

AB LIME



AB LIME
LIME & BLENDS

YOUR LOCAL SOIL NUTRITION SPECIALIST

AB Lime has been focusing on soil nutrition for more than 100 years, with soil science and technology leading our approach to business.

We take our products and our customers farming systems seriously.



Lime is the key that unlocks the
nutritional potential of your soil.



Lime corrects soil acidity and provides optimum conditions for plant development.

- But not all agricultural lime is equal.

The quality of the lime you apply influences:
Soil structure
Plant development
Efficient use of fertilisers
Bacterial activity in the soil
Animal health
Efficient use of herbicides.
Ground limestone is the most cost-effective lime source, but there are four questions to ask before you apply any-old lime to your soil:
What's the particle sizing?
What's its Neutralising Value (NV)?
What's its reactivity or Effective Neutralising Value (ENV)?
How much does it cost?

WHAT DETERMINES LIME QUALITY?

Particle sizing

The solubility of lime depends on its fineness. A range of particle sizes ensures the effects of lime continue throughout the year.

The Fertmark definition of agricultural lime is:

More than 95% should pass through a 2.00mm sieve

More than 50% should pass through a 0.500mm sieve

AB Lime's agricultural lime easily passes the 2.00mm sieve requirement and regularly has more than 70% passing through the 0.500mm sieve, 40% through 0.250mm, and 20–30% through 0.125mm sieve tests.

Neutralising Value

The Neutralising Value (NV) of limestone is determined by its calcium carbonate (CaCO_3) percentage. The higher the value, the greater the limestone's ability to neutralise soil acidity.

AB Lime rock generally has a natural calcium carbonate (CaCO_3) content greater than 90%.

Undried lime straight out of the quarry has a moisture content of about 12%. We dry our lime to about 2%. This allows it to be crushed effectively and means you're not paying for water.

Reactivity

The percentage of lime passing through a 0.250mm sieve and its neutralising value (NV) together determine the reaction speed in the soil, or how effective it is over one year.

This percentage of fines will influence soil pH in the first couple of months after application, while the larger particles (0.250-2mm) provide a lasting effect throughout the year.

WHAT IS LIME AND HOW DOES IT WORK?

Limestone contains calcium carbonate that dissolves in soil. Calcium is important for soil biology and soil structure, while carbonate helps neutralise soil acidity. The more carbonate, the more acid is neutralised.

New Zealand soils are not generally lacking in calcium. However, regularly applying lime controls soil acidity by regulating soil pH. Soils naturally acidify due to plant growth, organic matter decomposition, rainfall and fertiliser applications.

VISIT:
www.ablime.co.nz/lime-and-blends/efficiency-calculator
to compare our lime with other sources

Aim for a pH of 6.2

- This suits a wide range of plants and optimises nutrient availability to the plants.

IMPACT OF FERTILISER

Plants need plenty of nitrogen in the growing season. However, when there is more nitrate in the soil than plants can use, it can leach out of the soil and increase soil acidity.

To prevent this:

Use the recommended rate of nitrogen for your crop or pasture

Apply a little nitrogen often so that it is all taken up by the plants

Apply lime.

Nitrogen is available in different fertiliser forms, such as urea, ammonium sulphate and ammonium nitrate. Some of these fertilisers leave the soil more acidic than others, so they need different amounts of lime to counteract the acidity.

