Ministry for Primary Industries
Manatū Ahu Matua

Guidance Document

Compliance Guide to the Food Standard: Tutin in Honey

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Title

Guidance Document: Compliance Guide to the Food Standard: Tutin in Honey

About this document

This guide has been published to assist beekeepers, packers and exporters of honey to comply with the Food Standard: Tutin in Honey. The standard has been developed to ensure that dangerous levels of tutin do not occur in honey sold in New Zealand or exported.

For any references to sections included refer to sections in this guidance document unless it is otherwise stated.

Related Requirements

Food Standard: Tutin in Honey signed 15 January 2016 http://www.mpi.govt.nz/document-vault/11137

Animal Products (Harvest Statement and Tutin Requirements for Export Bee Products) Notice 2010

Food Standards Australia New Zealand, Food Standards Code Standard 1.4.1Contaminants and natural toxicants http://www.comlaw.gov.au/Series/F2015L00408

Food Standards Australia New Zealand, Food Standards Code Schedule 19
http://www.comlaw.gov.au/Series/F2015L00454

Document history

Previous Version Date	Current Version Date	Section Changed	Change(s) Description
December 2010	October 2016	Entire document	Updated in line with MPI Requirements and Guidance Programme. Updated to reflect requirements of the Food Standard: Tutin in Honey which came into force on 29 February 2016. New section numbering. New section (section 7) describing homogenisation of honey.
October 2016	November 2016	3.2	Correction to typographical error in date the new tutin limit came into effect

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Disclaimer

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Contents

1 Definitions

Australia New Zealand Food Standards Code (the Food Standards Code) contains standards for food that must be met in Australia and New Zealand. The code can be viewed at http://www.foodstandards.govt.nz

Batch means a lot of homogeneous product (usually, but not necessarily, the contents of one tank)

Blend means to mix together different containers of honey (eg 2 or more drums) to achieve one homogeneous batch.

Box section comb honey means any comb honey that is sold in the frame or other container in which it was produced in the beehive. This includes ross rounds, jars, or any other container.

Comb honey means honey sold still in the wax honeycomb

Cut comb honey means comb honey cut from the frames in which it was produced in the beehive

Composite means to combine several samples and carry out one test on the whole lot, rather than testing each individual sample.

Hobbyist means a beekeeper who does not sell honey, but may share it with family and friends

Homogenise in relation to honey means to mix so that all components are distributed evenly.

Honey supers are the portion of a beehive where honey is stored

ISO/IEC 17025 means the current edition of ISO/IEC 17025 "General requirements for the competence of testing and calibration laboratories"; this refers to the latest edition of that standard, together with any additions, amendments, and deletions made to or from that standard up to that time.

Maximum level in relation to honey and comb honey means 0.7 milligrams per kilogram (0.7mg/kg).

Representative sample is a sample which will give a test result that reflects the true level of a compound in the batch it was taken from.

Sale is defined in The Food Act 2014, and includes bartering and giving goods in exchange for services.

Tutin is a defined chemical compound (CAS No 2571-22-4) that causes toxicity in honey that results from honey bees gathering honeydew exudates from passion vine hoppers that have been feeding on the sap of tutu

The Food Act means the Food Act 2014, and applies to all food for sale in New Zealand.

The Standard means the Food Standard: Tutin in Honey, signed 15th January 2016.

Tutu means *Coriaria arborea* and *Coriaria sarmentosa*

Validation in this guide means confirming that a process is effective by collecting data.

2 Background

2.1 What is Toxic Honey?

There are a number of plants worldwide that can lead to toxicity in honey when bees forage either:

- directly on the nectar; or
- on the pollen of the plant; or
- on honeydew on the foliage.

Rhododendrons, for example, have been recognised as a source of toxic honey for centuries.

Toxicity in New Zealand honey has only been associated with bees collecting honeydew from the common varieties of tutu - *Coriaria arborea* and *Coriaria sarmentosa.* Tutu bushes contain a toxin called tutin. The honeydew is present as an excretion from passion vine hoppers (*Scolypopa australis*) that feed on tutu sap. Tutu honeydew honey is chemically similar to floral honey and cannot be distinguished by taste, sight or smell from other non-toxic honeys.

