Australian Government

Department of Education, Employment and Workplace Relations

# RTE4519A Develop a composting recipe

**Release: 1**

## RTE4519A Develop a composting recipe

# Modification History

Not applicable.

# Unit Descriptor

**Unit descriptor**
This unit of competency specifies the outcomes required to calculate composting recipes from documented formulas that can be followed in the preparation and mixing of raw materials of known characteristics in specified proportions for composting.
The unit involves applying a broad knowledge base to identify and apply solutions to a range of unpredictable problems, and taking responsibility for production outputs in relation to specified quality standards.

# Application of the Unit

**Application of the unit**
Composting is used as a general expression for the processing of organic materials; with this unit being relevant for both aerobic composting and vermiculture technologies.
This unit of competency applies to people working at a commercial-scale composting facility. It will require taking responsibility for own work output and that of others, for example as a site foreman or operations supervisor.
Where work requires the use of load shifting or other equipment, appropriate training/certification must be provided according to state and territory safety and licensing requirements.

# Licensing/Regulatory Information

Refer to Application of the Unit

# Pre-Requisites

Not applicable.

# Employability Skills Information

**Employability Skills**
The required outcomes described in this unit of competency contain applicable facets of Employability Skills.


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# Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.
Performance criteria describe the required performance needed to demonstrate achievement of the element. Where **bold italicised** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

# Elements and Performance Criteria

### Elements and Performance Criteria

| Element | | Performance Criteria | |
|---|---|---|---|
| 1 | **1 Identify and characterise raw materials.** | 1.1 | **Raw materials** are visually identified and categorised against established enterprise criteria. |
| | | 1.2 | Raw material **characteristics** are entered into enterprise compost recipe calculator to achieve a balanced recipe. |
| | | 1.3 | Where raw material identity or characteristics are uncertain or unknown, designated personnel are requested to take representative samples of material for laboratory analysis. |
| | | 1.4 | Receival and handling requirements for raw materials are determined. |
| 2 | **2 Establish production objectives.** | 2.1 | Identified market requirements and priorities are translated into product specifications using product performance data and enterprise records. |
| | | 2.2 | Raw material combinations that can potentially meet market requirements are identified. |
| 3 | **3 Calculate compost recipe.** | 3.1 | Raw material characteristics are recorded in enterprise **compost recipe**. |
| | | 3.2 | Raw material proportions or ratios suitable for composting by the enterprise by a particular technology and method are specified by weight in resulting compost recipe. |
| | | 3.3 | **Pre-processing** requirements of raw materials, feasible volumes of compost upon formation, and **compost production plan** are determined. |
| | | 3.4 | Composting batch management procedures are |


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| | | reviewed and any required variations to standard management procedures are defined and documented as a new procedure. |
| | | 3.5 Compost production schedule is estimated and documented. |
| | | 3.6 Compatibility of resulting compost recipe and production schedule is confirmed against documented customer requirements and priorities. |
| | | 3.7 Density of pre-processed raw materials is quantified, and weight-based recipe is translated into volume-based recipe for production. |
| | | 3.8 Volumetric compost recipe and production procedures are recorded as operational batch or bucket recipe and procedure. |
| 4 | **4 Validate compost recipe.** | 4.1 Raw materials are pre-prepared and mixed according to new compost recipe to form feedstock for composting. |
| | | 4.2 Composting batch is managed according to revised enterprise procedure. |
| | | 4.3 Composting process is monitored for efficiency in relation to estimated production schedule and enterprise requirements. |
| | | 4.4 **Environmental** and occupational health and safety (**OHS**) aspects and impacts are monitored for compliance with enterprise plan and regulatory requirements. |
| | | 4.5 Faults, variations or problems observed at any stage of process are identified and **remedial action** is carried out to maintain effective compost production. |
| | | 4.6 Sampling and testing of material during composting is conducted to determine completion of production process. |
| | | 4.7 End product quality is evaluated against established product specifications. |
| | | 4.8 Compost recipe, production schedule and procedures are revised to improve process efficiency and reliability, and product compliance |


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with defined specifications.

## Required Skills and Knowledge

This section describes the essential skills and knowledge and their level, required for this unit.

**Required skills include**:

documenting procedures in writing
interpreting and applying written procedures and formulas
reading and interpreting laboratory results
reading and interpreting sampling and testing data
using a computer.

**Required knowledge includes**:

control of hazards in handling raw materials and composting materials
processing duration required for various raw materials
range of commercial compost-based products
raw materials and their characteristics
relationship between key compost recipe variables and compost production systems, technologies and methods in compost production.


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# Evidence Guide

**Overview of assessment**

This unit of competency could be assessed on its own or in combination with other units of competency relevant to the job function such as after:

RTE3512A **Prepare raw materials and compost the feedstocks**

RTE3513A **Prepare value-added compost-based products**

RTE3713A **Carry out workplace OHS procedures**

RTE3714A **Maintain and monitor environmental work practices**.

