprise forms for recording of products weights 5.13 Recording of non-conformance packed products 5.14 Four fundamental operations (addition, subtraction, multiplication and division) 5.15 Conversions (metric and English system) for weights of packed products 5.16 Food safety principles and practices for packing operations 5.17 Food handling practices for packing operations 5.18 Proper waste disposal 5.19 Occupational Safety and Health standards for packing operations 5.20 HACCP basic principles 5.21 Current Good Manufacturing practices 5.22 SSOP of packing operations Guidelines 5.23 7S of Good Housekeeping 5.24 Halal guidelines 5.25 Can understand and follow instructional manuals 5.26 Parts and functions of packing equipment 5.27 Sourcing of packing materials for finished products	5.8 Practicing oral communication skills 5.9 Performing interpersonal skills 5.10 Performing basic mathematical skills for computing yield, including rejects and spoilage 5.11 Performing conversions 5.12 Applying environmental rules and regulations such waste segregation and disposals 5.13 Practicing sanitary food handling during packing operations 5.14 Practicing OSHS such as wearing of PPE 5.15 Practicing cGMP, 7S, SSOP, and HACCP 5.16 Maintaining various equipment, tools and utensils such as cleaning and sanitizing 5.17 Sourcing packing materials 5.18 Maintaining packing areas and facilities

		5.28 Regular upkeep of various equipment, tools, utensils and packing facilities 5.29 Preventive maintenance of packing equipment and tools **Values:** Same as element # 1	
6. Perform post-production activities	6.1 Packed finished food products are stored according to required storage condition 6.2 Tools, materials and equipment are cleaned and stored based on workplace procedures and operation manuals 6.3 Proper disposal of wastes are practiced according to environmental rules and regulations. 6.4 ***Production data*** checklist is accomplished according to enterprise protocol.	6.1 Different storage conditions 6.2 Operation of storage equipment (chiller/freezer) 6.3 Storing procedures and techniques for packed products 6.4 Cleaning and storing methods for equipment, tools and utensils 6.5 Storing procedures for excess materials and ingredients 6.6 Production data 6.7 Recording of storage time and temperature. 6.8 Preparation of daily production input report (spoilage and rejects) 6.9 Recording procedures of production data using enterprise forms 6.10 Reporting procedures on conditions of tools, equipment and utensils to immediate head/ supervisor. 6.11 Inventory of excess materials and ingredients 6.12 Basic arithmetical operations like multiplication, division, addition and subtraction 6.13 Inventory of equipment, tools, utensils and materials	6.1 Storing packaged food products 6.2 Cleaning and storing of equipment, tools and utensils 6.3 Storing excess materials and ingredients 6.4 Recording of storage time and temperature for finished products 6.5 Recording of spoilage and rejects 6.6 Recording of yields and recoveries 6.7 Recording of production data 6.8 Accomplishing/ completing enterprise forms and checklist on packing activities 6.9 Practicing interpersonal skills 6.10 Demonstrating oral communication skills 6.11 Accomplishing inventory forms 6.12 Demonstrating basic mathematical skills for production data recording 6.13 Computation of yields, recoveries and rejects 6.14 Following environmental rules and

		6.14 Environmental protection and concern 6.15 Food safety principles and practices for storage of finished products 6.16 Proper waste disposal 6.17 Occupational Safety and Health Standards on post production activities 6.18 HACCP basic principles on storage of finished products 6.19 Current Good Manufacturing practices 6.20 SSOP of post-production activities 6.21 7S of Good Housekeeping 6.22 Halal guidelines 6.23 Kosher and organic guidelines 6.24 Usage of instructional manuals 6.25 Parts and functions of all equipment, tools and utensils used in drying and dehydration operations, including storage equipment 6.26 Sourcing of cleaning materials during shutting down operations 6.27 Regular upkeep of various equipment, tools and utensils used in post-production activities 6.28 Preventive maintenance of equipment, tools and utensils use in post-production activities 6.29 Maintenance of storage facilities and room **Values:** Same as element # 1	regulations such as wastes segregating and disposals. 6.15 Practicing sanitary food handling upon storing finished products 6.16 Practicing OSHS such as wearing PPE during post production activities 6.17 Practicing cGMP, 7S, SSOP and HACCP 6.18 Maintaining various equipment, tools and utensils such as cleaning and sanitizing 6.19 Stowing of equipment, tools, utensils and materials 6.20 Sourcing cleaning materials 6.21 Maintaining working areas and storage facilities

