



Code of Practice: Processing of Bee Products

Part 3: HACCP Application

Prelims

Amendment 0

July 2005

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Disclaimer

IMPORTANT DISCLAIMER

Every effort has been made to ensure the information in this report is accurate.

NZFSA does not accept any responsibility or liability whatsoever for any error of fact, omission, interpretation or opinion that may be present, however it may have occurred.

Website

A copy of this document can be found at: <http://www.nzfsa.govt.nz/animalproducts/index.htm>

Review of Code of Practice

This code of practice will be reviewed, as necessary, by the New Zealand Food Safety Authority. Suggestions for alterations, deletions or additions to this code of practice, should be sent, together with reasons for the change, any relevant data and contact details of the person making the suggestion, to:

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Amendment Record

It is important that this publication is kept up-to-date by the prompt incorporation of amendments.

To update this publication when you receive an amendment, remove the appropriate outdated pages, destroy them, and replace them with the pages from the new issue. Complete instructions will be given on the covering letter accompanying the amendment. File the covering letter at the back of the publication and sign off and date this page.

If you have any queries, please ask your local verifier.

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1 Introduction

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1.1 Purpose of this document

Hazard Analysis and Critical Control Point (HACCP) is a systematic and science-based control system for assuring food safety. Food safety is achieved by assessing hazards, developing controls, and focusing on preventative measures.

Operators must apply the HACCP principles when developing their risk management programmes (RMP). To assist operators meet this requirement, the NZFSA, in consultation with an industry working group, has developed *Part 3: HACCP Application of the Code of Practice for the Processing of Bee Products*. This document shows how the HACCP principles are applied to a generic process covering the extraction, processing and packing of honey; and the processing of dried pollen.

An operator whose products and processes are adequately covered by the HACCP application in this document can use this for developing their RMP. The relevant HACCP sections of this code of practice (COP) can be copied into the RMP, or they can be incorporated into the RMP by reference (i.e. by using the RMP template given in Part 5). The operator may need to make some changes in the HACCP application to ensure that it accurately reflects the products and processes covered by their RMP.

1.2 Hazard

A hazard is a biological, chemical or physical agent in, or condition of, food with the potential to cause an adverse health effect.

- Biological hazards include pathogenic microorganisms (e.g. *Salmonella* spp., *Clostridium* spp, *Bacillus* spp), parasites and viruses. Microorganisms that are non-pathogenic are not considered as hazards. For example, yeast causes fermentation of honey and, therefore, is an undesirable organism in honey, but it is not considered a hazard because it does not cause illness.

- Chemical hazards include heavy metals, pesticides, veterinary medicines, and biotoxins (e.g. tutin in honey). Some food additives may also be hazardous if present in excessive or toxic amounts.
- Physical hazards are objects that may cause illness or injury. Examples of these hazards are glass, metal fragments, and plastic.

Hazards may occur in the product as a result of:

- an input (e.g. raw material, ingredients, packaging);
- the process itself; or
- direct or indirect contamination from “other sources” (e.g. personnel, water, pests, wastes, equipment, internal and external environs).

1.3 Good manufacturing practice (GMP)

GMP is covered under Part 2 of the code of practice. Supporting systems covering GMP must be developed and documented prior to HACCP application. The HACCP approach used in this COP is based on the expectation that these systems are effectively being implemented.

1.4 HACCP principles

The HACCP principles, as defined by Codex are:

1. Conduct a hazard analysis;
2. Determine the Critical Control Points (CCP);
3. Establish critical limits;
4. Establish a system to monitor control of the CCP;
5. Establish the corrective action to be taken when monitoring indicates that a particular CCP is not under control;
6. Establish procedures for verification to confirm that the HACCP system is working effectively;

7. Establish documentation concerning all procedures and records appropriate to these principles and their application.

The operator is required to apply these HACCP principles to the process, including all inputs. The operator is **not** required to carry out hazard identification and analysis for “other sources” (e.g. personnel and environmental sources), which are expected to be controlled by GMP (supporting systems).

The application of these principles is discussed in detail in the [Risk Management Programme Manual](#).

1.5 HACCP application for products and processes not covered by the code of practice

When the HACCP application given in this document does not adequately cover an operator’s product or process, the operator will need to carry out their own HACCP application. The HACCP approach and format shown should be used by the operator as a guide or pattern for their own application.

The HACCP application must be documented, and supported using information such as historical company records, technical publications or information provided by the NZFSA. The person or people involved in this activity must have the appropriate knowledge and skills regarding HACCP, the product and the process.

Prior to the application of HACCP principles to the process, all relevant supporting systems must be documented.

