

Innovation | Sustainable | Quality | Validated Efficacy

Botanova's advanced organic biological Eklonia Maxima growth promoters maximises marketable yield by using cell disruption technology, cold chain processing protocols, < 2% organic stabilisers and whole source material.

Leading Edge in Bio-manufacturing technology and protocols.

The highest commercial yield is achieved by increasing marketable yield at the lowest possible input cost. This efficacy point is enabled by maximising bioavailable bio-actives in our CropCore Kelp product range. In traditional products, many bio-actives are lost due to conventional processing protocols and technologies, requiring more applications at an increased cost. Although product labels accurately reflect the measurable quantities of bio-actives, the reality is that plant uptake levels are a lot lower, due to lower levels of bioavailability, resulting in runoff of valuable bio-actives.

Our technology: Our organic biological products are processed using cell lysis technology, where cell membranes are mechanically broken down by forcing biological matter through a tiny hole, faster than the speed of sound. The material is then slowed down to a fraction of a nano second. This bursts the cell structure by stretching it beyond its elasticity, resulting in the release of cellular components.

Cold chain protocols: Many bio-actives are heat sensitive and are destroyed by frictional production temperatures. Our cold chain production protocols ensures that these fragile bio-actives are protected during manufacturing, until the product is fully stabilised.

Stabilisers and preservatives: This micronisation also reduces microbial activity, yeasts and moulds. Thus, our products contain a lower count of stabilisers and preservatives that comprise only <2% of total volume. These chemicals are fully organic and approved by the EU additive listing for human consumption.

These organic chemicals have further been carefully selected to not only preserve and stabilise our products but to also enhance the impact on crop growth.

Concentration levels: By using the full kelp material, without generating any waste, we ensure the maximum concentration of bio-actives. No enrichment takes place, and the minimum viable liquid is added to place our products in usable formats. Typically, our dilution rates vary between 1.5ml/litre to 4 ml/litre dilution. This concentration is as a result of using the full kelp material and maximised bio-availability of bio-actives.

Harvesting protocols: Regulatory permit compliance of our botanical ocean farms and best practice harvest methods protects our natural ocean forests and marine ecology that are millions of years old.

Testing the efficacy claims of our Products

Our Botanova Kelp product range has been put through vigorous external trials to test the efficacy claims, determine the dilution and application rate, and to ensure there is no phytotoxicity that could be harmful to crops.

These trials were conducted by Power Agrisolutions (Pty) Limited, with the lead trialist being a registered SACNASP member. (This institution is a legislated regulatory body for natural science practitioners.) Effected in a greenhouse environment, the trial result is not influenced by environmental conditions and therefore our products' efficacy claims can be fully validated.

After the trial, the biomass, root mass and marketable yield is harvested and the measures recorded. To ensure statistical validity, an ANOVA statistical analysis is completed, to ascertain the recommended application rate that is statistically significant, but also represent the lowest application volume to ensure the maximum point of economic viability.



Increase in Marketable Yield

An increase in marketable yield was recorded in all our trials, across various crop groupings. The increase varies between 21% and 100%, depending on the crop that was trialled.



Legumes: Beans, Peanuts, Alfalfa, Lentils, Soya Bean

Legumes are important crops due to their high nutrient values, especially plant proteins. Legumes also facilitate a process of biological nitrogen fixation that converts gaseous nitrogen into forms like ammonia, nitrates and nitrites that plants use. They can also reduce the need for synthetic nitrogen.



Ground Nut

Trial Species
Finding +26% increase in marketable yield.

This increase was determined through recording the combination of the number of pods per plant as well as the average pod weight.

When using a calculated plant population of 66 667 plants per hectare, the yield per hectare would be 5 454 kg/ha in comparison to the control group, which had no application, yielding 4.325 kg/ha. The number of plants per hectare has been calculated using the trial pot size area. Under field conditions, root growth will not be restricted to pot size and can therefore result in a further increase in yield.