The following table gives you an idea of how much lime is required to counteract the acidity of different nitrogen fertilisers:

Nitrogen fertiliser (100 kg)	Counteracting lime application required
DAP	74 kg lime
Urea	79 kg lime
Ammonia sulphate	110 kg lime
MAP	55 kg lime

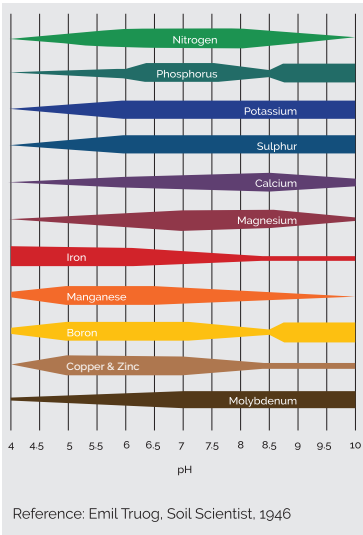
NUTRIENT AVAILABILITY

In neutral soils (pH 6-7), plant essential nutrients – like calcium (Ca), magnesium (Mg), potassium (K), nitrogen (N) and phosphate (P) – are present in optimum amounts.

In acidic soils (low pH), these nutrients are displaced by acidic cations and leached from the soil. Other micronutrients – like zinc (Zn), aluminium (Al), copper (Cu), manganese (Mn) and iron (Fe) – are soluble in low pH soils and can be present in levels toxic for plant growth.

Soil pH has a large influence on soil nutrient availability. While there is no “correct soil pH”, a target of at least 6.2 will increase the response of freshly applied N, P & K and unlock soil P and K. Soils below target pH will have reduced availability of N, P & K and a poorer response to applied nutrients – see below:

Figure 1: The influence of soil pH on the availability of plant nutrients



HOW OFTEN SHOULD YOU APPLY LIME?

Test soil pH annually and apply lime as often as necessary to maintain a pH of 6.2.

APPLICATIONS OF LIME AND SOIL TESTING

When applying lime, consider:

The existing soil pH, based on a soil test

The buffer capacity of the soil (its cation exchange capacity), also revealed via a soil test

The optimum pH of the crop being sown.

In a nutshell, testing soil pH tells you if lime is needed.

A more extensive soil test will also tell you the soil's Cation Exchange Capacity (CEC), which indicates your soil's ability to buffer or resist a change in pH. Generally, soils with high CEC have a greater resistance to pH change and require more lime to reach optimum pH.

Note that soil with a fine texture (clay loam) and/or high organic matter content require more lime to lift the pH.

To raise the pH of soil by 0.1 pH unit

apply 1 tonne per ha of good quality lime

ie. 5 tonnes/ha will increase soil pH from 5.7 to 6.2

Plants vary in their ability to tolerate soil acidity and many prefer a slightly acid soil pH. That's why there is no "correct soil pH" – because it depends on your soil type and the crop you want to grow.

If soil pH is lower than the bottom of the range, crop yields will suffer due to the crop's inability to tolerate that level of acidity. For sensitive crops, such as sugar beet, barley and peas, it's important to adjust soil pH well in advance of sowing.

ECONOMICS

Establishing the correct pH level for a crop is good agricultural practice and goes hand-in-hand with running a profitable operation.

Lime is a small annual investment and critical for maximising the return on expensive nitrogen (N), phosphorus (P) and potassium (K) fertilisers.

International research shows that, where soil pH was lifted from pH 5.5 to 6.3, grass production increased by an extra 1T DM/ha annually.

In New Zealand, Massey University trials showed lime applied to a soil pH of 5.7 significantly increased pasture dry matter¹.

There are few on-farm improvements that are so easy and cheap to carry out, that have such a fundamental effect on the success or failure of crops and farming.

ENVIRONMENTAL BENEFIT

Correct soil pH levels are fundamental in any sustainable soil management plan.

Where correct soil pH status is maintained, the activity of micro-organisms on clover roots will fix atmospheric nitrogen to the benefit of the clover and grasses.

When pH falls below a critical level, the micro-organisms die and may take years to re-establish, even when the lime status is corrected.

Unlike fertilisers, herbicides and pesticides, lime is unlikely to damage the environment, as the only nutrient it adds to soils is calcium. Calcium is already present in large amounts in most soils and has no harmful effects.