2 HACCP Application for the Extraction, Processing and Packing of Honey

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2.1 Scope

Table 1: Scope of the HACCP application

Components	Description/Details
Material being processed	Blossom honey or honeydew honey
Products	<ul style="list-style-type: none"> • Liquid honey ¹ • Creamed honey ² • Comb honey ³ • Bulk honey ⁴ • Wax
Process	<p>From receipt of supers to dispatch of packed honey.</p> <p>Key processing operations:</p> <ul style="list-style-type: none"> • Extraction ⁵ • Processing of liquid or creamed honey (including heating, filtering, creaming, blending) • Cutting of comb honey • Packing • Storage

1. Liquid honey is extracted honey that has been processed to make it completely liquid and free from visible crystals.

2. Creamed honey is extracted honey that has been processed by controlled crystallization.

3. Comb honey is honey presented in its original comb or portions thereof.

4. Bulk honey is the common term used in New Zealand for honey obtained by extraction, settling or straining, and with or without minimal heating. Bulk honey is usually packed in drums.

5. Extraction is the removal of honey from the comb by centrifugal force, gravity, straining or other means.

2.2 Product description

Table 2: Intended use and consumer of products, and product requirements

Product	Liquid or creamed honey	Comb honey	Bulk honey	Wax
Intended consumer	Humans (general public)	Humans (general public)	Humans (general public)	Humans (general public)
Intended use of product that leaves RMP ^{1,2}	<ul style="list-style-type: none"> Ready-to-eat Ingredient for preparation of other foods 	<ul style="list-style-type: none"> Ready-to-eat Ingredient for preparation of other foods 	<ul style="list-style-type: none"> Further processing and packing to liquid/creamed honey or other honey products Ingredient for preparation other foods 	<ul style="list-style-type: none"> Further processing into products for pharmaceutical use and manufacture of cosmetics Further processing into comb foundation
Regulatory limits ³	None	None	None	None
Other regulatory requirements specific to honey	Food Standards Code 2.8.2 - <ul style="list-style-type: none"> Reducing sugars \geq 60% Moisture \leq 21% 	Food Standards Code 2.8.2 - <ul style="list-style-type: none"> Reducing sugars \geq 60% Moisture \leq 21% 	Food Standards Code 2.8.2 - <ul style="list-style-type: none"> Reducing sugars \geq 60% Moisture \leq 21% 	N/A

Product	Liquid or creamed honey	Comb honey	Bulk honey	Wax
	<p>AP (Residue Specification) Notice 2004 -</p> <p>Specified chemical substances in honey \leq maximum permissible levels ⁴</p>	<p>AP (Residue Specification) Notice 2004 -</p> <p>Specified chemical substances in honey \leq maximum permissible levels ⁴</p>	<p>AP (Residue Specification) Notice 2004 -</p> <p>Specified chemical substances in honey \leq maximum permissible levels ⁴</p>	N/A
Labelling	<p>Labelling of retail packs as specified in the Food Standards Code.</p> <p>Labelling of transportation outers as specified in HC Spec 32.</p>	<p>Labelling of retail packs as specified in the Food Standards Code.</p> <p>Labelling of transportation outers as specified in HC Spec 32.</p>	<p>Labelling of transportation outers as specified in HC Spec 32.</p>	<p>Labelling of transportation outers as specified in HC Spec 32.</p>

1. It is common practice in the New Zealand honey industry to downgrade honey that do not meet certain commercial requirements (e.g. burnt, fermented honey) for animal consumption (e.g. fed to bees or used for stock feed).
2. Wax may also be further processed into products that are not for human or animal consumption (e.g. candles, floor wax, furniture wax).
3. Regulatory limits are limits that are essential to be met for food safety and are established by the regulator under the Animal Products Act 1999.
4. Every consignment of honey must be provided with an *Apiarist and Beekeeper Statement* as (i.e. Harvest declarations) as required by Human Consumption Specification 108. This statement confirms the controls applied by the beekeeper that are intended to minimise the risks to human health from drugs (e.g. antibiotic), agricultural chemicals (e.g. pesticides), and plant toxins, including phytotoxins of the native plant tutu (*Coriaria* spp).

2.3 Process description

The process flow diagrams show the key steps based on a generic process. Process steps and their sequence may differ for each premises. Operators must ensure that their process is accurately reflected in their RMP.