To produce toxic honey, the following conditions are required:

- significant concentrations of tutu bushes; and
- high numbers of vine hoppers; and
- the presence of honey bees (*Apis mellifera*).

A significant number of people have been killed, incapacitated and hospitalised over the years from eating toxic honey. The most recent case from commercial honey was in 2008 involving 22 people, some of whom showed severe clinical symptoms. Most poisonings have been associated with consumption of comb honey.

Both comb honey and extracted honey can be poisonous. Comb honey poses a greater risk because tutin can be concentrated in isolated cells of the honeycomb. A person eating comb honey can ingest higher levels of tutin than if the honey was extracted and thoroughly homogenised.

There are many areas where highly toxic honey has been produced. These should be avoided for honey production altogether after 1 January, especially for comb honey.

Around one quarter of honey samples from the North Island and top part of the South Island contain some level of tutin.

2.2 Tutu – The Plant

Tutu is a widely distributed native plant species found throughout New Zealand, particularly along stream banks, sheltered road verges and in regenerating native bush.

Livestock deaths from eating tutu were common in the past and early settlers in New Zealand also suffered illness and death from consuming the plant or its berries. Photos of tutu are found in Appendix 1.

Tutu plants are members of the *Coriaria* genus, of which there are a number of species found in New Zealand. While all contain tutin, small mountain species of *Coriaria* are unlikely to be found in the same area as vine hoppers. *Coriaria arborea* and *Coriaria sarmentosa* have been identified as the two species of concern, as they are widespread throughout New Zealand.

Honey harvested from an area which has any significant amount of tutu plants needs to be homogenised and tested for the presence of tutin. Comb honey should not be produced in such areas.

2.3 Tutin – The Toxin

Tutin is a neurotoxin. It is a member of the picrotoxin group and affects mammals, while seemingly having no effect on bees. Tutin is considered to be very stable and cannot be degraded by heating or processing.

Ingestion of tutin can be lethal, or make a person very unwell. It is generally accepted that as little as one teaspoon (approximately 10 ml) of toxic honey can have a severe effect on the human nervous system. Symptoms include vomiting, delirium, giddiness, increased excitability, stupor, coma and violent convulsions. Poisoning cases have resulted from people eating honey that was several years old.

Pharmacokinetic studies[1] and observation of tutin poisoning cases (from consumption of berries) in a hospital setting[2] suggest the non-lethal effects of tutin poisoning are short-term and self-resolving.

2.4 Passion Vine Hoppers

The key risk factor for the production of toxic honey is the presence of passion vine hoppers (*Scolypopa australis*) on tutu. Photos of adult and nymph passion vine hoppers are found in Appendix 1.

Passion vine hoppers are found on a wide variety of plants throughout the North Island and in the top of the South Island. There is some evidence that areas at higher altitude in the southern part of the North Island may be free of them. The same is likely to be true in the South Island.

Passion vine hoppers over-winter as eggs. There is only one generation each year. The white fluffy nymphs generally emerge between October and December and take nearly three months to develop. Adults are typically present from January to March. In warmer parts of the North Island, some may appear in December and a few may survive until late May. Both nymphs and adults produce honeydew in quantities sufficient enough for bees to gather.

Honey containing low levels of tutin has been found to be produced as early as November. This is likely to have been a result of fresh honeydew collection, but could also be caused by bees moving honey from over-wintering brood boxes up into honey supers.

2.5 Honeydew

Passion vine hoppers exude toxic honeydew (a sweet exudate) as a by-product of feeding on the sap of tutu. The more vine hoppers present, the more toxic honeydew is available to be collected by bees. When present in large quantities on tutu it may make the leaves sticky to touch. Once honeydew has been there in significant quantity for a few weeks a black sooty mould will grow on it which will be very obvious on the foliage of the plant. However, bees have been observed collecting honeydew from tutu bushes where there was no visible honeydew but vine hoppers were present.

[1] Human pharmacokinetic study of tutin in honey; A plant derived neurotoxin
Food and Chemical Toxicology 72 (2014) 234–241

[2] Tutu toxicity: three case reports of Coriaria arborea ingestion, review of literature and recommendations for management. NZMJ 1 March 2013, Vol 126 No 1370;
https://www.nzma.org.nz/__data/assets/pdf_file/0007/39922/content.pdf

3 Limits for Tutin in Honey

3.1 Limit for Honey and Comb Honey

Standard 1.4.1 of the Food Standards Code sets limits for natural toxicants in foods. Schedule 19-6 of the Food Standards Code contains the limit for tutin in honey and honey comb.

