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Liquid nutrition at its best

FoliMAX KelMAX

100% *Ecklonia maxima* Seaweed

Liquid nutrition at its best



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KelMAX is a premium quality natural seaweed concentrate developed specifically for the needs of professional turfgrass. KelMAX is derived from the freshly harvested South African seaweed *Ecklonia maxima*. The unique characteristics of this seaweed species and the proprietary method of hormone extraction, results in a biostimulant with the ideal auxin to cytokinin ratio to trigger the maximum root response when applied to turfgrass. While the extraction process used by most other seaweed products destroys the contained auxins in preference to the cytokinins, KelMAX retains the integrity of the naturally occurring high auxin content only found in *Ecklonia maxima* seaweed. Auxins have

the effect of triggering a root growth response in turfgrass, which is desirable versus cytokinins that trigger shoot growth, and it is ultimately the ratio of these hormones that determines the extent of root initiation. The ratio of naturally occurring auxins and cytokinins inherently within the *Ecklonia maxima* seaweed (>300 : 1) extracted without alteration, has been shown to produce the maximum root initiation response. Therefore when applied regularly, KelMAX will improve the density and depth of the root system. A larger more efficient root system will improve plant health, increase stress tolerance, and improve the ability of the turfgrass to take up nutrients and water.

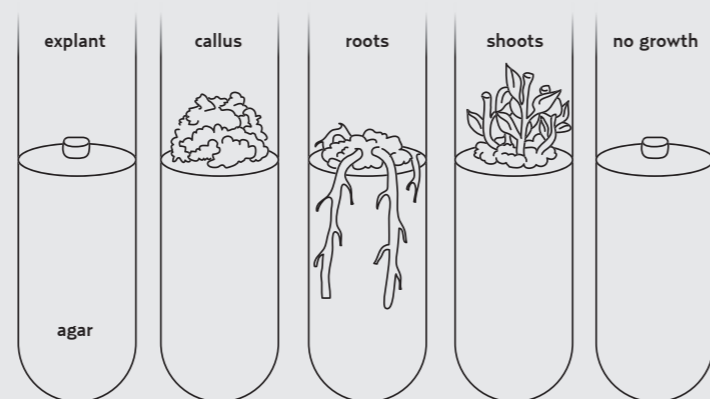
Key benefits of FoliMAX KelMAX

- Enriched with highly active natural auxins to trigger root initiation in turfgrass.
- Ideal auxin to cytokinin ratio (>300 : 1) that achieves the greatest root growth response.
- Guaranteed level of plant available free auxins at 75 µg/L for rapid utilisation by turfgrass.
- More efficient soil nutrient uptake from new root tips and extended rootmass.
- Faster recovery from turfgrass injury due to renovation practices or nematode attack.
- Improved plant health and increase stress tolerance.
- Packaged in Australia.

Auxins vs Cytokinins

Kelp seaweeds contain a number naturally occurring biostimulants, primarily auxins and cytokinins. When applied to plants, auxins are transported down to the root tips causing them to grow. Cytokinins on the other hand are transported upwards from the root meristem to promote shoot growth. From a turfgrass maintenance point of view, it is the auxin effect that is most beneficial.

It is important to note that the direct effect from an auxin product application does not come from the total amount of auxins within the product, but primarily from the ratio of auxins to cytokinins along with the amount of available free auxins (ie. free indole-3-acetic acid or IAA). Research has shown that a ratio of greater than 150 : 1 auxin to cytokinin is required to produce a root growth response in plants. As per the below diagram, a ratio of only 15 : 1 caused callus growth and a 1 :300 ratio (cytokinin dominated) caused shoot growth.



	3	3	3	0
Auxin (mg/L):	0.2	0.02	900	0.2
Cytokinin (mg/L):	15:1	150:1	1:300	no auxin
Auxin:Cytokinin:				

Mohr, H. and Schopfer, P., (1996). Chapter 23: Physiology of hormone action. In: Plant Physiology. Lawlor G., and Lawlor D. W. (transl. eds.). Springer-Verlag, Berlin - Heidelberg, Germany, 383-408.

There are both available and unavailable (conjugated) auxins. Plants store conjugated auxins in unavailable forms, that can be converted to available free IAA when there is a plant deficit. However this takes time and energy to hydrolyse the chemical bonds for the plant to then experience the auxin effect. Synthetic auxins added to many products and the majority of the total auxins within a product are in an unavailable form. Natural auxin in the form of available free IAA, and its concentration, are both critical factors to whether an application of a kelp product will trigger an auxin (root growth) response in turfgrass.

KelMAX contains a ratio of >300 : 1 of naturally occurring auxins to cytokinins which are inherently within the unique *Ecklonia maxima* seaweed species, along with a guaranteed level of 75 µg/L natural free IAA (indole-3-acetic acid). This results in a product that triggers the quickest and greatest root growth response when applied to turfgrass.

Why is *Ecklonia maxima* seaweed unique?

Ecklonia maxima is the king of seaweed and is often referred to as 'sea bamboo'. It is an extremely large and tough kelp that possesses a very long stipe (stem) and large blades (leaf), which is unique. As auxins are stored within the stipe and blades of kelp, it is these unique characteristics that result in the high level of auxins within the extracted concentrate.



Hormone Extraction Processes

The key to achieving the high level of natural auxins and appropriate auxin to cytokinin ratio to trigger a root growth response is in the method of hormone extraction. Most kelp products use chemical or heat digestive processes to extract the contained hormones. However these methods denature the delicate auxins dramatically reducing their concentrations, and therefore a product dominated by cytokinins results. However KelMAX retains the integrity of the naturally occurring high auxin content found only in *Ecklonia maxima* seaweed by utilising a proprietary cold micronisation process method of extraction. Therefore the 'juice' from the seaweed is extracted without alteration from chemicals or heat, maintaining all the benefits of the natural hormone levels.



FoliMAX KelMAX APPLICATION INFORMATION

Shake well before use and apply as a spray application in sufficient water to achieve adequate plant coverage at the dilution rates specified below.

Situation	Rate	Comments
Turf Maintenance	5L/ha	Apply monthly at a dilution rate of between 1:75 to 1:100 parts water.
Turf establishment Root injury recovery	20 L/ha	Apply during planting or when rapid root initiation is required at a dilution rate of between 1:75 to 1:100 parts water. If a lower dilution rate is used, lightly irrigate immediately after application.

MIXING PROCEDURE AND COMPATIBILITY WITH KelMAX

Fill spray vessel with half the required volume of water. Shake container of KelMAX and add required amount to spray tank while agitating. Add remaining water to the spray tank. Ensure the pH of the tank solution does not exceed 7 for maximum efficacy. Continue agitating during application. Wash out spray tank, including nozzles, immediately after use.



OTHER KEY PRODUCTS IN THE FoliMAX RANGE

FoliMAX Amino +

FoliMAX Amino + is a unique combination of amino acids derived from enzymatically digested plant protein, Vitamin B1 for improved root growth and disease resistance and plant growth promoters for optimising plant response in times of stress.



FoliMAX Humic+

Liquid Humic Acid (organic catalyst) which increases microbiological activity in the soil. Improves soil structure, fertility and water holding capacity. Ideal for use at renovation and turf establishment or as a maintenance tool on sand profiles.

