

Making kawakawa balm

Rongoā is commonly explored by matching ailments with remedy, but students can also enjoy making a sample remedy. Monique Goodson talked with NZASE Science Communicator Mike Stone about the process of making kawakawa balm with students.

Monique is a chemistry teacher at Hastings Girls' High School. After she made some kawakawa balm for Christmas presents, a colleague asked if Monique would make it with her Health class. Some online research and a talk with a Māori expert enabled her to create a simple lesson making kawakawa balm. Her students made the balm, decorated the jars and made models of myristicin, a naturally occurring insecticide, as well as discussing and researching rongoā.

The plant

Kawakawa, *Piper excelsum*, (formerly *Macropiper* genus) is a native New Zealand plant that grows in forests or gardens, needing shelter as it is very frost-sensitive. Found near the coast as far south as Christchurch, this bush or small tree can grow up to 6m tall.

The name kawakawa refers to the bitter taste of the leaves – the plant is related to both black pepper, *P. nigrum* and kava, *P. methysticum*.

Rongoā Māori

Use of plants and herbs are just one aspect of traditional Māori healing, which also includes physical techniques (such as massage) and spiritual aspects (such as karakia).

Kawakawa has huge mana as a healing plant, being used for many purposes and in many forms, e.g.

- Healing cuts and wounds and drawing pus from infections (poultice)
- Relieving pain of toothache (leaves chewed)
- Easing stomach upsets (tea) and diarrhoea (root chewed)
- Repelling insects (smoke from burning dried leaves) and treating insect bites (balm)
- Reducing pain, swelling and stiffness in joints, muscles and bruises (balm).

So, kawakawa has antibacterial, antiviral and anti-inflammatory properties as well as being an analgesic.

The process

Each iwi has their own protocols for harvesting – if possible talk to the hapū with which your school has a relationship, and find out their kawa.

General principles include collecting the leaves in the morning; saying a karakia first; choosing those with the most holes, taking only what you need, and not too much from a single plant; and returning the

leaf remains to the site of harvest.

Karakia do not always require words - take a moment to clear the mind, set the intention and acknowledge the sacrifice the plant is making for our benefit; it's about being respectful with this taonga (Kerridge, 2012).

Rongoā recipes such as this rarely have quantities, and while that can be challenging for a chemist, it allows a lot of scope for trial

Kawakawa: Rongoā practitioners seek the leaves with the most holes – those eaten by the looper caterpillar have the highest concentration of active ingredients. From kavaguides.com/kawakawa/



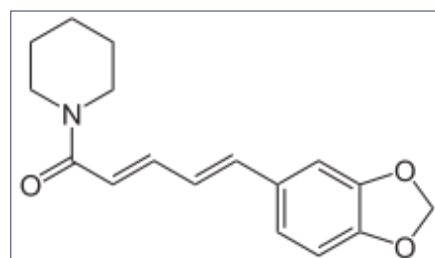
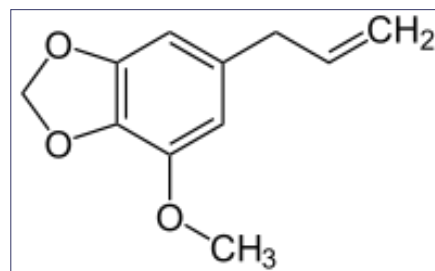
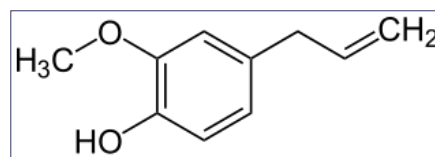
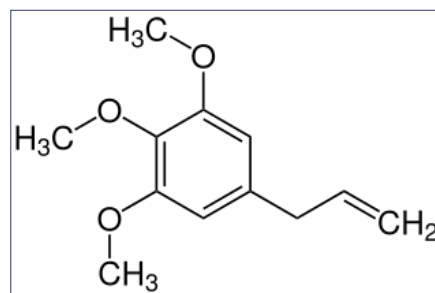
Left: Heating the infused kawakawa oil at HGHS. Photo: Monique Goodson.



and error. To make the balm:

