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Commentary

Impact of seaweed fertilizer on soil fertility and plant growth

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DESCRIPTION

In order to improve soil fertility and plant growth, seaweed is used to make organic fertilizer known as seaweed fertilizer. Seaweed fertilizer has been used for soil improvement since antiquity and offers a variety of advantages. Seaweed fertilizer can be applied in a number of different forms, including refined liquid extracts and dried, pulverised organic material. Through its composition of various bioactive molecules, seaweed functions as a strong soil conditioner, bio-remediator, and biological pest control, with each seaweed phyla offering a various benefits to soil and crop health. These benefits can include increased tolerance to abiotic stressors, improved soil texture and water retention, and reduced occurrence of diseases.

Through carbon storage and the uptake of nitrogen and phosphorus, seaweed aquaculture and fertilizer development play key roles in biogeochemical nutrient cycle on a larger socio-ecological scale. The application of seaweed fertilizer to soils can also change the composition and behaviour of microbial communities. Aquaculture of seaweed has the ability to produce ecosystem services by supplying human communities with food and a means of enhancing water quality in both natural systems and aquaculture operations. The diverse uses of seaweed-derived fertilizers and soil additions are receiving more attention as organic farming techniques gain favour. Even though it is still in its infancy, the seaweed fertilizer sector has enormous potential for both sustainable economic growth and the decrease of nutrient runoff in coastal systems.

Seaweed is one of the common names given to multicellular macroalgae, such as green algae, brown algae and red algae). The term, seaweed is sometimes used to refer to microalgae and plants as well.

Microalgae and plants can also sometimes be referred to as seaweed. Most commonly, seaweeds are benthic creatures that have a holdfast structure that keeps them attached to the sea floor. They also have a stipe, or stem, and blade-shaped leaves. This architecture and function do not apply to sargassum seaweed since it does not connect to the benthic environment. . Red seaweeds can occasionally be found up to 30 metres beneath the surface. Green seaweeds are typically found in shallow seas, whereas brown seaweeds, red seaweeds, and red algae are found in deeper waters. The tallest seaweeds can reach heights of up to 50 metres, while the smallest seaweeds only reach a few millimetres. There are 6200 red, 1800 brown, and 1800 green species of seaweed, respectively. Brown seaweeds are commonly referred to as kelp but can go by the names rockweed and wracks. In contrast to brown seaweeds, which are the most distantly connected to terrestrial plants, red seaweeds are the most diversified group of seaweed and, along with green seaweeds, are the most closely related to terrestrial plants. Seaweeds are widely distributed in shallow natural settings and are raised in both marine and arid aquaculture operations. The majority of brown seaweeds that are grown for uses like fertilizer and heavy metal detection are from the species *Ascophyllum, Ecklonia, Fucus,* and *Sargassum*, but the majority of brown seaweeds that are found in the wild are from the genera *Laminaria, Undaria,* and *Hizikia*. Green seaweeds from the genera *Ulva* and *Enteromorpha* are used as bioindicators, such as for heavy metal detection. *Poryphora*, a genus of red seaweed, is frequently utilised in human diet.

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