Table 3a: Process flow diagram for the extraction of honey

Inputs ¹	Process steps	Outputs ²
Honey supers →	1. Receiving	
	↓	
	2. Holding in hot room ³ / storeroom	
	↓	
	3. Deboxing and inspection	→ Rejects (e.g. infested combs, brood comb, dirty combs)
	↓	
	4. Uncapping	→ Cappings for honey separation
	↓	
	5. Pricking/loosening ⁴	
	↓	
	6. Extraction	→ Empty frames
	↓	
Honey separated from cappings →	7. Transfer of honey through sump	→ Wax & other debris to waste
	↓	
	8. Heating using heat exchanger	
	↓	
	9. Spinning	→ Wax & other debris to waste
	↓	
	10. Pumping into tanks and straining	→ Foreign objects (e.g. insect parts, wax) to waste
	↓	
	11. Holding in tanks	
	↓	
Drums →	12. Filling of honey into drums & weighing	
	↓	
	13. Labelling/marketing of drums	
	↓	
	14. Storage	
	↓	
	15. Dispatch	→ Bulk honey

1. An input is any material, additive, processing aid, ingredient, or packaging that is added or used for the production or processing of a food product.

2. An output is any material or product resulting from any operation under an RMP.

3. Some extractors do not use a hot room, particularly during warm summer days and when only a few boxes of honey are to be extracted (i.e. honey is extracted immediately after harvesting from the hives).

4. Thixotropic honeys, such as manuka, can be extracted more successfully when a pricker/loosener is used to loosen the contents of each honey cell before extraction.

Table 3b: Process flow diagram for processing of liquid and creamed honey

Inputs	Process steps	Outputs
Bulk honey from outside source →	1. Receiving	
	↓	
Bulk honey from own storage →	2. Cleaning of drum external surface	
	↓	
	3. Heating of drums	
	↓	
	4. Pouring of honey into vats/tanks & straining	→ Empty drums
	↓	
	5. Heating using heat exchanger	
	↓	
	6. Filtering	
	↓	
Seed honey →	7. Creaming	
	↓	
	8. Holding liquid or creamed honey in tanks	
	↓	
Containers (e.g. glass jars, plastic pottles, cartons) and labels →	9. Packing and labelling	
	↓	
	10. Storage	
	↓	
	11. Dispatch	→ Packed liquid or creamed honey

Table 3c: Process flow diagram for processing of comb honey

Inputs	Process steps	Outputs
Honey supers →	1. Receiving	
	↓	
	2. Freezing ¹ /storage	
	↓	
	3. Transfer to cutting room	
	↓	
	4. Deboxing & inspection ²	→ Rejects (e.g. dirty combs, dark wax, rusty wires)
	↓	
	5. Removal of wires	→ Wires to waste
	↓	
	6. Inspection of combs	→ Rejects (e.g. combs with foreign matter, dirty, with remaining wire)
	↓	
	7. Cutting of combs	→ Frames, cutting scraps
	↓	
	8. Inspection of cut combs	→ Rejects (e.g. poorly cut, other quality defects)
	↓	
Packaging (e.g. plastic containers, lids, carton box) →	9. Packing and labelling ³	
	↓	
	10. Storage/freezing ¹	
	↓	
	11. Dispatch	→ Packed comb honey

1. Freezing is used for killing wax moth.

2. The number and location of inspection steps will vary for each premises.

3. Some operators have a metal detector.

2.4 Hazard analysis and CCP determination

2.4.1 Identification of hazards from inputs

Hazards associated with each input are identified, considering any supplier agreements and requirements given in the COP.

Table 4a: Hazard identification

Inputs	Description/specification	Biological hazard (B)	Chemical hazard (C)	Physical hazard (P)
Honey supers ¹	Accompanied by an <i>Apiarist and Beekeeper Statement</i> (i.e. Harvest declaration)	Bacterial spores (e.g. <i>Bacillus</i> spp., <i>Clostridium</i> spp.) ²	Plant toxins (e.g. tutin) ³ Chemical residues (e.g. antibiotics, pesticides) ⁴	Wire, wood, and nails from wooden frames Plastic from plastic frames
Seed honey	Produced under an RMP (may be own product or purchased from another supplier)	Bacterial spores (e.g. <i>Bacillus</i> spp., <i>Clostridium</i> spp.)	Plant toxins (e.g. tutin) ³ Chemical residues (e.g. antibiotics, pesticides) ⁴	None
Drums	Meets the drum requirements given in Section 8 of Part 2 of the COP	None	None	None
Plastic containers	Suitable for use as food contact material as specified in Section 8 of Part 2 of the COP.	None	None	Plastic pieces
Glass jars	Suitable for use as food contact material as specified in Section 8 of Part 2 of the COP.	None	None	Glass fragments

1. Generally, only new foundations and combs are used for producing comb honey.

2. The pathogenic microorganisms of concern in honey are primarily spore-forming bacteria. Bacterial spores, particularly those in the *Bacillus* genus, are regularly found in honey. *Clostridium* spores, such as *Clostridium perfringens*, can also be found in honey. There is no conclusive evidence that *Clostridium botulinum* spores are a hazard in New

Zealand honey. Microorganisms can be introduced into honey either while the bees are making the honey (known as the primary source) or after the honey has been harvested (a secondary source). The primary sources of microorganisms are likely to include pollen, the digestive tracts of honey bees, dust, dirt, and flowers.