The maximum level for tutin in honey and honey comb has been set at 0.7 mg/kg. This limit applies to all honey that is produced or harvested or packed for sale for human consumption. This has been revised from previous limits in the Food (Tutin in Honey) Standard 2010 of 2 mg/kg for honey and 0.1 mg/kg for comb honey.

3.2 Honey Produced Prior to 12 March 2015

Honey which was packed for retail prior to 12 March 2015 is deemed to comply if it met the level for tutin in honey in force at that time (2 mg/kg for honey and 0.1 mg/kg for comb honey).

Any bulk honey extracted prior to this date, and which has yet to be tested for compliance with Option 1 must comply with the new limit of 0.7 mg/kg of tutin for honey and comb honey.

All other honey either extracted or packed after 12 March 2015 must comply with the new limit of 0.7 mg/kg for honey and comb honey.

4 General Requirements of the Standard

This Standard places responsibilities on:

- all beekeepers who supply honey for sale (sale and sell is defined in section 13 of the Food Act 2014 and includes barter); and
- people and businesses that sell honey; and
- anyone who packs honey into a final container for sale

5 Sampling and Testing Requirements

Only fully validated test methods can be used for tutin testing. Samples must be representative of the actual level of tutin in the honey. This is best achieved by homogenising the honey in validated equipment prior to testing (see section 7).

5.1 Honey

Samples of honey must be sent to an accredited laboratory (see section 5.4). Samples can be sent in a variety of forms – samples from a bulk tank, core samples from a drum, or a retail ready pack such as a jar.

Honey samples may be composited, however this should only be done by the laboratory (see section 5.5).

The limit of detection for current tutin testing methods is 0.01 mg/kg. In the future more sensitive test methods may be developed which allow detection of a lower level.

5.2 Comb Honey

Because honey samples can be tested to detect very low levels of tutin, testing is now an option available for ensuring the safety of cut comb honey. Testing for tutin in cut comb honey needs to be done on a harvest by harvest and apiary by apiary basis because tutin contamination will vary between apiary sites even where apiaries are located close together.

The combined drip and any imperfectly filled combs from a lot (i.e. all the honey from a single apiary site harvested on the same day) should be:

- extracted;
- thoroughly homogenised; and
- tested using a test with a limit of detection of at least 0.01 mg/kg.

If the result exceeds 0.01 mg/kg, the whole lot must be:

- extracted, homogenised and tested; or
- disposed of so it does not enter the human food chain;

The 0.01 mg/kg limit has been selected because of the inherent variability of comb honey.

Because of the low limit of detection required for testing cut comb honey, it is not possible to composite samples.

5.3 Box Section Comb Honey

There is no testing option for box section comb honey, as it is not possible to take a representative sample without destroying the comb.

Box section comb honey has to be harvested only from areas or at times where no or low risk of tutin contamination exists (Options 2, 3 and 4). Option 5 is also available for box section comb honey, but only in years when testing is not required (See Section 6.5 for more detail).

5.4 Laboratories

Testing must be done in a laboratory accredited to ISO 17025. MPI does not endorse any particular laboratory for undertaking this testing.

Laboratories involved in testing honey for export have to be approved under MPI's Recognised Laboratory Programme (RLP):

- see http://www.foodsafety.govt.nz/registers-lists/rlp-laboratories/index.htm; and
- search the 'Activities' box for 'honey'; and
- then search the resulting lists for '8.42' (this is the code for tutin testing).

5.5 Composite testing

Samples may only be composited for analysis by accredited laboratories. The number of samples that may be composited for analysis will vary depending on the sensitivity of the methods used for analysis.

As per section 5.2 compositing of comb honey samples is not permitted.

5.6 Representative Samples

When sampling honey for tutin, care must be taken to ensure that the sample is representative of the tutin level in the batch. This is a requirement of Part 3 of the Standard.

All persons blending honey to dilute tutin should ensure that their equipment has been sufficiently validated to prove the resulting batch of honey is thoroughly homogenised (see section 7).