RANGE OF VARIABLES

VARIABLE	RANGE
1. Equipment and tools	**Equipment and tools may include the following:** 1.1 Equipment: 1.1.1 Cabinet drier 1.1.2 Solar drier 1.1.3 Vacuum sealer 1.1.4 Polysealer 1.1.5 Cabinet dryer with trays 1.1.6 Solar Dryer 1.1.7 Moisture Analyzer 1.1.8 Freezer Upright 1.1.9 Refrigerator 1.1.10 Weighing scale • Weighing scale (10-50 kgs) • Weighing scale (1-6 kgs) 1.2 Tools 1.2.1 Timer 1.2.2 Probe thermometer 1.2.3 Knife sets 1.2.4 Sharpener 1.2.5 Salinometer 1.2.6 Refractometer 1.2.7 Pressure gauge 1.2.8 Temperature gauge\ 1.2.9 Cooler
2. Preparation of equipment and tools	**Preparation of equipment and tools includes:** 2.1 Sanitation 2.2 Calibration/adjustments 2.3 Checking/inspecting 2.3.1 Equipment performance 2.3.2 Defective equipment and tools
3. Processing materials	**Processing materials include:** 3.1 PPE 3.1.1 Aprons 3.1.2 Hair Nets 3.1.3 Mouth Masks 3.1.4 Rubber Boots 3.1.5 Gloves 3.2 PEB/PP 3.3 Laminated Foil 3.4 Sticker labels 3.5 Styrophor chest
4. Kitchen utensils	**Kitchen utensils include:**

VARIABLE	RANGE
	4.1 Measuring spoons 4.2 Spatula 4.3 Food trays 4.4 Colanders 4.5 Trays 4.6 Containers for salt, condiments, spices
5. Ingredients	**Ingredients include:** 5.1 Salt 5.2 Sugar 5.3 Condiments 5.4 Food-grade colorants 5.5 Food additives for drying and dehydration
6. Preparation of raw materials	**Preparation of raw materials include:** 6.1. Washing 6.2. Cleaning 6.3. Peeling 6.4. Slicing 6.5. Cutting
7. Pre-Treatment of raw materials	**Pre-treatment of raw materials includes:** 7.1 Syruping 7.2 Plumping 7.3 Soaking 7.4 Salting 7.5 Acidiying (anti-browning) 7.6 Blanching 7.7 Application of food additives such as anti-browning, anti-oxidants and anti-molds
8. Dried products	**Dried products may include:** 8.1. Dried mangoes 8.2. Mango leather 8.3. Mango bar
9. Finished product inspection	**Finished product inspection includes:** 9.1. Package integrity 9.2. Appropriateness of label 9.3. Conformance to product specifications
10. Production Data	**Production data include:** 10.1 Production schedule 10.2 Production target 10.3 Production input 10.3.1 Raw Materials 10.3.2 Ingredients 10.3.3 Processing materials 10.3.4 Packaging materials 10.4 Production output 10.4.1 Quantity of finished goods 10.4.2 Rejects 10.4.3 Yields

EVIDENCE GUIDE

5. Critical Aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Prepared equipment, tools, materials and utensils 1.2 Prepared the raw materials 1.3 Dried pre-treated raw materials 1.4 Cooled and sweat dried products 1.5 Packed dried products 1.6 Performed post- production activities 1.7 Practiced safety and good housekeeping following OSHS, HACCP, and 7S of Good Housekeeping, SSOP and cGMP standards.
6. Resource Implications	**The following resources should be provided:** 2.1 Specific work area/station 2.2 Equipment, tools and utensils to be prepared for drying and dehydration activities 2.3 Mangoes 2.4 Materials, supplies and ingredients relevant to the proposed activity 2.5 Manuals and references
7. Methods of Assessment	**Competency in this unit must be assessed using at least two (2) of the following methods:** 3.1 Written test 3.2 Direct observation with oral questioning 3.3 Demonstration with oral questioning
8. Context of Assessment	4.1 Competency maybe assessed in actual workplace or at the designated TESDA Accredited Assessment Center.