3. There have been a number of reported cases of tutin poisoning in New Zealand. Tutin toxicity in honey results from honey bees gathering honeydew exudate from the sap-sucking insect commonly known as the passion vine hopper, when these vine hoppers have been feeding on the sap of tutu (*Coriaria arborea*) bushes. Certain beekeeper controls and the use of the *Apiarist and Beekeeper Statement* (i.e. Harvest declaration) are intended to minimise the risk to human health from tutin in honey. Beekeeper controls include: removing hives and honey supers before the risk period; or by monitoring the tutu, vine hopper and foraging conditions in the areas around the apiary (3 km radius) and not collecting honey when conditions indicate that tutin is likely to be a problem.

Comb honey poses a greater risk to human health from tutin because it is eaten directly off the comb, increasing the chance of consuming honey with a high concentration of tutin. Extracted honey is often bulked or blended with other honey thereby reducing the concentration of toxin.

4. The types of chemical residues that can occur in honey include antibiotics used for the treatment of bees, pesticides for controlling mites and insect infestations, and fungicides. The control of chemical residues involves effective beekeeping practices and the monitoring of certain chemical residues. Results of residue testing on New Zealand honey in 2000 - 2003 indicate that residue levels in honey are generally in compliance with legal requirements.

2.4.2 Process step hazard analysis and CCP determination

Table 4b: Hazard analysis and CCP determination for the extraction of honey

Process step	Inputs	Hazard reasonably likely to occur on or in the product at this step	Justification	Q1. Is there a control measure(s) for the hazard at this step? If yes, identify the control measure and then answer Q2. If no, consider hazard at next step.	Q2. Is the control measure at this step essential to food safety as defined by a regulatory limit? If yes, this step is a CCP. If no, this step is not a CCP.	CCP no.
1. Receiving	Supers	B – Bacterial pathogens	Bacterial spores (e.g. <i>Bacillus</i> spp, <i>Clostridium</i> spp) are likely to occur.	No	No	
		C – Tutin toxin	Reported incidence of tutin in NZ honey.	Yes – Supplier statements confirming beekeeper controls	No	
		C – Chemical residues	Residues may occur in honey. ¹	Yes – Supplier statements confirming beekeeper controls	No	
2. Holding in hot room/storeroom	Supers	B – Bacterial pathogens	Hazard carried over from previous step	No		
3. Deboxing	Supers	B – Bacterial pathogens	Micro contamination from boxes (e.g. dirt, insect larvae, rodent excretions) can occur.	Yes – GMP: visual inspection of combs; removal of defective and infested combs; and hygienic practices will minimise contamination	No	
4. Uncapping	Combs	B – Bacterial pathogens	Micro contamination from the cappings (e.g. dirt, dust, dead bees and other foreign matter) is likely to occur.	Yes – GMP: hygienic practices; and maintenance of uncapping knife will minimise contamination	No	
5. Pricking /loosening	Uncapped combs	B – Bacterial pathogens	Micro contamination from the pricker/loosener can occur.	Yes – GMP: cleaning of pricker/loosener will minimise contamination	No	

Process step	Inputs	Hazard reasonably likely to occur on or in the product at this step	Justification	Q1. Is there a control measure(s) for the hazard at this step? If yes, identify the control measure and then answer Q2. If no, consider hazard at next step.	Q2. Is the control measure at this step essential to food safety as defined by a regulatory limit? If yes, this step is a CCP. If no, this step is not a CCP.	CCP no.
6. Extraction	Uncapped combs	B – Bacterial pathogens	Micro contamination from the comb and frames is likely to occur.	Yes – GMP: removal of damaged and dirty combs/frames; and cleaning and maintenance of equipment will minimise contamination	No	
		P – Foreign objects, e.g. wood, wire, nails, plastic	Wood pieces, wire fragments and nails from wooden frames, and plastic from plastic frames can occur.	Yes – GMP: maintenance of frames will minimise the hazards	No	
7. Sump	Extracted honey	B – Bacterial pathogens	Micro contamination from the sump and surroundings can occur.	Yes – GMP: cleaning of sump; regular removal of debris; and covering of sump will minimise contamination	No	
		P – Foreign objects, e.g. wood, wire, nails, plastic	Carried over from previous step	Yes – GMP: removal of debris from the sump will remove some physical hazards	No	
	Honey separated from cappings	B – Bacterial pathogens	Honey separated from cappings can have higher micro levels.	Yes – Excluding honey from cappings will minimise micro contamination of honey	No	
8. Heating	Extracted honey	B – Bacterial pathogens	Carried over from previous step	No		
		P – Foreign objects, e.g. wood, wire, nails, plastic	Carried over from previous step	No		
9. Spinning	Extracted honey	B – Bacterial pathogens	Carried over from previous step	No		
		P – Foreign objects, e.g. wood, wire, nails, plastic	Carried over from previous step	Yes – GMP: most physical hazards are removed when honey is passed through the spinner	No	
10. Pumping into tanks & straining/filtering	Extracted honey	B – Bacterial pathogens	Carried over from previous step	No		
		P – Foreign objects, e.g. wood, wire, nails, plastic	Carried over from previous step	Yes – GMP: any remaining physical hazards are removed by	No	