BENEFITS TO STOCK

The benefits to stock of limed pastures relate to increased intake from the more palatable and nutritious grasses (e.g. perennial ryegrass) and clovers. These species are lime sensitive, so at optimal pH, replace more acid loving weed grasses.

While few soils in New Zealand are calcium deficient, liming helps increase the percentage of calcium within a plant. It also encourages and helps maintain a high nutritional value sward.

AGROCHEMICAL EFFECTIVENESS

The efficiency of some residual herbicides (i.e. triazine and sulfonylurea) applied to the soil can be affected by soil acidity. Soils with low pH absorb chemicals more strongly than well-limed soils, so the chemical's effectiveness is reduced.

ASSESSING SOIL CONDITION

You can easily examine soil in the paddock and get an understanding of its condition. The only equipment you need is a spade.

By looking at the colour, texture, structure, number of earthworms, porosity and rooting depth, and by smelling the soil, you gain a good understanding of its quality.

Damage to soil quality affects water and air movement, root penetration, availability of nutrients and soil biology – all essential for plant growth.



¹ "Lime Particle Size Effects on Pasture Production in Winton, Southland", Hanly, J. A. and Loganathan, P. August 2002. Fertiliser & Lime Research Centre and Massey University – for Awarua Browns Ltd.



You and your farm are unique – AB Lime can provide personalised blends to help achieve your specific on-farm goals.



**TO BOOK A SOIL TEST
CALL 0800 227 559**

AB Lime's blending plant specialises in the science of correcting trace element imbalances and restoring essential major and micro elements in your soil.

By blending your lime into your fertiliser requirements, you save on spreading and transport costs. And we know what you can and can't blend together – we have been doing it for years!

While AB Lime is an independent lime company, we also hold fertiliser and trace elements from all the major fertiliser companies on-site, to enable fast and efficient blending.

An electronically-controlled conveyor blending system, with a speed of 5T/min ensures a well-balanced and blended fertiliser – supplied either in bulk or into bags – it's your choice.

FERTILISER FOR SOILS

Fertiliser is a large part of any farm's expenditure, so it's important to understand what you're buying.

Before purchasing, check:

How much nutrient is in the product?

This effects whether it will have an impact on plant growth and how much to apply.

How available is this nutrient to plants?

This indicates how long before plants can take it up.

What is the unit cost for this nutrient?

i.e. How much it will cost to apply?

Plants don't know the difference between expensive N and cheap N. They just use N.

Generic fertilisers, like Super, are generally cheaper than highly marketed fertilisers. Always buy the cheapest nutrient source you require – but check its total content and availability. Talk to us, if you need more information.

SOIL TESTING – KNOWING WHAT YOU HAVE, AND WHAT YOU HAVEN'T

Soil is the most valuable resource in farming.

Because of its dynamic nature, a soil test is essential to give you a snapshot of what's happening at that moment. We recommend you test annually and at the same time of year.

Our staff are experienced and trained soil nutrient specialists and can do soil tests for you and also provide a fertiliser recommendation that's independent from any fertiliser company. Equally, they are happy to work from supplied soil tests.

OUR STANDARD TESTS ARE NOT STANDARD!

Soil tests should include the standard nutrient status tests, but also tests that advise how your specific soil will respond to fertiliser.

Therefore, alongside standard testing, we also recommend testing for:

Cation Exchange Capacity (CEC)

Anion Storage Capacity (also known as Phosphate Retention Test or ASC)

Total Phosphate

Total and Organic Sulphur; and

Boron.

Be aware that:

Nutrients can be applied in many different forms – some are not immediately plant available. Nutrient availability is an essential part of selecting the correct fertiliser programme for your farm.

Cation Exchange Capacity (CEC)

CEC is the total capacity of soil to hold positively-charged ions, like magnesium (Mg²⁺) and potassium (K⁺). CEC is unique to each soil and difficult to change. It influences soils' ability to hold essential nutrients and to buffer soil acidification.