5.6.1 Honey

When bees collect honeydew from tutu and fill individual cells back at the hive, the cells will often end up with differing levels of tutin. This can lead to in inconsistent levels or layering of tutin in bulk honey in an extraction tank or drum

To have true representative samples, it is important to thoroughly homogenise the honey before sampling. Skipping the mixing or homogenisation step before sampling could result in artificially high or low results that are not representative of the batch (see section 7).

5.6.2 Comb honey

True representative samples also apply to honeycomb. When honeycomb is cut during packaging, all leftover comb and drip must be collected and thoroughly homogenised, then tested for tutin.

5.7 Application to Hobbyists

Any hobbyist beekeeper who wishes to sell their honey is covered by the Standard.

This Standard does not apply where a hobbyist beekeeper only collects honey for their own use. This includes where honey is gifted to friends and family provided that is not in exchange for goods or services. However, it is strongly recommended that hobbyist beekeepers adopt one or more of the options required of beekeepers selling honey as set out in the Standard to avoid poisoning themselves, their friends or their family. See section 6 Compliance options

Hobbyist beekeepers should also note that when they sell honey, the extraction and packing of that honey is subject to requirements of the Food Act 2014. They will need to register as a business with their Local Council. The default regime for extractors and packers of honey is a National Programme Level 1. Hobbyists wishing to sell their honey should contact their Local Council in the first instance. There is also information on the MPI website: https://www.mpi.govt.nz/food-safety/food-act-2014/national-programmes/

5.8 Beekeepers' Responsibilities

Beekeepers must ensure that the honey produced does not contain excessive levels of tutin. There are many areas where highly toxic honey has been produced, these should be avoided for honey production altogether after 1 January, especially for comb honey.

Beekeepers selling honey directly are required to undertake at least one of the five options in the Standard (refer to section 6) to ensure that their honey meets the tutin limits stated in the Food Standards Code. They will need to ensure that they have full records of tutin levels available for inspection by:

- an officer appointed under the Food Act 2014;or
- Animal Products Act Officer/ Accredited Verifier for businesses operating under RMP.

5.8.1 Record Keeping

Beekeepers must make sure that they keep any records demonstrating compliance with the Standard for at least four years. This is because honey may be stored for several years before being sold. Failure to keep adequate records for this length of time is a breach of the requirements of the Standard.

In the event that records are not sufficient to demonstrate that one of the options has been complied with, an officer may take actions such as:

- Requiring all honey to be homogenised and tested before sale; or
- Seizure and destruction of product; or
- Product recall

Records should include hive locations and harvest dates. Records can be contained in documents such as hive diaries.

5.8.2 Beekeepers Supplying Honey to Exporters

Beekeepers supplying packers or exporters must keep records of which compliance option(s) they have taken, and provide a written statement that shows they hold records of this when on-selling honey.

There are additional requirements for beekeepers supplying exporters, including:

- identifying which of the options in the standard they have complied with in the form of a harvest declaration or transfer statement; and
- Meeting any additional requirements under the Animal Products such as the Animal Products (Harvest Statement and Tutin Requirements for Export Bee Products) Notice 2010.

In the event that records are not sufficient to demonstrate that one of the options has been complied with, an officer may take actions such as:

- Requiring all honey to be homogenised and tested before sale; or
- Seizure and destruction of product; or
- Product recall

All exported honey must be packed under an RMP. There are specific requirements for documentation under an RMP, which any beekeeper supplying an exporter must complete. This includes the “Apiarist and Beekeeper Statement for the Harvest of Honey and other Bee Products for Human Consumption” (the harvest declaration) found on the MPI website: http://www.mpi.govt.nz/exporting/food/honey-and-bee-products/forms-and-templates/

Failure to complete the documentation will mean that the honey can’t be exported.

If a beekeeper has not provided written statements showing which tutin compliance option they have followed, the packer or exporter must test the honey for tutin

Sufficient records need to be kept to demonstrate compliance with the Standard. Failure to keep such records means that the honey supplied may not be eligible for export.

5.9 Packer’s Responsibilities

Anyone who packs honey into bulk containers for storage or sale to another packer, or into jars for retail sale, needs to ensure:

- that the honey has been harvested or tested in accordance with the provisions of the Standard; and
- they hold documentation to demonstrate this.