Process step	Inputs	Hazard reasonably likely to occur on or in the product at this step	Justification	Q1. Is there a control measure(s) for the hazard at this step? If yes, identify the control measure and then answer Q2. If no, consider hazard at next step.	Q2. Is the control measure at this step essential to food safety as defined by a regulatory limit? If yes, this step is a CCP. If no, this step is not a CCP.	CCP no.
				the strainer/filter ²		
11. Holding in tanks	Extracted honey	B – Bacterial pathogens	Carried over from previous step	No		
12. Filling into drums & weighing	Extracted honey	B – Bacterial pathogens	Carried over from previous step	No		
	Drums	B – Bacterial pathogens	Micro contamination from left over honey or other food residue can occur.	Yes – GMP: compliance with drum requirements; and cleaning of drums will minimise contamination	No	
		C – Chemical residues	Chemical residues from reused drums can occur.	Yes – GMP: compliance with drum requirements	No	
13. Labelling/ marking of drums	Bulk honey	B – Bacterial pathogens	Carried over from previous step	No		
14. Storage	Bulk honey	B – Bacterial pathogens	Carried over from previous step	No		
15. Dispatch	Bulk honey	B – Bacterial pathogens	Carried over from previous step ³	No		

1. The control of chemical residues involves effective beekeeping practices and the monitoring of chemical residues. Results of residue testing on New Zealand honey in 2000-2003 indicate that residue levels in honey are generally in compliance with legal requirements. The level of any chemical residue is not going to increase during honey processing, thus, they have not been considered further in succeeding steps.

2. If the operation has no steps for removing foreign matter (e.g. spinner or other filtering device), bulk honey produced from this operation is likely to contain foreign matter, including objects that may be considered as physical hazards (e.g. wire, stones). The operator who will further process or pack the bulk honey must ensure that these hazards are eliminated by their process.

3. Vegetative forms of bacterial pathogens (e.g. *Salmonella* spp., *Listeria monocytogenes*) have not been detected in honey. However, bacterial spores (e.g. *Bacillus* spp, *Clostridium* spp) are likely to occur in honey. Although these spores will not grow in honey, when it is used as an ingredient in another food, the bacterial spores from honey could be introduced to and grow in that food.

Table 4c: Hazard analysis and CCP determination for the processing of liquid and creamed honey

Process step	Inputs	Hazard reasonably likely to occur on or in the product at this step	Justification	Q1. Is there a control measure(s) for the hazard at this step? If yes, identify the control measure and then answer Q2. If no, consider hazard at next step.	Q2. Is the control measure at this step essential to food safety as defined by a regulatory limit? If yes, this step is a CCP. If no, this step is not a CCP.	CCP no.
1. Receiving	Bulk honey ¹	B – Bacterial pathogens	Bacterial spores (e.g. <i>B. cereus</i> , <i>Clostridium</i> spp) are likely to occur in honey.	No		
2. Cleaning of drum external surface	Bulk honey	B – Bacterial pathogens	Carried over from previous step.	No		
3. Heating in hot room	Bulk honey	B – Bacterial pathogens	Carried over from previous step.	No		
4. Transfer of honey into vats/tanks & straining	Bulk honey	B – Bacterial pathogens	Micro contamination from equipment can occur.	Yes – GMP: hygienic practices and cleaning of equipment will minimise contamination	No	
5. Heating using heat exchanger	Honey	B – Bacterial pathogens	Carried over from previous step.	No		
6. Filtering	Honey	B – Bacterial pathogens	Carried over from previous step.	No		
7. Creaming	Honey	B – Bacterial pathogens	Micro contamination from equipment can occur.	Yes – GMP: hygienic practices and cleaning of equipment will minimise contamination	No	
	Seed honey	B – Bacterial pathogens	Bacterial spores (e.g. <i>B. cereus</i> , <i>Clostridium</i> spp) are likely to occur in honey.	No		
8. Holding in tanks	Liquid or creamed honey	B – Bacterial pathogens	Micro contamination from equipment can occur.	Yes – GMP: hygienic practices and cleaning of tanks will minimise contamination	No	
9. Packing and labelling	Honey	B – Bacterial pathogens	Carried over from previous step.	No		