Soils high in organic matter and clays generally have higher CEC values. It's an important property – influencing soil structure stability, nutrient availability, soil pH and the soil's reaction to fertilisers.

Anion Storage Capacity (ASC)

ASC is a one-off test providing useful soil information about the fixation of phosphate and leaching of sulphur – important factors to consider when applying fertilisers.

Total and Organic Sulphur

About 95% of sulphur in soils is in organic form and only a very small part is available to plants.

The extractable organic Sulphur test is useful where sulphate-S test results are low.

Total P and Total S results are important to compare with a plant available nutrient test, to monitor the long term effects of fertiliser.

Boron

Boron is an essential plant nutrient for shoot and root development.

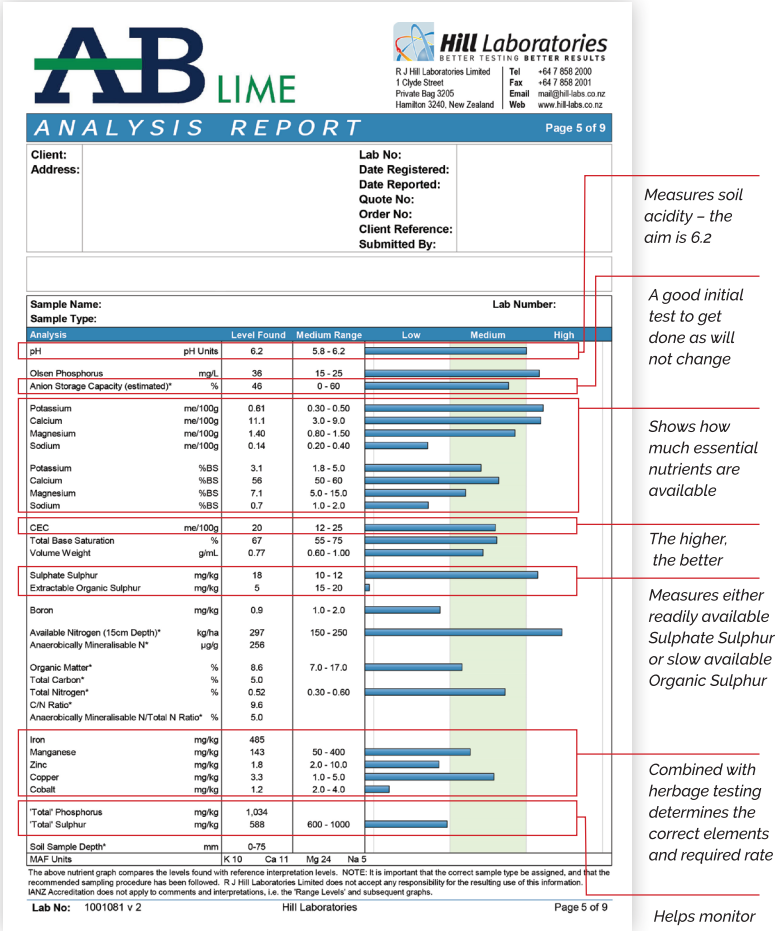
Clover is sensitive to Boron deficiency, causing a reduction in yield. However, the margin for toxicity is slight, so testing is critical.

HERBAGE TESTING

Herbage testing compliments soil testing. It can indicate which elements are – or are not – being taken up by a plant, but not necessarily why.

A comprehensive soil test, in combination with herbage testing, establishes what nutrients your soil needs.

We herbage test at AB Lime, so do ask us about it.





AB LIME
ENVIRONMENTAL

PROUD OF OUR ENVIRONMENT

Like you, AB Lime is committed to minimising our environmental impact whilst encouraging continual improvement in performance across a number of very diverse business units all with their own individual and unique environmental challenges.

How we achieve this can be challenging.



We start by understanding the individual and unique environmental challenges each business unit faces and how they each effect their surrounding environment.

