

# Edible insects

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## Background

Entomophagy (the eating of insects) has been practised in Australia for tens of thousands of years.

Commercial insect farming began in Asia, and is now a well-established, fast-growing global sector. Offering a highly sustainable alternative to animal protein, insects can be processed and eaten in 3 ways:

1. as whole insects
2. in ground or paste form
3. as an extract of protein, fat or chitin for fortifying food products.



Figure 1 Edible insects

The nutritional value of edible insects varies between species, but in general, they are highly nutritious and especially rich in proteins.

A study conducted in 2013 compiled nutrient compositions of 236 edible insects and concluded that insects provide satisfactory amounts of energy and protein, are high in monounsaturated and/or polyunsaturated fat, and are rich in vitamins and minerals and, in some cases, folic acid.

## Insect species

Three insect species can be sold as a food in Australia and New Zealand:

1. *Zophobas morio* (super mealworm)
2. *Achaeta domestica* (house crickets)
3. *Tenebrio molitor* (mealworm beetle).

Insect species not listed above may require pre-market assessment and approval by FSANZ to ensure they are safe for human consumption. For more information, visit: [foodstandards.gov.au/business/novel](http://foodstandards.gov.au/business/novel)

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## Biosecurity checks

Certain insect species are declared as pests in NSW. Written approval from the NSW Department of Primary Industries and Regional Development (DPIRD) Biosecurity & Food Safety is required for each proposed live insect species. This is subject to regulations under the *Biosecurity Act 2015*.

Before rearing or processing insects, businesses must email the proposed species list (common name, genus, species) to [biosecurity@dpiird.nsw.gov.au](mailto:biosecurity@dpiird.nsw.gov.au) for assessment and approval.

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## Import checks

When importing insects for human consumption or animal feed, the insects must be dead and heat treated. The Commonwealth Department of Agriculture, Fisheries and Forestry (DAFF) regulates the import of food into Australia and assesses each application on a case-by-case basis.

The main requirements are:

- insect species are not listed on the CITES list of endangered species <https://checklist.cites.org/#/en>
- insects have undergone heat treatment with supporting documentation.

DAFF may require additional information on an import declaration, together with the import permit.

The Biosecurity Import Conditions system (BICON) database houses the Australia's biosecurity import conditions for more than 20,000 plants, animals, minerals and biological products and can help determine what import conditions exist and if an import permit is required.

For more information, see:

- Importing Insects and arachnids [agriculture.gov.au/biosecurity-trade/import](http://agriculture.gov.au/biosecurity-trade/import)
  - Biosecurity Import Conditions system (BICON) [agriculture.gov.au/biosecurity-trade/import/online-services/bicon](http://agriculture.gov.au/biosecurity-trade/import/online-services/bicon)
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## Food safety checks

Edible insects can also carry pathogenic microorganisms, such as *E. coli* and *Salmonella*. Potential outbreaks are likely to increase with improper handling or storage of products.

This can largely be avoided by following current hygiene, rendering and food processing standards to ensure edible insect products are safe to eat.

## Good rearing practices

- Insect rearing must be undertaken in a closed environment where ventilation, lighting, temperature and humidity can be controlled.
- The facility must be sealed and have adequate systems in place to prevent entry of pests and escape of insects.
- Water and feed/substrates must be controlled according to the type of insects.
- Feeding times and type of substrate must be recorded and retained on the premises.
- Full traceability of substrates used is required.

## Hygienic practices

- Cleaning schedules and hygienic practices must be in place throughout the production chain (for example, rearing, processing, packaging and transport).
- It is important to prevent cross-contamination from air, soil and other sources, and to ensure insect faeces are removed from containment areas on a regular basis.
- Any business processing food for human consumption must comply with Standards 3.2.2 and 3.2.3 of the Australia New Zealand Food Standards Code (the Code).

## Effective processing techniques

- Insects may contain pathogenic microorganisms such as bacteria, viruses or fungi. Therefore, insects must undergo validated processing steps to safely reduce their microbial content. This can be achieved by the application of heat.
- Heat treatment has a minimal effect on physical and chemical contamination, which may be pass to insects from substrates, the environment (for example, heavy metals and pesticides) or use in rearing (for example, antibiotics). Therefore, it is important to make sure that chemical contamination is low and screen for physical contaminants after harvesting and processing.

## Testing

- Feed/substrates can be tested for heavy metals, pesticides and microbial contamination before being fed to insects.
- The final insect product should also be tested for microbial contamination and/or chemicals in accordance with current practices for other animal products. Testing should include *Escherichia coli* (less than 3 cfu/g), *Listeria monocytogenes* (less than 100 cfu/g) and *Salmonella* (not present in 25g).

