

Seaweed – a resource for organic farming



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Traditionally, coastal communities worldwide have been using drift seaweed as soil amendment and fertilizer. This practice is, however, very limited among farmers in Norway where only few farmers collect autumn storm-cast seaweeds for agriculture. Collected seaweeds are left standing over winter either on the ground or in pit (McKinnon *et al.* 2000). The following spring, the compost, mostly from *Laminaria*, *Ascophyllum* and *Fucus* alone or mixed with animal manure, is ready for use in different small-scale farming of berries, corn, potatoes, vegetables and green fodders. Nowadays meals (mostly dried and milled *Ascophyllum*, *Ecklonia* and *Fucus*) are also sold as soil additives (as both fertilizers and soil conditioners).

The fertilizing effect of composted seaweeds is dependent on their biochemical composition, mineralization pattern and the synchronization of the mineralization of nutrients with the crops demand. At the same dried weight, fresh seaweed contain similar amount of nitrogen as farmyard manure; seaweeds however contain higher potassium level and lower phosphorus content. Composting of purely drift seaweed converted 70 % of the biomass into organic compost consisting of 2.3 % nitrogen, 0.86 % phosphorus, and 1.8 % potassium (Haq *et al.* 2011). Besides fertilizing effect, seaweed compost can act as soil conditioner. Insoluble carbohydrates, i.e. alginates in brown seaweed, improve soil structure and stability as well as aeration, especially in clay soils. The alginate-enhanced soil will have improved moisture retention properties and can hold large quantities of rainwater, which they slowly give off

during a dry period. The effects on soil moisture retention is similar in all soils. Moreover, soil loss by runoff can be prevented in seaweed-enhanced soil, making cultivation of steep slopes possible.

For the last 60 years, seaweed-derived liquid extracts have been also commercially available worldwide (Craigie 2001) and extensively used as fertilizer by horticulturists, gardeners, farmers, and orchardists to enhance plant growth and fruit yields. They contain osmolytes (e.g. betaine), hormones (e.g. auxin, cytokinin abscisic acid, ethylene, gibberellin), polysaccharides (e.g. fucoidan, alginic acid, carrageenan, agar) and minerals (e.g. calcium carbonate). Used as foliar spray, soil conditioner and seed soak before sowing; these extracts give resistance to numerous stresses such as frost, insect's infestation, viral and fungal diseases. Addition of seaweed-derived liquid extracts enhance soil quality and microbial activity. The positive effects of the use of seaweed in organic farming are recognised and their utilization is authorized for organic production under some restrictions (Mattilsynet, 2009).

References

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