Our focus is to:

Actively seek to reduce negative impacts.

Enhance the positive aspects of our operations on the natural environment through effective planning and management.

Comply with all legislation, regulations and other requirements relevant to the business activities.

Establish and maintain Environmental Management Plans for each business unit that prescribes and provides for appropriate guidelines, standards, measures and procedures to eliminate, minimise and mitigate environmental effects.

Manage landholdings so that biodiversity is protected and enhanced, where practicable, throughout AB Lime operations.

Raise environmental awareness and the importance of being a good corporate citizen through the training and development of employees.

MONITORING

Regular environmental monitoring enables us to not only comply with certain consents but more importantly fully understand the surrounding environment and the impact our activities are having, or potentially could have.

Some environmental impacts are very visible and easy to detect such as vegetation die off or algal growth in waterways. However many impacts are invisible such as heavy metal concentrations in sediments or contaminants dissolved in water.



Dairy Farm water monitoring

As our farm is at the head of a catchment it is an ideal location to understand the effects a single dairy farm can have on water quality. All surface channels begin on the farm, with some from springs that bubble up out of the limestone rock.

Water samples are taken from nine sites that include a mixture of surface water channels and tile drains that exit the property.

Monitoring is carried out monthly and analyses:

E - coli

Nitrate

Nitrite

Dissolved Reactive Phosphorous

Total Ammoniacal Nitrogen

Turbidity.

Surface water monitoring

Surface water that flows out of the quarry is monitored continuously. Continuous water quality and flow sensors take measurements more than once a second for parameters such as:

Turbidity

Electrical Conductivity

Temperature

pH

Dissolved oxygen

Flow.

This continuous data is valuable and is used to show the impact of rainfall events on water quality. More importantly this water quality monitoring allows AB Lime to pick up any unusual results or patterns as they occur in real time and address any issues immediately.

AB Lime is committed to
minimising our impact on the environment.

LANDFILL

The AB Lime landfill takes all of Southland's municipal household waste with some special industrial wastes as well.

As a Class A landfill we adhere to strict standards – including site selection to reduce the potential for adverse environmental effects, engineered systems for leachate containment and collection systems for both leachate and landfill gas.

The landfill is lined with a technical and comprehensive series of impermeable layers. This ensures that waste and leachate is confined within the landfill that would otherwise leach in to the surrounding environment.

The surrounding environment is monitored frequently; weekly and monthly for potential impacts the landfill may have on the land and waters.

Landfill gas monitoring

Landfill gas is a by-product from the decomposition of organic waste found in landfills. Landfill gas is typically made up of 30-50% of methane, 30% Carbon Dioxide and trace amounts of other gases.

Methane is a very potent greenhouse gas and with no collection it would simply rise leave the landfill and go into the atmosphere and contribute to global warming.

At AB Lime landfill gas is captured and controlled by a series of gas wells before it is collected and then burnt at a flare that destroys the methane and turns it into carbon dioxide and water.

Landfill gas is a useful fuel source and a project is under way at AB Lime to utilise the landfill gas to burn in our coal fired lime kilns that dry our agricultural lime. This will greatly reduce the coal burnt at AB Lime - and thereby reducing our carbon footprint.

Gas monitoring is carried out at each of the 20 gas well heads in the landfill. This sample is then analysed and the composition recorded.

Gas compounds that are monitored include:

Methane

Carbon Dioxide

Oxygen

Hydrogen Sulphide

Carbon Monoxide.

This information allows AB lime to understand the gas composition and quality from different areas in the landfill.



Landfill Underdrainage Water Monitoring

To ensure the integrity of the series of impermeable layers associated with the landfill liner any underdrainage water that may flow beneath the landfill is monitored monthly for contamination.

Seven groundwater monitoring bores are located beyond the landfill footprint - above and down gradient to provide a full environmental comparison. These are sampled and independently analysed twice a year.

