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Manufacturer and Formulator Guidance Document

0-0-4 Liquid Seaweed Extract

0-0-4 Liquid Seaweed Extract is a rich source of naturally-derived organic polymers (fucoidan, alginate, tannins, and more) that have demonstrated benefits for plant and soil health. Bioactives from seaweed are valuable active and synergistic ingredients in plant protection products, crop biostimulants, and premium fertilizers where they can increase nutrient use efficiency, promote rooting, ameliorate crop stress, and prime against certain pests and diseases.

Storage

This product is stabilized by the addition of organic acids, but is otherwise free of preservatives. Avoid contamination of the contents; clean and sanitize all instruments that will contact the product or interior of the container, and use the full contents of the container as soon as practicable after unsealing.

Store in a clean and dry location out of direct sunlight.

General Mixing Instructions

This product is ready-to-blend convenient liquid formulation.

Due to the influence of other additives on the solubility of this product, it is recommended to dilute the product before adding other formulation ingredients. Use clean, low-solute water with a slightly acidic to alkaline pH (pH 6+) to dilute.

Water Quality

Access to clean, low-solute water is important for dilution and for long-term stability of the final blended product. Water sources containing high levels of dissolved minerals like calcium, iron, and magnesium can result in particulate formation and precipitation (flocculation) due to reactions between the minerals and organic seaweed polymers.

Compatibility with plant nutrients

The natural seaweed polymers in this product feature abundant functional groups that bind to positively charged plant nutrients, helping to retain them on plant and soil surfaces where they can be efficiently absorbed. Plant nutrients like calcium, iron, and magnesium that are multivalent cations (have a charge of +2 or greater in solution) can bridge polymers together, which can be problematic for the stability and usability of product formulations containing these nutrients.

To minimize complications, multivalent cation plant nutrients should be added in chelated forms (e.g. metal-EDTA complexes) and final product pH should be adjusted to the effective range for the chosen chelator.

Formulated Product Shelf Life

Long term shelf stability of formulations containing this product can be shortened by microbial contamination or by reactions between seaweed polymers and other formulation ingredients, especially divalent plant nutrients.

If product formulation shelf life is not satisfactory, try to determine the cause of product instability. Test product samples for spoilage microorganisms, test source water quality, and review other ingredients for potential problems such as high levels of divalent plant nutrients.

If microbial spoilage is suspected, consider the following when adjusting procedures and formulations:

1. Shelf life may be extended by pasteurization, if heating of the formulation is permitted. Follow standard protocols for temperature and holding time for pasteurizing liquids.

2. Microbes require available water to multiply. Control water availability (water activity) by increasing the concentration of the formulated product.

3. Lowering the product pH can limit microbial growth. Reduce the pH to 4.5 – 5.0 using a mineral or organic acid.

4. Preservatives are an effective means of preventing spoilage. Select a preservative that is effective at the pH of the formulated product, if relevant regulations permit.

Product Inclusion Rate

This product can be incorporated into product formulations across a wide range of concentrations. Typically, this product is included at rates of ≤ 1:3 final volume in nutrient formulations, to improve nutrient uptake and use efficiency while minimizing incompatibilities.

Final application concentrations of as little as 1 part in 2000 can be efficacious and add value to product formulations.

This product contains approximately 333.5 grams of soluble seaweed extract-derived nutrients and organic molecules per liter.