Signed statements from suppliers stating that they are complying with one or more of the options in the Standard are sufficient. The Standard does not require the packer to hold copies of all of the beekeeper's documentation as some of this (for example specific hive locations) is commercially sensitive.

Honey packers and sellers must also keep records for four years from the time honey is packed for sale or exported. This ensures that (should a trace-back be necessary) the relevant documentation will be available.

Packers are entitled to rely on honey test results from suppliers and retesting should not normally be necessary after homogenisation, provided:

- tutin levels are known and compliant in all incoming batches of honey; and
- homogenisation equipment has been suitably validated (see section 7).

If a packer has any doubt about the documentation or homogenisation of the product supplied, the packer should ensure that the product is homogenised and tested before sale to ensure it is safe.

The packer will need to ensure that a representative sample is taken when testing honey, as described in section 5.6.

5.10 Honey for the Domestic Market

Honey which is not destined for export may be produced under

- an RMP under the Animal Products Act;
- a National Programme (NP) Level 1 Under the Food Act;
- a custom Food Control Plan (FCP) under the Food Act.

All businesses must comply with the Standard, regardless of which regulatory regime they are under. Any extractor or packer registered under a custom FCP or NP1 must:

- include tutin compliance documentation in their FCP or NP1;
- show tutin compliance documentation to the verifier on the initial verification visit, and any further verification visits.

5.11 Honey for Export

All honey for export is covered by the Standard, including honey to be exported under official assurances (Government Certification).

Honey that is packed for export to countries requiring official assurances must be processed by premises operating under an RMP. Beekeepers supplying such premises must complete harvest declarations as described in section 5.8.2.

All persons involved in the production of honey for export need to ensure that any relevant General Requirements for Export (GREX) and Overseas Market Access Requirements (OMARs) provided under the Animal Products Act are complied with. These documents are available at www.mpi.govt.nz. Government certification may be refused for non-compliant export consignments.

MPI will provide official assurances for exported honey on the basis of compliance with:

- the Standard; and
- the limits in the Food Standards Code.

MPI cannot guarantee that the honey complies with importing country regulations concerning contaminants in honey. Many countries have default limits for contaminants, or they may have zero tolerance for contaminants where a level has not been specified in their own regulations.

MPI will not be able to issue official assurances for honey where the official assurance contains attestations about compliance with importing country contaminant regulations, except where:

- the contaminant requirements have been notified in an MPI OMAR; and
- the product has been shown to comply.

There is a risk of product rejection in markets that have not officially recognised the New Zealand tutin limit. Should honey be tested at the border for tutin in such countries, and there is a detection which exceeds the importing country's standard, MPI will not be in a position to negotiate clearance for that consignment.

Additionally, businesses operating under the Animal Products Act are required to comply with the requirements of the Animal Products (Harvest Statement and Tutin Requirements for Export Bee Products) Notice 2010 http://www.mpi.govt.nz/document-vault/75

If honey needs to be tested for tutin before being exported, the laboratory you send samples to must be part of the MPI Recognised Laboratory Programme (as described in section 5.4)

6 Compliance Options

These options apply to all honey produced for sale in New Zealand from 29 February 2016.

6.1 Option 1: Holding Test Results

The Standard requires testing where honey has been harvested in a situation where:

- it is likely to have some tutin in it; or
- none of the other compliance options are possible or have been followed.

Samples may be taken by either a beekeeper or a packer of honey and sent to an accredited laboratory for testing.

Honey and honey comb samples must be representative, and should be taken after honey is homogenised. Studies should be carried out to ensure homogenisation is sufficiently thorough (see section 7).

6.1.1 Record Keeping

Records of tutin levels for all honey that is exported or packed for retail sale must be kept for four years. Records should include:

- where honey was obtained from (beekeeper or bulk honey supplier);
- tutin levels of each batch prior to homogenisation (if known);
- details of any blending and subsequent homogenisation of batches;
- tutin levels of the resulting homogenised batches.

6.2 Option 2: Holding Records that Demonstrate a Low Risk Harvest Date

A low risk harvest date is where honey supers are placed on hives after 1 July and removed by 31 December of any year. Harvesting honey within these dates should avoid any significant risk of tutin contamination as vine hopper numbers do not build up until late summer.

