



# Laboratory services

Scion's analytical chemistry laboratory specialises in forestry related samples and material testing. We provide a variety of tests on solid biofuels, soil, foliage, waste water, biomaterials and wood preservatives.



## Testing solid biofuels

The tests follow standard procedures and provide customers with assurance for determining and classifying the quality of traded wood fuel in New Zealand. We provide a range of tests on the quality of wood fuels such as sawmilling residues, shavings, sawdust or processed fuels, like wood pellets, torrefied wood and wood chips. These tests provide assurance in quality to suppliers and users. They include:

- **Moisture content.** The most important test for determining wood fuel properties. Often the moisture content percentage range is specified for various wood fuel users. We use the oven-dried method.
- **Particle size distribution and amount of fines.** One of the most important properties for classifying wood fuels as different systems are designed to suit fuels with specific particle sizes. Size distribution will also affect the systems performance. Oscillating screens and sieves of various diameters are used.
- **Ash content.** An important test for determining wood fuel properties. Samples are ignited at 525°C in a muffle furnace for one hour. Ash is the inorganic residue left after combustion.
- **Calorific Value (CV)** measures the heat of combustion as the gross calorific value and is expressed as MJ/kg of fuel. This is determined using a ground sample that is pelletised and ignited in a 'bomb' where the temperature changes are measured.

## Other tests available, include:

- **Bulk density** measures a certain volume of wood fuel and combined with gross CV provides an energy density (GJ per m<sup>3</sup>).
- **Total carbon, nitrogen and hydrogen (CNH)** reported as a percentage of dry matter.
- **Major elements** in ground wood sample or ash, e.g. calcium, magnesium. Detected by ICP-MS. Some elements may be helpful to predict melting behaviour of ashes.
- **Trace elements** in ground wood sample or ash, e.g. arsenic, cadmium. Detected by ICP-MS. Useful for environmental concerns.

## Laboratory services

Scion's testing laboratory has in-depth knowledge of the forestry sector through the expertise of our staff, our institutional knowledge and sample databases.

- **Solid biofuels.** Enabling classification of wood/biofuels based on particle size, moisture content, ash content, bulk density and energy density using the Bomb Calorimeter.
- **Wood preservation.** Analysing wood and solution samples for wood preservatives including boron, copper, CCA, tin, permethrin and triazoles.
- **Carbohydrate and lignin analysis.** Determining extractive, carbohydrate and lignin levels in wood and pulp products, which allow manufacturers to tailor their processes and work more efficiently.
- **Foliage analysis.** Identifying nutrient levels and performing elemental analyses in plant material; providing fertiliser recommendations. Instruments used are the Microwave Digestor, Carbon & Nitrogen Analyser and the ICP-MS.
- **Soil analysis.** Analysing soils/sludges/vermicompost for nutrient and elemental testing including heavy metals; PRS probe testing; physical parameters such as particle size, macroporosity and particle density; providing fertiliser recommendations for nursery samples; instruments utilised Microwave Digestor, Carbon & Nitrogen Analyser, ICP-MS and FIA (flow injection analysis).
- **Water/wastewater analysis.** Determining aspects of site water quality as an indicator of environmental health; nutrient and elemental analyses; pH and conductivity; instruments utilised Microwave Digestor, Carbon & Nitrogen Analyser, ICP-MS and FIA (flow injection analysis).

Samples may be delivered directly to Scion or sent by courier. Sample request forms are available to be filled in to accompany the samples. These are available on the Scion laboratory services website.

Pricing and turnaround depends on sample size and analyses required. Please contact Scion regarding urgent analysis or any other enquires. Reports are emailed to customers and a hard copy sent.

## Contact information

### Laboratory services

Email [testing@scionresearch.com](mailto:testing@scionresearch.com)

Website

[www.scionresearch.com/analytical-services](http://www.scionresearch.com/analytical-services)

## About Scion

Scion is the Crown research institute that specialises in research, science and technology development for forestry, wood and wood-derived materials, and other bio-material sectors.

Scion's purpose is to create economic value across the entire forestry value chain, and contribute to beneficial environmental and social outcomes for New Zealand.



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Prosperity from trees *Mai i te ngahere oranga*