Process step	Inputs	Hazard reasonably likely to occur on or in the product at this step	Justification	Q1. Is there a control measure(s) for the hazard at this step? If yes, identify the control measure and then answer Q2. If no, consider hazard at next step.	Q2. Is the control measure at this step essential to food safety as defined by a regulatory limit? If yes, this step is a CCP. If no, this step is not a CCP.	CCP no.
	Glass jars & lids	Glass	Pieces of broken glass are occasionally found in glass consignments; jars can also break during handling and processing.	Yes – GMP: supplier agreement; visual inspection; correct handling procedures; and proper setting of machines will prevent contamination	No	
	Plastic containers	Plastic pieces	Plastic pieces are occasionally found in container consignments.	Yes – GMP: supplier agreement; visual inspection; and correct handling procedures will prevent contamination	No	
10. Storage	Packed honey	B – Bacterial pathogens	Carried over from previous step.	No		
11. Dispatch	Packed honey	B – Bacterial pathogens	Carried over from previous step. ²	No		

1. It is assumed in this hazard analysis that the bulk honey received has undergone a process which has eliminated any physical hazards (e.g. by filtering).

Bulk honey that has not undergone effective spinning and/or filtering after extraction is likely to contain foreign matter, including objects that may be considered as physical hazards (e.g. wire, stones). The operator who will further process or pack this type of bulk honey must ensure that the relevant physical hazards are identified in their hazard analysis and controlled by their process (e.g. by filtering).

2. Vegetative forms of bacterial pathogens (e.g. *Salmonella* spp., *Listeria monocytogenes*) have not been detected in honey. However, bacterial spores (e.g. *Bacillus* spp, *Clostridium* spp) are likely to occur in honey. Although these spores will not grow in honey, when it is used as an ingredient in another food, the bacterial spores from honey could be introduced to and grow in that food.

Table 4d: Hazard analysis and CCP determination for comb honey

Process step	Inputs	Hazard reasonably likely to occur on or in the product at this step	Justification	Q1. Is there a control measure(s) for the hazard at this step? If yes, identify the control measure and then answer Q2. If no, consider hazard at next step.	Q2. Is the control measure at this step essential to food safety as defined by a regulatory limit? If yes, this step is a CCP. If no, this step is not a CCP.	CCP no.
1. Receiving	Supers	B – Bacterial pathogens	Bacterial spores (e.g. <i>B. cereus</i> , <i>Clostridium</i> spp) are likely to occur in honey supers.	No	No	
		C – Tutin toxin	Reported incidence of tutin in NZ honey. ¹	Yes – Supplier statements confirming beekeeper controls	No	
		C – Chemical residues	Residues can occur in honey ²	Yes – Supplier statements confirming beekeeper controls	No	
2. Freezing/ storage	Supers	B – Bacterial pathogens	Carried over from previous step	No		
3. Transfer to cutting room	Supers	B – Bacterial pathogens	Carried over from previous step	No		
4. Deboxing & inspection	Supers	B – Bacterial pathogens	Micro contamination from boxes (e.g. dirt, insect larvae, rodent excretions) can occur.	Yes – GMP: visual inspection of combs; removal of defective and infested combs; and hygienic practices will minimise contamination	No	
5. Removal of wires	Combs	B – Bacterial pathogens	Carried over from previous step	No		
		P - Wire	Broken wire can be left inside the comb.	Yes – GMP: correct techniques will minimise occurrence of broken wires		
6. Inspection of combs	Combs	B – Bacterial pathogens	Carried over from previous step	No		
		P - Wire	Broken wire can occasionally be left inside the comb.	Yes – GMP: inspection using a light box and rejection of affected combs		
7. Cutting of combs	Combs	B – Bacterial pathogens	Carried over from previous step	No		

Process step	Inputs	Hazard reasonably likely to occur on or in the product at this step	Justification	Q1. Is there a control measure(s) for the hazard at this step? If yes, identify the control measure and then answer Q2. If no, consider hazard at next step.	Q2. Is the control measure at this step essential to food safety as defined by a regulatory limit? If yes, this step is a CCP. If no, this step is not a CCP.	CCP no.
8. Inspection of cut combs	Combs	B – Bacterial pathogens	Carried over from previous step	No		
9. Packing and labelling	Combs	B – Bacterial pathogens	Carried over from previous step	No		
	Plastic containers	P – Plastic pieces	Plastic pieces are occasionally found in container consignments	Yes – GMP: supplier agreement and visual inspection of containers will prevent contamination.	No	
10. Storage	Packed comb honey	B – Bacterial pathogens	Carried over from previous step.	No		
11. Dispatch	Packed comb honey	B – Bacterial pathogens	Carried over from previous step. ³	No		

1. Comb honey poses a greater risk to human health from tutin because it is eaten directly off the comb, increasing the chance of consuming honey with a high concentration of tutin. Generally, comb honey processors impose stricter controls for sourcing of honey supers for comb honey production to minimise the risk to human health from tutin.

