Is there any benefit to applying foliar seeds of compost or seaweed extract to vegetable crops?

What is foliar feeding?

Foliar feeding involves feeding plants through their leaves. It is typically done using a fine sprayer which squirts the solution onto the plant's foliage. Although much less is absorbed through the leaves than through the roots, it is a highly efficient process with fewer nutrients lost to the soil. Because of this, absorption of certain micro-nutrients is much quicker through the leaves than from the soil. Less energy is needed by the plant to transport the nutrients to the right place.

The best way to apply foliar feeding

Foliar feeding helps in times of drought, poor soil conditions or stress from pests and disease but it must be done correctly. If the solution is too strong or evaporates too quickly then the salts that are left behind on the leaves can scorch them. A finer spray creating smaller droplets is less likely to fall off the leaves and by ensuring that the solution contains a surfactant helps it cling to the leaves.

Consider the age of the leaves when applying foliar feeding as nutritional intake varies with age. Also make sure the leaf pressure is at its highest for maximum uptake and ideally apply the extracts when humidity is high and temperature around 20°C.

Foliar feeding of seaweed extract has a multitude of benefits.

Benefits of seaweed extract

Seaweed extracts have been gaining momentum in recent years owing to their potent **plant growth-enhancing properties**. Some of the components of these extracts act as natural biostimulants for plants.

Research has shown that they:

- **increase yield** and dry weight accumulation
- promote **seedling growth**
- increase **mineral uptake**
- increase **biomass** growth
- increase grain yield
- increased fruit yield (size of fruit and number per plant)

Not only does seaweed extract improve plant growth, but it also improves **vigour**, increasing **stress tolerance** and the plant's **ability to fight** off pests and disease.

Most of the components are organic which makes them ideal for **organic farming** systems and environmentally sensitive crop production. The benefits spread to the soil as well. The microbial composition of the soil changes when seaweed extract is applied giving it a greater ability to reduce the activity of soil-borne pathogens.

How do the extracts work?

Often biostimulants either directly or indirectly provide macro- and micro-nutrients such as N, P and S or help the plant to assimilate these more efficiently.

Phytostimulatory properties

Seaweed extracts contain multiple growth promoting substances including phytohormones and macro- and micro-nutrients. They promote plant growth at all stages of development and even post-harvest.

Phytoelicitor activity

The phytoelicitor component of seaweed extracts binds to specific receptor sites on the plant's membrane. This stimulates activation of the defence mechanisms, increasing the resistance to a broad range of pathogens as well as environmental stressors such as drought, salinity and cold.

Phytohormonal responses

Seaweed extracts possess or influence phytohormonal activity. Phytohormones, such as gibberellins, auxins and cytokinins, regulate plant growth, development and reproduction. They promote root development creating healthier and more robust root networks and are involved in seed germination. This improves seedling vigor.

Microbiome changes

The biostimulants have effects on the microbiome patterns within the rhizosphere and phyllosphere. The composition of these bacterial and fungal communities is mostly beneficial to the plant.

Interestingly, the seaweed extracts that have been fractionated do not work. Instead, the whole components must be applied as one. They work in synergy to induce the beneficial responses in the target plants.

What sort of yields can you expect from applying seaweed extracts?

Seaweed extracts are known for their plant-enhancing properties. Under experimental conditions, seaweed fertiliser **increased the yield** of root and tuber crops and fruit by more than **20%** and general vegetables by **13%**. But it wasn't just yields that improved, the quality of the crop did so too. **Total sugar, soluble sugar, and reducing sugar increased by 8%, 18%,** and **21%**, respectively. On top of that, the crops' **starch, vitamin C, protein** content increased as did the sugar-acid ratio which gives the fruits and vegetables their flavour.

But it isn't just about the effectiveness of the seaweed extracts, it is how they are applied to the plants. There is evidence that **foliar application is more effective** than soil application. Under experimental conditions, **foliar** application of seaweed fetiliser has been shown **to increase crop yield** by almost **14%** compared to 11% for root application.

Useful Resources

1. Paper - Biostimulatory activities of *Ascophyllum nodosum* extract
2. Foliar Feeding – Folly or Wisdom?
3. Paper - Phytohormonal basis for the plant growth promoting action
4. How Does Seaweed Extract Help Plants?
5. Paper - Biostimulant Properties of Seaweed Extracts in Plants
6. How does foliar feeding work?
7. Paper - Effects of seaweed fertilizer application on crops' yield