To date there has never been any indication that the landfill liner has been compromised. However controls are in place to be able to collect any contaminated underdrainage water and direct it to the leachate collection system if necessary to prevent it escaping into the environment.



AB LIME
MOTU NGAHERE

CREATING OUR OWN SANCTUARY

Our vision is to create a sanctuary for Central Southland native fauna and flora in our own 63ha block of native bush called Motu Ngahere (Island of Bush).



Motu Ngahere was once part of a large continuous forest that included the Forest Hill Reserve.

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Now home to one of the last few remnant native forests in Central Southland, our goal is to manage the site in an environmentally sensitive manner that will enhance our farm, provide recreational opportunities for staff and the local community and provide a haven for local flora and fauna.

Currently over 100 native species have been recorded including large, mature podocarp and rata, supported by a diverse understory of hardwoods, ferns and some rare threatened plants such as white mistletoe (*Tupeia antartica*).

The limestone substrate and associated outcrops create interesting features and provide habitats for some of the more unusual plants on the site. The open paddocks at the top provide views across Southland where you can even see Stewart Island on a clear day!

OBJECTIVES

In time our key objective is to be able to introduce rare and uncommon floral and fauna species by providing a haven for these species to thrive, free from competition from introduced species.

Our stages of objectives to meet are as follows:

To protect and restore Motu Ngahere's ecosystem values

To manage the wider site in a way that supports and is sensitive to the environment

To restore and create a habitat for native species

To reintroduce rare native species.



IDENTIFIED THREATS

Before 2019 Motu Ngahere had no real pest prevention or control. Since then AB Lime has worked hard to identify key threats to the success and viability of the sanctuary.

Identified pest include:



Small mammalian pest

- mustelids
- rodents
- possums



Large browsers

- deer
- goats



Various species of pest plants

- elderberry
- gorse

OUR NURSERY

To complement the conservation and restoration of Motu Ngahere and other projects onsite we have our own native tree nursery (Tamariki e Motu Ngahere) that is large enough to hold 40,000 medium sized plants.

Seeds are collected from Motu Ngahere and germinated in our greenhouse.

They are then transplanted into larger sized containers until they are about 1m tall and ready for planting out. This ensures that the plants have the best chance of becoming established and not be overcome by weeds - meaning less maintenance and a better chance of survival.



AB LIME
FARMING

PROUDLY FARMING

The old saying - actions speak louder than words - couldn't be more apt when it comes to AB Lime. With our own on-site dairy farm we truly know and understand our customers.



Being as emotionally and financially invested as our customers ensures greater insight into the daily trials and tribulations associated with farming.

In 2014 AB Lime undertook a considerable on-site dairy conversion – heavily investing in infrastructure, stock and personnel.

At the time this investment was undertaken to maximise land returns based on an \$8.65 pay out. Sadly this level of return did not remain - forcing an evaluation and refinement of the farming model moving forward.

For AB Lime that meant refocusing on what was important and 'doing the best' – best animal health practices, best environmental solutions and best people.

In addition the dairy farm become the perfect testing ground for AB Lime's drive to achieve the ideal balance between production and the environment.

SUSTAINABILITY

The focus on sustainability is key to how AB Lime operates now and into the future.

Sustainability affects all parts of our business - not only in regards to animal health and the stewardship of natural resources but also the economic viability of farming and the wider community as a whole.

Our farm management plan addresses a number of key issues, including good winter crop practices, water and waterway management, soil health through to animal health. In addition our company values of quality and balance ensures that profit is secondary to happy, healthy staff.

MAXIMISING ANIMAL HEALTH

Animal health is vital in relation to a farm's sustainability practices. Poor animal health impacts on the profitability of a farm through loss in productivity as well as impacting on cost structure and placing additional pressure on staff resources.

Knaprock

Poor laneways and tracks impact on a cow's hoof health with stone bruising, leading to lameness and loss of income.