SECTION 3: TRAINING ARRANGEMENTS

3.1 TRAINEE ENTRY REQUIREMENTS

Trainees or students wishing to enroll in this course should possess the following requirements:

- Able to communicate, both orally and in writing
- Able to communicate, verbal or non-verbal; and
- Able to perform basic arithmetic operation

3.2 TRAINER QUALIFICATIONS FOR PROCESSED FOOD AND BEVERAGES SECTOR

Trainers who will deliver the training on MANGO PROCESSING LEVEL II should have the following:

- Must be practicing trainer or attended 80 hours of trainer's training within the last three (3) years
- Must have 2 years industry experience relevant to the area within the last five years

*Note: Consider iWER guidelines (apprenticeship) in converting training/seminar to industry experiences

3.3 LIST OF TOOLS, MATERIALS AND EQUIPMENT

Recommend list of tools, materials and equipment for the training of 25 trainees for Mango Processing Level II.

FULL COMPENTENCY STANDARDS

TOOLS		EQUIPMENT		MATERIALS	
QTY	**Description**	**QTY**	**Description**	**QTY**	**Description**
5 sets	Measuring spoons	2 units	Weighing scale (10-50 kgs)	50 pcs.	Aprons
5 sets	SS Spatula	5 units	Weighing scale (1-6 kgs)	50 pcs.	Hair Nets
5 sets	Food trays	5 units	Polysealer	50 pcs.	Mouth Masks
		1 unit	pH meter	25 pairs	Rubber Boots
25 pcs.	Trays	1 unit	Freezer Upright	100 pairs	Gloves
50 pcs.	Containers for salt, condiments, spices	1 unit	Refrigerator	100 pcs	Polyethylene bottle (PEB)/ Polypropylene (PP)
10 pcs.	Mixing Containers/Vats	1 unit	Cooler box	100 pcs	NYPE pouch
25 pcs	Knife	5 units	Stove	100 pcs.	Sticker labels
5 pcs.	Whetstone	1 set	Titration set-up	10 kg	Fresh green mango fruit (5kg for pickled mango and 5kg for sweet and sour)

10 pcs.	Chopping boards	2 units	Waring blender	10 kg	Fresh ripe mango fruit (5 kg for mango vinegar and 5 kg for mango wine
5 units	Calculator	1 unit	Water bath	30 kg	Refined sugar
5 pcs	Strainer	1 unit	Pulp extractor	50g	Wine yeast
5 pcs	Graduated cylinder (glass)	1 unit	Trolley	50g	Sodium metabisulfite
5 pcs	Flasks	1 unit	Pressure cooker	1 kg	Salt
5 pcs	Funnel	2 units	Jacketed kettle	1000ml	Mother vinegar
5 pcs	Gallon jars			100 pcs	Glass bottles
10 pcs.	• Plastic rectangular perforated trays	1 unit	Headspace gauge	20 pcs	Wine bottles
10 pcs.	• Long handled ladles (SS)	5 units	Vernier caliper	20 pcs	Cork/aluminum cap
5 pcs.	• Heavy duty buttom pan (SS)	5 units	Gas tank	20 pcs	Cap seal
15 pcs.	• Paring knives	1 unit	Vacuum gauge	500 g	Cotton
10 pcs.	• Knives SS	1set	Food processor, set	500 ml	5.25% chlorine bleach (Ex. Zonrox)
10 pcs.	• Peelers	5 units	Stainless steel blender	15 kg	Rare-ripe mangoes
5 sets	• Measuring cups (solid) SS	5 units	Digital weighing scales 1 – 2 kg capacity with 2 decimal graduation	15 kg	Ripe mangoes
5 sets	• Measuring cups for liquid (plastic)	2 units	Steamer	500g	Lemon rind
5 pcs.	• Clocks/timer	1 unit	Plastic protect cap sealer (heat gun or hot blower)	50g	Refined salt
15 pcs.	• Mixing bowls, stainless steel	5 pcs	Washing vat	15 pcs	Sterilized jars with PVC cap (approx. 2-3 bottle per kg of fruits)
10 pcs.	• Heavy duty plastic chopping board (HDPE)	1 unit	Cabinet dryer with trays	50 pcs.	Masks
5 pcs.	• Dial thermometers	1 unit	Solar Dryer	100 pcs.	Laminated Foil
5 pcs.	• Jar lifter	1 unit	Dehydrator	15 kg	Ripe mango fruit
5 pcs.	• Wire baskets	1 unit	Vacuum sealer	600 g	Lemon juice (or citric acid)
15 pcs.	• Casseroles stainless steel	1 unit	Double boiler	500g	Confectionary sugar
10 pcs.	• Basting spoon paddle			10g	Potassium metabisulphite