Low levels of tutin (less than 0.1 mg/kg) have been found in honey harvested in November and December in Northland. It is likely that low levels may also occur in other warm parts of the country in honey harvested before 1 January. It is unclear whether these low levels are as a result of early vine hopper activity or bees shifting contaminated late season honey up into honey supers as they make room for brood in the bottom boxes in the spring.

6.2.1 Record Keeping

Beekeepers will need to keep records (e.g. hive dairies) which specify:

- hive locations; and
- the dates supers were placed on; and
- and dates supers were taken off.

6.3 Option 3: Holding Records that Demonstrate an Absence of Tutu

If a thorough check of the likely bee foraging radius around beehives does not find a significant quantity of tutu, then this may be used to justify taking no further action to manage for tutin. This option is not available for compliance with the Standard if a significant concentration of bushes is found.

“Significant” tutu means more than a few isolated bushes (for example alongside a stream or road cutting for a few hundred metres where tutu bushes are found every 10-20 m). Dense concentrations of tutu are often found in close proximity to watercourses, road cuttings and in more sheltered areas, especially where bush is regenerating.

If in any doubt as to whether a concentration of tutu bushes is significant it is better to adopt the cautious approach and undertake testing, until test results show that there is little or no tutin risk in your area (follow Options One or Five).

The likely bee foraging radius will vary greatly depending on topography, for example, bees are unlikely to fly over a mountain range to forage. It will also vary depending on the availability of floral sources in the area and time of year. However, bees may fly 10 km or more to forage in some situations.

Where changes occur that are likely to impact upon the status of an area. For example, a forest being felled, checks will need to be made of the felled area on a regular basis (annually should be sufficient) to check for new growth of tutu.

Very few areas will be able to be surveyed in a sufficiently thorough manner and be found sufficiently free of tutu to be able to rely on this option.

6.3.1 Record Keeping

Documentation to support this option should include 1:50 000 scale topographical maps showing the location of beehives together with detailed notes or photographs of areas likely to contain tutu that have been surveyed. Areas likely to contain tutu include road cuttings and river/stream gullies and areas of regenerating bush in an area where these are not clearly either in pasture or mature forest which will shade out the tutu.

Records must be kept of:

- the areas that have been checked (location specified as coordinates and approximate size); and
- dates areas were checked; and
- numbers and sizes of tutu bushes found.

Where any tutu is present, checks need to be made of these areas periodically and records kept of these checks to ensure that the numbers and sizes of plants present have not built up to a point where they may present a risk.

6.4 Option 4: Holding Records that Demonstrate a Low Risk Location

Apiary sites below 42 degrees south are deemed to be in low risk locations. This line is south of Westport on the West Coast and south of Cape Campbell on the East Coast of the South Island. Passion vine hoppers have been found in the Buller Gorge, and in coastal areas of the South Island north of this line. Tutin has also been found in honey in some of these areas.

6.4.1 Record Keeping

Beekeepers with apiaries below 42 degrees south need to keep records of hive locations and be able to show that those locations are south of the line.

Under some circumstances it is possible that vine hoppers may be found south of this line, particularly in warmer coastal areas. In this case beekeepers should be vigilant for their presence.

If vine hoppers are present, it would be prudent to make sure honey is safe by using another appropriate option as set out in the Standard.

6.5 Option 5: Demonstrating Low Risk in Areas by Testing Honey

This option is designed to allow beekeepers to demonstrate that there is low risk of tutin contaminating honey from the areas around their apiaries. This option may be useful:

- where there are preferential floral sources consistently available; or
- in areas where there is little tutu present but surveying to prove it is difficult; or
- in areas where passion vine hopper numbers are low.

This option is not suitable for use in warmer areas of the country where there are more likely to be high concentrations of tutu or vine hoppers present. In those areas, honey should either be tested in accordance with Option 1 or harvested in accordance with Option 2.

There are two tutin limits under this option:

- For extracted honey production no targeted sample can exceed 0.035mg/kg tutin
- For comb honey production no targeted sample can exceed 0.01mg/kg tutin

This option requires data from three consecutive years (for both honey and comb honey) before it can be used. After the initial three years testing is required one year in ten.

Box section comb honey can be produced after the initial three years, and during the nine years testing is not required, providing that no individual results have exceeded 0.01 mg/kg.