1. Add a packed cup of fresh whole leaves to a cup of olive oil in a large jar and leave on a warm shelf for 1-3 weeks. (Or put in a pot in an oven at 50°C for six hours, or in a double boiler over simmering water for three hours). This infuses the oil with kawakawa.
2. Decant a cup of this oil into a Pyrex jug or small saucepan.
3. Add beeswax and shea butter (Monique sourced them from [Go Native](#)).
4. Stand in a saucepan over gently simmering water (or use a double boiler) to let the beeswax fully dissolve.
5. Test consistency – dip a teaspoon into the mixture then put in the fridge to set. If it's too soft heat it some more, if too firm add more of the infused oil.
6. Add any essential oils if you are using them (eg, lavender, chamomile).
7. On a flat, smooth surface pour the mixture into several small, pre-sterilised jars. It will solidify quickly so you need to be organised and work efficiently. Put the lids on once cool.
8. Label and date ready for use.

As with all home-made cosmetics, users are wise to test for allergies by putting the ointment on a small patch of sensitive skin before applying more liberally.



Structural formulae of elemicin (top), eugenol, myristicin, and piperine (bottom).

The chemistry

Research has shown that kawakawa leaves contain many active compounds:

Active compound (& source)	Properties	Chemical name
Myristicin (leaf)	Reduces inflammation and kills bacteria; insecticide	3-methoxy-4,5-methylenedioxyallylbenzene
Diayangambin (leaf)	Suppresses the skin overgrowth of psoriasis	A complex ether
Elemicin (leaf)	Reduces inflammation	5-allyl-1,2,3-trimethoxybenzene
Eugenol (leaf)	Reduces inflammation and kills bacteria	4-Allyl-2-methoxyphenol
Piperine (flower)	Peppery smell/taste. Kills bacteria, reduces inflammation. Alleviates pain, chills & fevers.	5-(1,3-benzodioxol-5-yl)-1-piperidin-1-ylpenta-2,4-dien-1-one

These compounds are variously classified as terpenes, phenylpropenes, and alkaloids, and are also found in nutmeg and mace. The variety of active constituents in kawakawa make it a complex and powerful medicine.

While Monique taught this lesson in Health,

it would also have use as an application of Organic Chemistry in year 12. She reflected that exploring rongoā encourages us to broaden our perspective “The Māori way of doing things is to look at the big picture, while western science explores constituent parts.”



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The HGHS production line filling and labelling the jars. Photo: Monique Goodson.

In the classroom

- As well as making the balm students could -
- Discuss the use of treatments other than those prescribed by doctors.
 - Design and make labels.
 - Discuss phase changes and melting at different temperatures (addressing a common student misconception that all substances melt at 100°C).
 - Explore the structural formula of one active ingredient (see the table links); e.g. make a model with MolyMod, identify the functional groups and explain what properties they might indicate; redraw the structural formulae showing all atoms.
 - Look at the chemical name and see what parts they recognise and what these tell us.
 - Interrogate the spectra of some active ingredients (eg, [myristicin](#)).
 - Through rangahau (research), find out how kawakawa is used in te ao Māori.
 - Research the historical trade in black pepper and nutmeg from the Spice Islands in Malaysia.
 - Explore the similarities with kava.
 - Sit and talk, kanohi ki te kanohi, with a kaumātua, e.g. about local tikanga (kawa) and pūrakau about kawakawa.
 - Read the story of [Chris Ryan's science fair project](#) in *Connected* 2015 L3, and explore the Nature of Science links.

Thanks to Hiraani Hutana for teaching Monique how to make the balm; and to Mere Manning for her contributions to this resource.

References

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- Lauren Glucina, 2021, [Kawakawa balm](#), Ascension Kitchen.
- Kerridge, D. (2012). [Rongoā Māori](#), *Avena: Journal of the NZ Association of Medical Herbalists*, Vol. 12, Issue 2, p24-33.
- Alistair Richardson, 2015, [Hot new chemistry from a kiwi pepper tree](#), *Chemistry in NZ*, Vol. 79, No.2, p91-93.

Ngā Kupu

- Kanohi ki te kanohi** – Face to face
- Karakia** – Chant, pray, prayer
- Kawa** – Protocol; bitter, acidic (taste)
- Mana** – Prestige, spiritual power
- Pae rewa** – Melting point
- Pūhui matū** – Chemical compound
- Pūrakau** – Ancient stories
- Rangahau** – Research, investigate
- Rongoā rākau** – Plant medicines
- Taonga** – Treasure, anything prized
- Te ao Māori** – The Māori world.

Te Aka Māori Dictionary



The HGHS packaged balm. Photo: Monique Goodson.