**Critical aspects for assessment and evidence required to demonstrate competency in this unit**

The critical requirements for this unit of competency as a whole are listed below.

Assessment must confirm one's ability to:

calculate a compost recipe that is consistent with the technology and method available from combinations of raw materials

produce a compost recipe that will achieve defined product specifications

document compost production plan consistent with plant capabilities and site constraints.

**Context and specific resources for assessment**

Assessment for this unit of competency is to be largely practical in nature and must be assessed in a commercial-scale composting facility or in a situation that reproduces and/or simulates operational conditions.

For valid assessment, one should have opportunities to participate in exercises, case studies and other real and simulated practical and knowledge assessments that demonstrate the skills and knowledge specified in this unit.

The candidate should also have access to the following resources:

a range of load-shifting equipment

hand tools and equipment such as temperature probe, oxygen probe, mulch fork, gloves and shovel

personal protective equipment

raw materials for assessment, recognition and preparation

drying oven for testing

electronic balance or scales

batch recording forms and compost recipe forms

water and irrigation system

compost recipe calculators, either manual or electronic

Wilkinson, K et al 2001, **Guide to Best Practice - Composting Green Organics**, second edition, Department of Natural Resources, Government of Victoria.

**Guidance information for assessment**

To ensure consistency in one's performance, competency should be demonstrated on more than one occasion over a period of time in order to cover a variety of circumstances, cases and responsibilities and, where possible, over a number of assessment activities.

The skills and knowledge required to demonstrate competency must allow for application in a broad industry context, and should be transferable to a range of work environments, including the ability to deal with unplanned events. For example, this could include work within composting operations of varying scale; processing a range of different raw materials; producing a range of different composts and value-added products to meet the demands of different markets; located in an urban or rural context with varying environmental constraints; and using various equipment, practices, technologies and management systems.



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# Range Statement

**RANGE STATEMENT**

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. **Bold italicised** wording in the performance criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

| | |
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| **Raw materials** or compostable organic materials may include: | animal mortalities |
| | biosolids such as sewage sludge |
| | crop residuals |
| | dairy waste |
| | fats and oils |
| | food organics such as: |
| | food waste |
| | kitchen waste |
| | food processing waste |
| | forestry residuals |
| | manures |
| | organic sludges |
| | other organic waste or by-product of processing |
| | paper mill wastes |
| | paper-based materials |
| | plant materials such as: |
| | garden organics |
| | green organics |
| | green waste |
| | yard waste |
| | sawdust and wood shavings |
| | sewage facility grit and screenings |
| | wood and timber (non-treated). |
| Raw materials can be **characterised** by their: | physical, chemical or biological properties |
| | point of origin and any associated issues arising such as variability in material qualities. |


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| **Compost recipe**: | is a mixture of materials that results in characteristics suitable for rapid and reliable biological transformation while minimising potential for negative environmental emissions |
| | compost recipe calculations may involve: |
| | simple calculations that can be carried out by hand or using a computerised spreadsheet |
| | determination of carbon to nitrogen (C:N) ratio with suitable moisture content, structure and porosity for efficient and trouble-free composting for a given site and processing method |
| | key variables in compost recipe that need to be balanced such as: |
| | C:N ratio |
| | moisture content |
| | other nutrients |
| | acidity or alkalinity (pH) |
| | structure and porosity. |
| **Pre-processing** of raw materials commonly involves: | immediate incorporation with absorbent raw materials |
| | materials size reduction |
| | moisture adjustment through such things as addition of water |
| | particle size screening |
| | physical contaminant removal. |
| **Compost production plan** may include: | additional water required |
| | compost recipe |
| | final product or market specifications to be met |
| | handling and pre-processing requirements for raw materials |
| | maximum size of compost pile for effective management with available machinery |
| | monitoring schedule |
| | processing duration |


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| | value adding required. |
| **Environmental** aspects and impacts of production may include: | attraction of pests<br>emissions from vehicle and machinery operations<br>erosion<br>fire<br>leaks<br>litter<br>noise<br>odours<br>organic dusts<br>spills<br>water pollution from run-off or leachate. |
| **OHS** hazards may include: | biological hazards associated with raw materials or product<br>ergonomic hazards associated with manual handling<br>physical hazards such as:<br>compressed air and water<br>dust<br>hammer mills and grinders<br>hot or cold weather conditions<br>noise<br>shredders<br>underfoot conditions<br>vehicles and mobile machinery<br>sharps or other physical contaminants in materials. |
| **Remedial action** may include: | action taken in response to problems identified by self or others or at direction of manager such as:<br>actions carried out to maintain effective and consistent compost production<br>adjustments to compost batch management<br>adjustments to processing technique. |


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# Unit Sector(s)

Not applicable.


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