Being the same product as our ag-lime range AB Lime knaprock offers an ideal footing surface.

Laid at 125 – 150mm thick and properly compacted, knaprock will help to eliminate most hoof problems and ensure easier, faster access to and from your dairy shed.

In addition to laneway, knaprock is also ideal for feedpads and silage pit areas - reducing the presence and build up of mud and debris, often associated with Southland conditions.

Blending for Animal Health

Our blending plant can also blend in an array of trace elements to help you meet animal health requirements with products including:

Copper

Selenium

Zinc

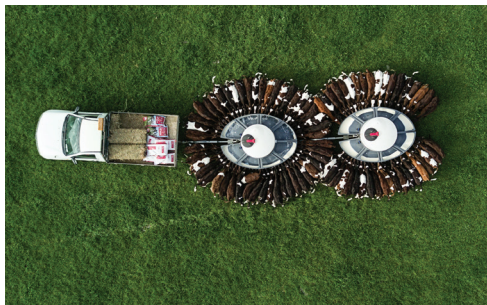
Magnesium.

Tell us what you need and we can custom blend, accordingly.

Healthy Cow

Developed in conjunction with a leading animal nutritionist AB Lime also produces a range of calcium-based animal health products to improve the health of your herd under the Healthy Cow brand.

The range targets calcium and magnesium disorders, such as milk fever and mastitis, grass staggers and supports overall health, while improving performance and profitability.





WARNING

Healthy Cow products are only to be used once the herd has calved.



HOW DOES HEALTHY COW WORK?

Calcium is extremely important in the lactating dairy cow, particularly during calving and the early stages of lactation. It influences production and reproduction and affects the efficiency of feed conversion in the cow through muscular function. It is also used in the muscular effort of delivering a calf and shrinking the uterus back to normal. (Slow shrinkage delays the return to oestrus and increases the risk of clinical infections, therefore reducing reproductive performance.)

Did you know that colostrum milk contains up to 10 times as much calcium as the cow has immediately available?

In most cows, calcium levels in spring will be very low, due to reduced uptake while on dry cow rations. This is exacerbated if cows have been grazing low calcium diets prior to calving, such as crops or cereal silages. The result is sub-clinical hypocalcaemia, which develops into milk fever, as calcium levels drop further.

Cows with milk fever have suppressed immune systems and are more susceptible to other infections, including mastitis.

From a productivity perspective, if there is inadequate calcium in the diet, the cow will continue to put calcium in the milk but she will reduce milk yield.

The sooner the calcium requirements of the lactating cow are met, the quicker the cow will gain normal physiology and metabolic status. This is where Healthy Cow plays a vital role. As a finely ground calcium supplement that is easily added to your herd's daily dietary intake – either directly to the pasture or mixed with supplementary feed – it can have a significant effect on a cow's overall health.

THE ECONOMIC SENSE OF HEALTHY COW

When it comes to improving your bottom line, Healthy Cow can make a dramatic difference when you consider that the average cost of treating a cow for milk fever is about \$1500 per cow¹ and the average incidence of milk fever in New Zealand is 2%.

At only \$7.23 per cow per season (based on recommended application rates), Healthy Cow reduces the instance of milk fever and improves overall herd performance.

This cost analysis is based on a 500-cow herd:

Cost of milk fever per cow¹	\$1,500
Cows/season (500 cows x 2% x 1500)	\$15,000
Cost of Healthy Cow/cow	\$7.23²
Healthy Cow/season (500 cows x \$7.23)	\$ 3,615
Savings/season (\$15,000 minus \$3615)	\$11,385

1. Total estimated cost based on vet treatment for milk fever and other related issues such as uterine infections, mastitis as well as loss in production and fertility.

2. Pricing as at Jan 2020. Subject to change.





What's the best nutrition for your soil?
Call us and we'll help you find out.

AB LIME

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www.ablime.co.nz