2. The control of chemical residues involves effective beekeeping practices and the monitoring of chemical residues. Results of residue testing on New Zealand honey in 2000-2003 indicate that residue levels in honey are generally in compliance with legal requirements. The level of any chemical residue present is not going to increase during honey processing, thus, they have not been considered further in succeeding steps.

3. Vegetative forms of bacterial pathogens (e.g. *Salmonella* spp., *Listeria monocytogenes*) have not been detected in honey. However, bacterial spores (e.g. *Bacillus* spp, *Clostridium* spp) are likely to occur in honey. Although these spores will not grow in honey, when it is used as an ingredient in another food, the bacterial spores from honey could be introduced to and grow in that food.

2.4.3 Outcome of CCP determination

No CCP was identified for the extraction, processing and packing of honey. The control of hazards at key steps is expected to be adequately addressed by GMP (i.e. complying with the procedures given in Part 2 of this COP).

Since no CCP has been identified, the other HACCP principles that relate to a CCP (i.e. identification of critical limits, CCP monitoring, CCP corrective action) have not been applied to the generic process.

3 HACCP Application for the Processing of Dried Pollen

Amendment 0

July 2005

3.1 Scope

Table 1: Scope of the HACCP application

Components	Description/Details
Material being processed	Fresh or frozen pollen
Products	Dried pollen
Process	From receipt of pollen to dispatch of packed dried pollen. Key processing operations: <ul style="list-style-type: none">• Drying• Cleaning• Freezing• Packing• Storage

3.2 Product description

Table 2: Intended use and consumer of products, and product requirements

Product	Dried pollen
Intended consumer	Humans (general public)
Intended use of product that leaves RMP	<ul style="list-style-type: none"> • Ready-to-eat • Ingredient for preparation of other foods and dietary supplements
Regulatory limits ¹	None
Other regulatory requirements specific to bee products	Every consignment of pollen must be provided with an <i>Apiarist and Beekeeper Statement</i> (i.e. Harvest declaration) and comply with the requirements of HC Spec 108 ²
Labelling	<p>Labelling of retail packs as specified in the Food Standards Code including an advisory statement as required by Standard 1.2.3.</p> <p>Labelling of transportation outers as specified in HC Spec 32.</p>

1. Regulatory limits are limits that are essential to be met for food safety and are established by the regulator under the Animal Products Act 1999.

2. The *Apiarist and Beekeeper Statement* (i.e. Harvest declaration) confirms the controls applied by the beekeeper that are intended to minimise the risks to human health from drugs (e.g. antibiotic), agricultural chemicals (e.g. pesticides), and plant toxins, including phytotoxins of the native plant tutu (*Coriaria* spp).

3.3 Process description

The process flow diagrams show the key steps based on a generic process. Process steps and their sequence may differ for each premises. Operators must ensure that their process is accurately reflected in their RMP.

Table 3: Process flow diagram for the processing of dried pollen

Inputs ¹	Process steps	Outputs ²
Fresh or frozen pollen →	1. Receiving	
	↓	
	2. Holding in freezer	
	↓	
	3. Drying	
	↓	
	4. Cleaning and sorting	→ Foreign matter to waste
	↓	
Packaging →	5. Bulk packing	
	↓	
	6. Storage in freezer	
	↓	
Packaging and labels →	7. Retail packing and labelling	
	↓	
	8. Dispatch	→ Packed dried pollen

1. An input is any material, additive, processing aid, ingredient, or packaging that is added or used for the production or processing of a food product.

2. An output is any material or product resulting from any operation under an RMP.

3.4 Hazard analysis and CCP determination

3.4.1 Identification of hazards from inputs

Hazards associated with each input are identified, considering any supplier agreements and requirements given in the COP.

Table 4a: Hazard identification

Inputs	Description/specification	Biological hazard (B)	Chemical hazard (C)	Physical hazard (P)
Fresh or frozen pollen	Accompanied by an <i>Apiarist and Beekeeper Statement</i> (i.e. Harvest declaration) and complies with HC Spec 108.	Bacterial pathogens from rodent droppings, insect fragments and wastes, dusts and other contaminants ¹	Chemical residues, e.g. pesticides ² Allergen ³	Wood, metal pieces (e.g. staples, wire)
Plastic packaging	Suitable for use as food contact material as specified in Section 8 of Part 2 of the COP.	None	None	Plastic pieces
Glass jars	Suitable for use as food contact material as specified in Section 8 of Part 2 of the COP.	None	None	Glass fragments

1. At present, there is insufficient information on the types and levels of pathogen contamination on bee pollen. Further investigation on this matter is proposed.