Alfalfa

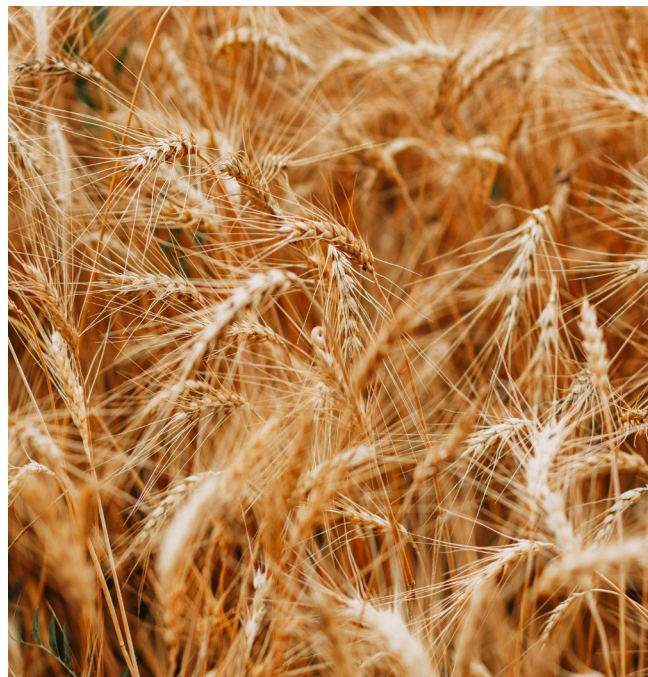
Trial Species
Finding - Increase in drought stress tolerance.
+ 23% increase in marketable yield.

To test the impact of drought stress tolerance, different application rates were used, in combination with different water withdrawal combinations.

Our data results showed that at the recommended application rate, a higher level of marketable yield was achieved when compared to the control group despite a 25% reduction in water. At 50% of the control irrigation, an increase in marketable yield was still evident, relative to the control.

The kg/ha yield, increased with 23 %, in spite of the lower water access.

Row Crops: Maize, Sweetcorn, Sorghum, Millet



Zeal Maize

Trial Species
Findings + 21% increase in marketable yield.
+ 48% Increase in root weight.
+ 15% Increase in cob weight.
+ 68% increase in shoot bio mass.

Maize, the largest crop in South Africa, is an excellent nutrition source and export crop which is a significant contributor to food security.

The trial results showed an average yield of 7 366 kg/ha, relative to the control group that showed an average yield of 6 066 kg/ha.

(Note that maize yield should be viewed relative to the control group and not national averages, as pot trials restricts growth.) The increase in root weight is a positive indicator as bigger root systems enables a higher uptake of water and nutrients.

Leafy Vegetables: Cabbage, Lettuce, Spinach



Spinacia Oleracia

Trial Species
Findings + 100% increase in marketable yield.
+ 48% increase in root biomass.
+ 42% increase in yield.

Spinach is widely grown in South Africa. It is easy to grow and a relatively hardy plant which can be grown in many climates. The leaves or shoots represents a large area of the actual yield and therefore uptake of CropCore Kelp, which is bio-available, is maximised.

100% increase in yield, with the first crop. The control, which had no CropCore Kelp application produced an average yield of 1 916 kg/ha. At the recommended application rate, an average yield of 3 899 kg/ha was recorded. This represents double the yield, relative to the control.

The root biomass yield followed the same pattern as the shoot biomass yield, with the control showing the lowest values and the recommended application rate producing the highest.

The biomass yield of the ration crop followed a similar trend to the first crop, although it was slightly higher than that measured in the first crop.

Solanaceous Fruits: Tomato, Pepper, Chilli



Tomatoes

Trial Species
Findings +83% increase in shoot biomass.
+94% increase in flowering.

Tomatoes represents the second highest vegetable crop production in South Africa, with the first being potatoes (technically, tomato is a fruit and not a vegetable). It is one of the higher value vegetable crops and in high consumer demand.

Shoot biomass is a good indicator of expected tomato yield at harvest. A similar increase was noted in flowering, being predictive of a noteworthy expected increase in yield.