It is most likely that honey harvested later in the season rather than earlier will be contaminated with tutin if it is present in an area. Late season harvests must be targeted for sampling if using this option, as you will only be allowed to harvest honey before the latest date that you have tested honey. For example if the latest test date that you have is 1st February, you will only be able to extract honey harvested before the 1st February if using this option.

Honey from individual apiaries may be sampled, or apiaries in a close geographic location (eg within the same valley) may have the honey homogenised and tested together. The bees from those apiaries must have a common predictable foraging area. A common foraging area will need to be demonstrated. If there is any doubt about the common foraging area, apiaries should be sampled individually. The honey from those apiaries would normally be combined into a single batch in the course of extraction

6.5.1 Record keeping

Beekeepers will need to be able to clearly demonstrate why they believe the bees have a common foraging area. 1:50 000 topographical maps with apiary locations and natural features that will clearly limit bee foraging marked on them will be required to support use of this option.

Details of all harvests from all apiaries and any associated test results must be kept to demonstrate that the locations and harvests most at risk of tutin contamination have been tested each year.

For comb honey, apiaries should always be sampled individually.

7 Homogenisation of honey

Part 3 of the Standard requires that honey samples must be representative. The best way to achieve this is to ensure honey is homogenised before taking a sample. Part 4 of the Standard requires that anyone diluting honey with high levels of tutin must homogenise and test the resulting batch.

When honey is extracted and homogenised, uncontaminated honey will dilute any tutin. It is therefore very important to ensure honey with any amount of tutin present is thoroughly homogenised before testing and sale.

It is important to have confidence that the level of tutin is consistent throughout a batch of honey to be packed for sale in final packs. The operator must know that any equipment used for blending honey (e.g. from different drums) results in a thoroughly homogenised batch. Premises blending honey should ensure that the equipment used has been through sufficient testing to ensure that the resulting product is thoroughly homogenised.

The recommended way to achieve a homogeneous batch is to have the entire batch in a single bulk holding tank with a stirring device with sufficient stirring done to ensure the honey is thoroughly homogenised. This will generally require agitation with a mechanical stirrer for a set period of time. Stirrers should be designed in such a way that the whole volume of honey moves in a rolling, circular motion from the bottom to the top of the tank.

If suppliers of bulk honey have not demonstrated that the honey was thoroughly homogenised before filling into bulk containers, then the packer or exporter should thoroughly homogenise it before packing. This will mean that any subsequent sample taken for tutin testing will be truly representative.

7.1 Validation of homogenisation equipment

Operators can test the effectiveness of their equipment by measuring tutin levels. In a thoroughly homogenised batch of honey, the tutin level will be the same throughout the batch.

An effective way to achieve this is to take samples from a tank after homogenising a batch of honey, at set points as the tank is emptied.

7.2 Validation Method for Honey Packers

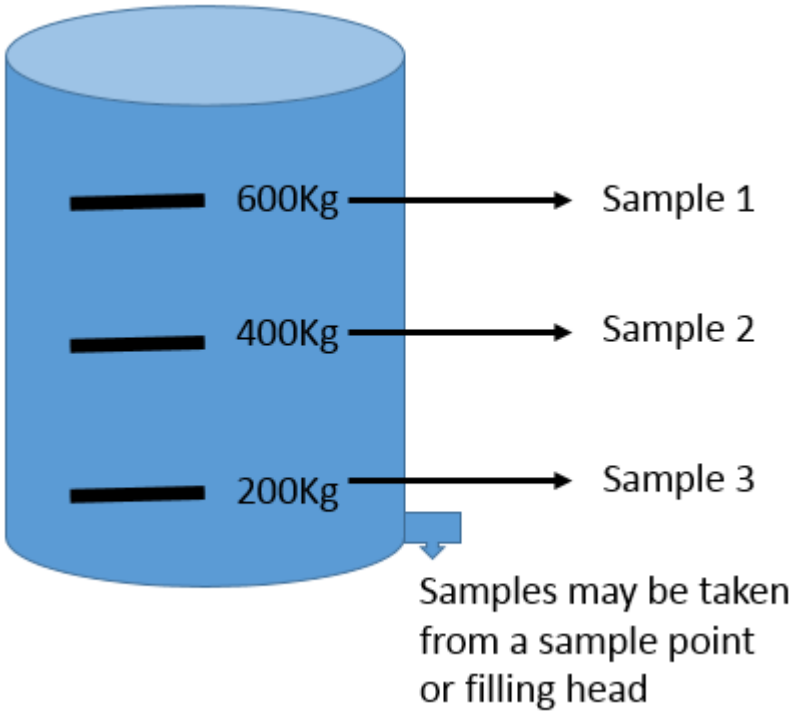
Three samples is the minimum sample size to give an acceptable degree of certainty. Samples are taken from a sample point (or the filling head) as a bulk tank is emptied during packaging.