2. The potential for chemical residue contamination in bee pollen is minimised by controls at the apiary, and confirmed through the *Apiarist and Beekeeper Statement* (i.e. Harvest Declaration) as required by the Human Consumption specification 108. This statement confirms the controls applied by the beekeeper that are intended to minimise the risks to human health from drugs (e.g. antibiotic), agricultural chemicals (e.g. pesticides), and plant toxins.

3. The ingestion of bee pollen has been identified as a possible cause of anaphylaxis, gastro-intestinal symptoms, asthma, and angioedema/urticaria. The Report of the New Zealand Bee Product Warning Scientific Review Working Group (1999) concluded that the estimated risk to the population from ingestion of bee pollen is extremely low. The Working Group also concluded that risk management should be limited to ingredient labelling of all products containing bee pollen.

3.4.2 Process step hazard analysis and CCP determination

Table 4b: Hazard analysis and CCP determination for the processing of dried pollen

Process step	Inputs	Hazard reasonably likely to occur on or in the product at this step	Justification	Q1. Is there a control measure(s) for the hazard at this step? If yes, identify the control measure and then answer Q2. If no, consider hazard at next step.	Q2. Is the control measure at this step essential to food safety as defined by a regulatory limit? If yes, this step is a CCP. If no, this step is not a CCP.	CCP no.
1. Receiving	Fresh or frozen pollen	B – Bacterial pathogens	Bacterial pathogens may be present in fresh pollen from contaminants such as rodent droppings, insect parts and wastes, dust	Yes – Supplier agreements and inspection for contaminants at receipt will minimise contamination	No	
		C – Chemical residues	Residues can occur in pollen ¹	Yes – Supplier statements confirming beekeeper controls	No	
		C - Allergens	Pollen is known to cause allergic reactions in certain people	No ²		
2. Holding in freezer	Pollen	B – Bacterial pathogens	Carried over from previous step	Yes – GMP: proper freezing will prevent micro growth ³	No	
3. Drying	Pollen	B – Bacterial pathogens	Carried over from previous step	Yes – Proper drying may reduce micro levels and prevent micro growth ³	No	
4. Cleaning and sorting	Dried pollen	B – Bacterial pathogens	Carried over from previous step	Yes – GMP: effective cleaning and removal of dust, insect and other physical contaminants can reduce micro levels ³	No	
5. Bulk packing	Dried pollen	None				
	Packaging	None				
6. Storage in freezer	Dried pollen	None				

Process step	Inputs	Hazard reasonably likely to occur on or in the product at this step	Justification	Q1. Is there a control measure(s) for the hazard at this step? If yes, identify the control measure and then answer Q2. If no, consider hazard at next step.	Q2. Is the control measure at this step essential to food safety as defined by a regulatory limit? If yes, this step is a CCP. If no, this step is not a CCP.	CCP no.
7. Retail packing and labelling	Dried pollen	C - Allergen	Carried over from step 1	No. Labelling will not control the hazard but it will minimise the risk to the consumer ²		
	Packaging	None				
8. Storage	Dried pollen	C – Allergen	Carried over from previous step	No		
9. Dispatch	Dried pollen	C- Allergen	Carried over from previous step ²	No		

1. The control of chemical residues involves effective beekeeping practices which is confirmed through the *Apiarist and Beekeeper Statement* (i.e. Harvest Declaration) as required by the Human Consumption specification 108. There is insufficient data, at present, to confirm the levels of chemical residues in New Zealand pollen. The level of any chemical residue is not going to increase during pollen processing, thus, they have not been considered further in succeeding steps.

2. The Report of the New Zealand Bee Product Warning Scientific Review Working Group (1999) concluded that management of risks from allergens in bee pollen should be limited to ingredient labelling of all products containing bee pollen. The Food Standards Code 1.2.3 requires that the label on a package of bee pollen must include an advisory statement to the effect that the product contains bee pollen which can cause severe allergic reactions.

3. There is insufficient information, at present, on the impact of certain process steps (e.g. freezing, drying, cleaning) on the microbiological load in bee pollen. Limited industry data suggests that proper collection of pollen, application of GMP during processing and the thorough removal of physical contaminants minimises the microbiological load in bee pollen. The hazard analysis shown in this table is based on limited industry information, and scientific information on the general impact of these process steps on microorganisms in food. Further investigation is necessary to confirm the hazard analysis.

3.4.3 Outcome of CCP determination

No CCP was identified for the drying of bee pollen. The control of hazards at key steps is expected to be adequately addressed by GMP (i.e. complying with the procedures given in Part 2 of this COP).

Since no CCP has been identified, the other HACCP principles that relate to a CCP (i.e. identification of critical limits, CCP monitoring, CCP corrective action) have not been applied to the generic process.