4 pcs.	• Food tongs			50ml	Glycerine
15 pcs.	• Colanders, stainless steel			50 pcs	Polyethylene/Polypropylene bags (0.003 mm thickness)
5 pcs.	• Wooden spoon			**TRAINING MATERIALS**	
5 pcs.	• Strainer			5 copies	books/ reference
5 pcs.	Timer			5 copies	manual
5 sets	Knife sets			5 copies	videos
5 pcs	Sharpener				
2 units	Refractometer (0-90^{o} brix)				
1 set	Salinometer with cylinder				
1 unit	Probe thermometer				
1 unit	Pressure gauge				
1 unit	Temperature gauge				

PROCESS FOOD BY FERMENTATION AND PICKLING
(for sweet and sour mango, pickled mango, mango wine and mango vinegar)

TOOLS		EQUIPMENT		MATERIALS	
QTY	**Description**	**QTY**	**Description**	**QTY**	**Description**
5 sets	Measuring spoons	1 unit	Weighing scale (10-50 kgs)	50 pcs.	Aprons
5 sets	Spatula	5 units	Weighing scale (1-6 kgs)	50 pcs.	Hair Nets
5 sets	Food trays	1 unit	Refractometer	50 pcs.	Mouth Masks
5 pcs.	Colanders	5 units	Polysealer	25 pairs	Rubber Boots
25 pcs.	Trays	1 unit	pH meter	100 pairs	Gloves
50 pcs.	Containers for salt, condiments, spices	1 unit	Probe thermometer	100 pcs	Polyethylene bottle (PEB)/ Polypropylene (PP)
10 pcs.	Mixing Containers/Vats	1 set	Salinometer with cylinder	100 pcs	NYPE pouch
25 pcs	Knife	1 unit	Freezer Upright	100 pcs.	Sticker labels
5 pcs.	Whetstone	1 unit	Refrigerator	10 kg	Fresh green mango fruit (5kg for pickled mango and 5kg for sweet and sour)
10 pcs.	Chopping boards	1 unit	Cooler box	10 kg	Fresh ripe mango fruit (5 kg for mango vinegar and 5 kg for mango wine
5 units	Calculator	5 units	Stove	8 kg	Sugar, refined
5 pcs	Strainer	1 set	Titration set-up	50g	Wine yeast

5 pcs	Graduated cylinder (glass)	1 units	Whiteboard eraser	50g	Sodium metabisulfite
5 pcs	Flasks	2 units	Waring blender	1 kg	Salt
5 pcs	Funnel	1 unit	Water bath	1000ml	Mother vinegar
5 pcs	Gallon jars	1 unit	Pulp extractor	100 pcs	Glass bottles
				20 pcs	Wine bottles
				20 pcs	Cork/aluminum cap
		TRAINING MATERIALS		20 pcs	Cap seal
		5 copies	• books/ reference	500 g	Cotton
		5 copies	• manual	100 ml	5.25% chlorine bleach (Ex. Zonrox)
		5 copies	• videos		

PROCESS FOOD BY SUGAR CONCENTRATION

(for mango marmalade, mango jam, mango puree, mango nectar, mango juice, mango candied fruits)