## Labelling

Packaged products must comply with the labelling standards detailed in Part 1.2 of the Code.

As insects can cause allergic reactions or sensitivities in some people, the label should indicate the presence of insect protein and chitin, and a statement that these may have an effect on people who are sensitive to shellfish. These warning statements and declarations can be made in accordance with Standard 1.2.3 of the Code.

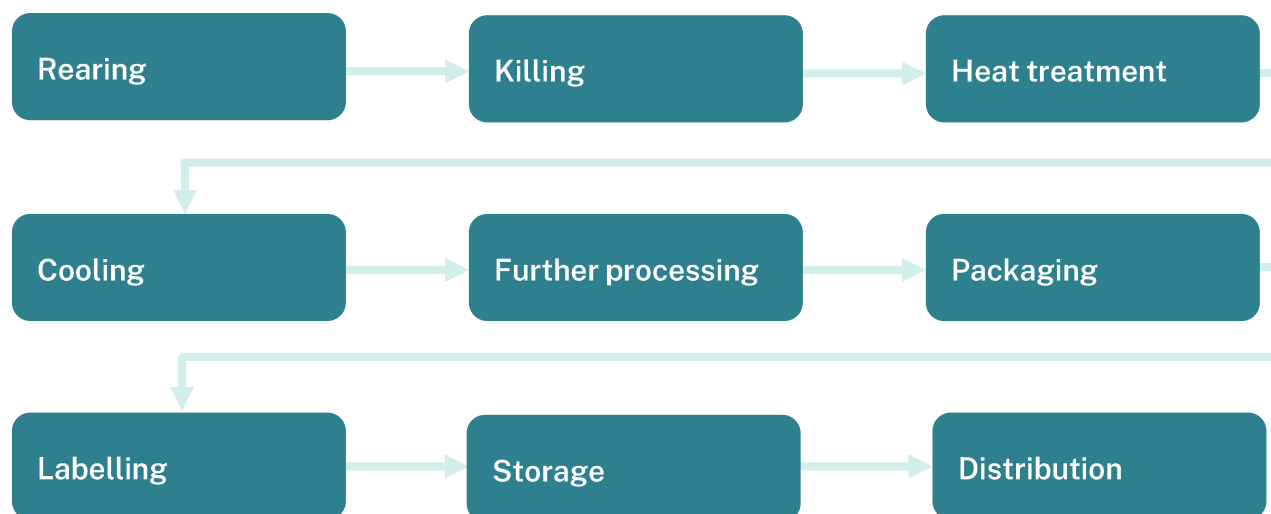


Figure 2. General process flowchart

## References

- Food Standards Australia New Zealand (FSANZ). Food Standards Code [foodstandards.gov.au/food-standards-code](http://foodstandards.gov.au/food-standards-code)
- Commonwealth Scientific and Industrial Research Organisation (CSIRO) (2021). [Edible insects A roadmap for the strategic growth of an emerging Australian industry](#) (PDF, 6.3 KB)
- Rumpold, B.A & Schlüter, O.K. (2013). Nutritional composition and safety aspects of edible insects. *Molecular Nutrition & Food Research*, 57, 802 – 823.
- Van Huis, A., Itterbeeck, J.V., Klunder, H., Mertens, E., Halloran, A. et al. (2013). Food and Agriculture Organization of the United Nations (FAO). Edible insects: future prospects for food and feed security. [www.fao.org/4/i3253e/i3253e.pdf](http://www.fao.org/4/i3253e/i3253e.pdf) (PDF, 5.6 MB)

## More information

- Visit Department of Agriculture, Fisheries and Forestry (DAFF)  
[www.agriculture.gov.au/biosecurity-trade/import/goods/food/type/insects-and-arachnids](http://www.agriculture.gov.au/biosecurity-trade/import/goods/food/type/insects-and-arachnids)
- Read Commonwealth Scientific and Industrial Research Organisation (CSIRO) (2021). [Edible insects A roadmap for the strategic growth of an emerging Australian industry](#) (PDF, 6.3 KB)
- Visit [www.foodauthority.nsw.gov.au](http://www.foodauthority.nsw.gov.au)
- Contact the Food Authority helpline:
  - Email [food.contact@dpird.nsw.gov.au](mailto:food.contact@dpird.nsw.gov.au)
  - Phone 1300 552 406

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