ISSN–0974–0759 | ●●● Article ●●● |Visit us : *www.researchjournal.co.in*|

Seaweed: Diva in agriculture

Nongmaithem Leindah Devi and Jotish Nongthombam

Krishi Vigyan Kendra (C.V.Sc. and A.H., CAU), Selesih, Aizawl (Mizoram) India
(Email : leindahnong@gmail.com)

Seaweed is a micro-organism that grows in oceans, lakes, rivers and is comprised of algae. Algae is a plant like organism that doesn't contain actual roots, flowers, leaves and stems, but does contain the green pigment known as chlorophyll. This allows the organisms to grow through the process of photosynthesis. Seaweed can include members of green, red or brown algae families, and there exist around 10,000 species within many marine habitats around the world.

Seaweed: Why is it so beneficial for soil? Seaweed improves the water-holding characteristics of soil and helps the formation of crumb structure. Alginic acid in combined with seaweed and joins metallic radicals in soil to form a polymer with greatly increased molecular weight. Salts formed by alginic acid with soil metals swell when wet and retain moisture tenaciously, so helping the soil to form a crumb structure. Substances secreted by soil bacteria in the presence of seaweed include organic chemicals known as polyuronides. Polyuronides are chemically similar to soil conditioner alginic acid, whose direct effect on the soil and themselves have soil-stabilizing properties. Seaweed contains all known trace elements but not all are available forms are exceptable to the plants. This problem can be overcome by chelating which combines the mineral atom with organic molecules. With liquid extract, this ability to chelate can be taken a stage further than happens naturally with seaweed and seaweed meal.

Seaweed: Why is it so beneficial for plants? Seaweed fertilizers prove beneficial when applied on the soil, delivering strength through vital nutrients. The seaweed fertilizers are best administered when sprayed. Thus, liquid seaweed fertilizers have their own set of benefits. Seaweed extracts have been proven to accelerate the health and growth of plants.

– When the plant, from its neonatal stage, shifts to acquiring or developing buds, it is suggested that seaweed fertilizer be sprayed gently on those buds to promote a healthy growth.

– Seeds are treated/ sowed with seaweed fertilizers before planting, the seeds will germinate better, have an increased growth rate and their roots will possess strength.

– A 'fighter' plant could be acquired if the seaweed organic fertilizers are doctored on the plant. The plant will display a higher immunity against diseases and pests such as greenfly, whitefly and will have an ameliorated growth pattern.

– The seaweed encourage vigor in the plant growth cycle as it consists more than 70 nutritional deporting minerals and enzymes.

– Seaweed consists of a sponge like porous component called the alginates, a type of algae. This component has a dominant role to play in the root system strengthening. The fertilizers when sprayed from the tip of the leaves to the roots of the plant, alginates holds the residue of the fertilizers near the roots giving them a comfortable access to moisture, without making them soggy and wet with mixture.

– Liquid seaweed fertilizers contain elements called hormones. They are Auxins, Cytokinins, Gibberellins and Betaines, required in minor proportions but they do contribute to the overall plant health. The auxins are a major hormonal component that regulates the speed at which the plant develops. Auxins, as hormones have a tendency to increase the growth or delay the growth rate of the plant. It also aids the flower buds to unfold at the

right time.

– Cytokinins are another group of hormones in the organic seaweed fertilizers that judiciously distributes nutrients and minerals in the soil. The aging process in plants also known as the senescence, in plant taxonomy takes a backseat with the cytokinin content in the fertilizers.

– Liquid seaweed fertilizers has alginates that has a conditioning property when applied to plants. The soil has metal content with which the alginates react and form polymers that restore moisture in the soil when it gets wet.

– Seaweed enhances photosynthesis via increasing a plants chlorophyll levels. Seaweed contains a complex range of biological stimulants, nutrients, and carbohydrates. Seaweed in itself is not a plant food, rather it is classified as a "bio-stimulant."

– Improved cold tolerance: Plants that have broken dormancy too early due to unseasonable fluctuating temperatures are able to make it with the help of just one foliar application as have seedlings that were put out and left uncovered.

Treatment of waste water by seaweed to reduce nitrogen- and phosphorus-containing compounds: Seaweeds can be used to reduce the nitrogen and phosphorus content of effluents from sewage treatments. Many seaweeds have a preference to take up ammonium as the form of nitrogen for their growth and ammonium is the prevalent form of nitrogen in most domestic and agricultural wastewater. Seaweeds have the ability to take up more phosphorus than they require for maximum growth. It would be preferable to use seaweeds that have some commercial value, but these do not necessarily have the ability to withstand the conditions encountered in the processing of the wastewater. There is a need for the seaweed to be able to tolerate a wide variation in salinity because of the dilution of salinity by the sewage or wastewater. Intertidal and estuarine species are the most tolerant, especially green seaweeds such as species of *Enteromorpha* and *Monostroma*. Red and brown seaweeds that are of interest because of their commercial value, tropical or subtropical forms have been successfully used, while cold-temperate species are usually too sensitive to changing seasons and may fail to grow (and remove nutrients) in the winter months. While many investigations have demonstrated the suitability of seaweeds for wastewater treatments, their use on a large scale is yet to be implemented, although this may change with the increasing realization of the need to protect marine environments.

Removal of toxic metals from industrial wastewater by seaweed: The accumulation of heavy metals (such as copper, nickel, lead, zinc and cadmium) by seaweeds became apparent when those seaweeds used as human foods were first analysed. The heavy metal content, especially of the large brown seaweeds, varied according to their geographic source and sometimes to their proximity to industrial waste outlets. Using seaweeds as biological indicators of heavy metal pollution, either from natural sources or from activities such as mining or disposal of industrial wastes. This has been successfully implemented using brown seaweeds such as *Sargassum*, *Laminaria* and *Ecklonia* and the green seaweeds *Ulva* and *Enteromorpha*. Seaweeds has ability to take up heavy metals and use them to remove heavy metals in cleaning up wastewater. Milled, dried species of the brown seaweeds *Ecklonia*, *Macrocystis* and *Laminaria* were able to adsorb copper, zinc and cadmium ions from solution. *Ecklonia maxima*, *Lessonia flavicans* and *Durvillaea potatorum* adsorbed copper, nickel, lead, zinc and cadmium ions, though to varying extents depending on the seaweed type and metal ion concentration. After the extraction of alginate from brown seaweeds there is an insoluble waste product, mostly cellulose, and the adsorbing properties of this have been tested and found to equal some of the brown seaweeds.

Received : *02.08.2019* ***Revised :*** *08.10.2019* ***Accepted :*** *09.11.2019*