In informal trials, earlier flower formation was recorded.

Increase in yield relative to input costs

Irrespective of crop grouping, we demonstrated a consistent and valid increase in marketable yield. With the high concentration of our product, the input costs is insignificant relative to the commercial increase in yield that can be expected.

Bio-Actives

Bio-actives such as minerals, vitamins, growth hormones and amino acids are well regarded in seaweed agriculture solutions. Yet, there are many more bio-actives in kelp-based organic plant materials that new research is identifying and exploring. By following our cold chain and chemical protocols, use of cell lysis technology and full material processing, we optimise the retention of both known and un-known bio-actives. These bio-actives work synergistically to create the optimal performance results with our kelp products.

The following are examples of bio-actives that are resident in the Botanova Kelp product range:

Minerals and trace minerals:

Nitrogen, Carbon, Calcium, Magnesium, Potassium, Sodium, Sulphur, Phosphate, Iron, Manganese, Zinc, Boron, Copper, Iodine, Molybdenum.

Polysaccharides:

Alginic acid (Mannuronic acid, Guluronic acid), Fucoidans.

Amino acids:

Arginine, Glycine, Histidine, Aspartic Acid, Glutamic Acid, Threonine, Alanine, Proline, Cystine, Lysine, Tyrosine, Methionine, Valine, Isoleucine, Leucine, Phenylalanine.

Other stimulants:

Phlorotannins, Eckol, 2-Phloroeckol, and Dibenzodioxin-fucodiphloroethol.

Growth hormones :

Auxins: Indole-3-acetic acid (IAA); 1-Naphthaleneacetic acid (NAA); Indole-3-butyric acid (IBA), 4-Chloroindole-3-acetic acid (4-C1-IAA), Indole-3-propionic acid (IPA).

Other hormones: Cytokinins, Glibberines, Brassinosteroids, Absciscic acid

Vitamins:

B1, B2, B3, B5, B9, B12, C, E, K

Botanova Product Range

CropCore Kelp diluted concentrations are applied to enable different markets and different commercial farmers to choose the dilution that suits them best. Having a very high viscosity, it provides flexibility to evaluate spraying and blending equipment relative to the dilutions available.



CropCore Kelp PLUS

Dilution: 1.4 ml/litre water

Suitable for blenders who have commercial blending equipment available and would use this product as an input ingredient in their own formulations.

Registration number: M486

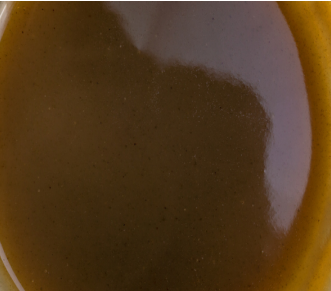


CropCore Kelp ESSENCE

Dilution: 2 ml/litre water

Suitable for commercial farmers who have filters between tanks and sprayers and have blending equipment that can agitate sufficiently to disperse the product in water.

Registration number: M485




Kelpure CUSTOM BLEND

Dilution: 2ml-4 ml/litre water

Suitable for commercial farmers who needs a flowing product that is easy to dilute in water, prior to application.

Custom Blend



Warning

GMS HAZARD STATEMENTS | H319: Causes serious eye damage. H335: May cause respiratory irritation. H314: Causes severe skin burns and eye damage. H226: Flammable liquids. **GHS Precautionary Statements** | P233: Keep container tightly closed. P240: Ground/bond container and receiving equipment. P260: Do not breathe dust/fume/gas/mist/vapours/spray. P261: Avoid breathing dust/fume/gas/mist/vapours/spray. P264: Wash hands thoroughly after handling. P264+P265: Wash hands thoroughly after handling. Do not touch eyes. P280: Wear protective gloves/protective clothing/eye protection/face protection/hearing protection. P301+P330+P331: **If swallowed:** Rinse mouth. Do NOT induce vomiting. P302+P361+P354: **If on Skin:** Take off immediately all contaminated clothing. Immediately rinse with water for several minutes. P304+P340: **If inhaled:** Remove person to fresh air and keep comfortable for breathing. P305+P354+P338: **If in eyes:** Immediately rinse with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing. P319: Get medical help if you feel unwell. P337+P317: **If eye irritation persists:** Get medical help. P363: Wash contaminated clothing before reuse. P403+P233: Store in a well-ventilated place. Keep container tightly closed. P501: Dispose of contents/container.