TOOLS		EQUIPMENT		MATERIALS	
QTY	**Description**	**QTY**	**Description**	**QTY**	**Description**
10 pcs.	Plastic rectangular perforated trays	1 unit	Refrigerator	10 kg	• Refined sugar
10 pcs.	Long handled ladles (SS)	1 unit	Freezer	15 kg	Rare-ripe mangoes
5 pcs.	Heavy duty buttom pan (SS)	1 unit	Mechanical or cabinet drier	15 kg	Ripe mangoes
15 pcs.	Pairing knives	5 units	Stoves	100g	Citric acid (food grade)
10 pcs.	Knives SS	1 unit	ph Meter	500g	Lemon rind
10 pcs.	Peelers	1 unit	Trolley	50g	Refined salt
5 sets	Measuring spoons, sets SS	1 unit	Cap sealer	15 pcs	Sterilized jars with PVC cap (approx. 2-3 bottle per kg of fruits)
5 sets	Measuring cups (solid) SS	1 unit	Pressure cooker	200 ml	5.25% chlorine bleach (Ex. Zonrox)
5 sets	Measuring cups for liquid (plastic)	2 units	Jacketed kettle	**TRAINING MATERIALS**	
5 pcs.	Clocks/timer	2 units	Refractometer (0-90^{o} brix)	5 copies	books/reference
15 pcs.	Mixing bowls, stainless steel	1 unit	Headspace gauge	5 copies	manual
10 pcs.	Heavy duty plastic chopping board (HDPE)	5 units	Vernier caliper	5 copies	videos
5 pcs.	Dial thermometers	5 units	Gas tank		
5 pcs.	Jar lifter	1 unit	Vacuum gauge		
5 pcs.	Wire baskets	5 units	Weighing scales (10 kg. capacity)		

15 pcs.	Casseroles stainless steel	1set	Food processor, set		
10 pcs.	Basting spoon paddle	5 units	Stainless steel blender		
4 pcs.	Food tongs	5 units	Digital weighing scales 1 – 2 kg cap with 2 decimal graduation		
5 pcs.	SS spatula	2 units	Steamer		
20 pcs.	Utility trays	1 unit	Plastic protect cap sealer or heat gun (same with hot blower)		
15 pcs.	Colanders, stainless steel	5 pcs	Washing vat		
5 pcs.	Funnel SS	1 unit	Pulp extractor		
5 pcs.	Wooden spoon				
5 pcs.	Strainer				

PROCESS FOOD BY DRYING AND DEHYDRATION
(for mango bar, dried mango, mango leather)

TOOLS		EQUIPMENT		MATERIALS	
QTY	**Description**	**QTY**	**Description**	**QTY**	**Description**
5 pcs.	Timer	1unit	Freezer Upright	50 pcs.	Aprons
5 sets	Knife sets	1 unit	Refrigerator	50 pcs.	Hair nets
5 pcs	Sharpener	1 unit	Cabinet dryer with trays	50 pcs.	Masks
5 sets	Measuring spoons	1 unit	Solar Dryer	25 pairs	Rubber boots
5 sets	Spatula	1 unit	Dehydrator	100 pcs	Gloves
5 sets	Food trays	1 unit	Vacuum sealer	100 pcs	Polyethylene bottle (PEB)/ Polypropylene (PP)
25 pcs.	Utility Trays	5 units	Polysealer	100 pcs.	Laminated Foil
5 pcs.	Colanders	1 unit	Food Processor	100 pcs.	Sticker labels
50 pcs.	Containers for salt, condiments, spices	1 unit	Weighing scale (10-50 kgs	15 kg	Ripe mango fruit
1 pc.	Cooler box	1 unit	Weighing scale (1-6 kgs)	2 kg	Refined Sugar
1 unit	Refractometer	2 untis	Stove	500g	Lemon juice (or citric acid)
1 unit	Salinometer	1 unit	Double boiler	500g	Confectionary sugar
1 unit	Probe thermometer	1 unit	Pulp extractor	10g	Potassium metabisulphite
1 unit	Pressure gauge			50ml	Glycerine
1 unit	Temperature gauge			50 pcs	Polyethylene/Polypropylene bags

					(0.003 mm thickness)
				100 ml	5.25% chlorine bleach (Ex. Zonrox)