For example, the tank is filled with 600kg of honey, and stirred for a set time period to thoroughly homogenise the batch. The operator takes a sample at the start of emptying the tank, and then every subsequent 200kg. Each sample must be tested individually for tutin (see Figure 1). **Note** – it is not possible to use a continuous bleed or to composite samples for the purposes of this test.

If homogenisation is complete, samples 1, 2 and 3 will all have the same level of tutin in them. Check with your lab to see what amount of variation between samples is acceptable (this will depend on how accurate the lab method is).

Note – for this method to work effectively, the honey being homogenised must have variation in tutin level. For example drum number 1 and 2 have 0.1mg/kg of tutin, and drum number 3 has 0.5mg/kg of tutin. It may be possible to measure other variables instead, for example brix. Check with your verifier.

Figure 1 – taking samples from a tank



7.3 Validation Method for Honey Extractors

If you extract an entire batch of honey into a holding tank before packing it into drums, you could validate the homogenisation of honey in the holding tank by using the same method as above.

For example a whole apiary/day's production is extracted into the tank, held and stirred. Samples are taken as above during drumming off.

If the batch is properly homogenised, then all three samples will have the same level of tutin.

Doing this will show that any tutin testing you do on drums of honey is truly representative of the level in the batch (as per Part 3 of the Standard).

Note – this will only work if there is tutin present in the honey to be extracted.

8 Honey that Exceeds the Maximum Level

8.1 Honey (Other than Comb Honey)

Current industry practices for dealing with honey that exceeds the maximum level of 0.7 mg/kg include blending with other batches with lower levels of tutin.

If this does occur, it is essential that all honey must be thoroughly homogenised, using a process that has been validated (as described in section 7).

Honey must be tested after homogenisation, and prior to packing. This is a requirement of Part 4 of the Standard.

8.2 Comb and Box Section Comb Honey

Cut comb honey can be tested, by collecting all leftover comb and drip. If this returns a high result, it may be possible to extract honey from the combs. It may also be necessary to blend the honey with other batches with lower levels of tutin.

Any honey extracted must be tested after homogenisation, and prior to packing. This is a requirement of Part 4 of the Standard.

Box section comb honey cannot be tested for tutin. However if any honey from the same apiary is extracted, and returns a high level of tutin, then any box section comb honey from that apiary can be extracted and blended as per cut comb honey.

8.3 Other Options

8.3.1 Disposal

If it is not possible to thoroughly blend away honey with high levels of tutin, the honey should be disposed of. You will need to get approval and keep records of this for four years.

It should be noted that use of tutin contaminated honey in manufactured food products, e.g. in baked goods or mead, is prohibited by the Food Standards Code unless the level in the honey is below 0.7 mg/kg.

8.3.2 Feeding it Back to Bees

Honey that exceeds the maximum level of tutin may be fed back to bees if it can be fed back to the same hive or apiary that produced the honey. This must only be done when there are no supers present on the hives.

Feeding contaminated honey back to the bees could mean that any honey harvested subsequent to this will contain some level of tutin.

Any honey harvested from these hives must be tested in accordance with Option 1. Options 2, 3, 4 and 5 are not available.

Any comb produced from these hives must also be tested, and therefore it is not possible to produce box section comb honey off a hive that has been fed honey with high levels of tutin contaminated honey.

9 Appendix I: Passion Vine Hoppers and Tutu

Figure 2: Tutu Bush Picture - Jim Edwards

Figure 3: Scolypopa Nymph. Picture - HortResearch

Figure 4: Adult passion vine hopper. Picture - Mark Goodwin