1L

Botanova

CropCore Kelp PLUS

1.4 ml per 1L Dilution

100% Ecklonia Maxima Kelp

Increase Shoot Bio-mass

Increases Marketable Yield in Grain Crops

PLANT GROWTH ENHANCER


Dilution: Mix 1.4 ml per 1 000 ml water or 140 ml per 100 litres of water. Do not increase the dilution without testing first. Do not increase the dilution to more than double the recommended dilution rate. Use half the recommended rate in less fertile soil, smaller species, or under poor/uncertain field conditions.

Guidelines: Once the plant leaves are visible above the soil (at the two or three leaf stage), do the first application. Allow at least 14 days between applications. Do not spray directly onto flowers. Drench seedlings in diluted mixture before planting to reduce transplant shock. With foliar application, ensure the leaves are fully drenched and have time to dry before irrigation is continued. Use only as directed.

Shake container thoroughly before use. Use immediately after dilution. Before mixing solutions, do a miscibility test first. First dilute CropCore Kelp Plus before blending with other solutions. The use of filters between tanks and irrigation systems is recommended under commercial farming conditions. Use of industrial blending equipment for dilution and blending is recommended. Do not combine with other stimulant products. Use in conjunction with a fertiliser programme. Test before applying to whole crop. Once opened, the preservation can be compromised. Use only as directed. Refer to SDS for personal protection equipment (PPE) to be used when utilising the product.

Expected results: Results will vary according to weather, water, application accuracy, soil conditions, water availability, nutrient availability, and other conditions. The assistance of an agronomist is recommended. Increases marketable yield in grain crops such as maize, sweetcorn, sorghum, and millet. Organic Carbon (C): 432.5 g/kg SG @ 20°C: 1.0

Storage: Store in a cool, dry place away from sunlight.



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1L

Botanova

CropCore Kelp ESSENCE

2 ml per 1L Dilution

100% Ecklonia Maxima Kelp

Increase Root Bio-mass

Increases Flowering in Solanaceous Fruits

PLANT GROWTH ENHANCER

Dilution: Mix 2 ml per 1 000 ml water or 200 ml per 100 litres of water. Apply once every two weeks as foliar. Do not increase the dilution without testing first. Do not increase the dilution to more than double the recommended dilution rate. Use half the recommended rate in less fertile soil, smaller species poor or uncertain field conditions.

Guidelines. Once the plant leaves are visible above the soil (at two or three leaf stage), do the first application. Allow for at least 14 days between applications. Do not spray directly onto flowers. Drench seedlings in diluted mixture before planting to reduce transplant shock. With foliar application, ensure the leaves are fully drenched and have time to dry before irrigation is continued. Use only as directed.

Shake container thoroughly before use. Use immediately after dilution. Before mixing solutions, do a miscibility test first. First dilute CropCore Kelp Essence before blending with other solutions. The use of filters between tanks and irrigation systems are recommended under commercial farming conditions. Due to the density of this product, use industrial blending equipment for dilution and blending. Do not combine with other stimulant products. Use in conjunction with a fertiliser programme. Test before applying to whole crop. Once opened, the preservation can be compromised. Use only as directed. Refer to SDS for personal protection equipment (PPE) to be used when utilising the product.

Expected results: Results will vary according to weather, water, application accuracy, soil conditions, water availability and quality, nutrient availability and other conditions. The assistance of an agronomist is recommended. Increases flowering in solanaceous fruits such as tomato, green pepper, paprika, and chilli. Organic Carbon (C) 432.5 g/kg | SG @ 20° C: 1.03.

Storage: Store in a cool, dry place away from sunlight.

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