



SEAWEED CONCENTRATE FLAKE – WHY IT WORKS

I recently read an article on Agribusinessglobal.com by Russel Sharp that explains at a more scientific level what makes Seaweed extracts effective even at relatively small application rates.

Although many of you that are using the Gibb-Gro Seaweed Concentrate Flake know first-hand the benefits of seaweed, I always did wonder how it could be so effective. Especially when you think of the quantities of traditional fertilisers that need to be applied.

Russell has explained this with lots of science, but I will attempt to simplify.

For thousands of years in many coastal areas, raw seaweed has been used to improve farming systems productivity. In the 2nd half of the 20th century the use of liquid seaweed became globally more widespread. Farmers using seaweed extracts reported positive results on crop quality and yield but as the cynics pointed out these results could not simply be correlated to the seaweed extract's elemental nutrient content. As a result, it has taken time for the scientific explanation for this phenomena to catch up.

Due to science's clearer understanding of algal biochemistry and the relevant modes of action, seaweed is not considered to be a fertiliser but are classified in the rapidly developing sector of biostimulants.

Most of the effective seaweed extracts used in agriculture as biostimulants are extracted from species of brown algae and most notably the species *Ascophyllum nodosum* (knotted wrack). Gibb-Gro Seaweed Concentrate Flake is no different and the cold-water harvested *Ascophyllum nodosum* is considered to be the premium seaweed internationally.

The stressful conditions of UV light, temperature variations, repeated exposure to desiccation and a slower growth rate combine to create higher concentrations of bioactive compounds in *Ascophyllum nodosum*. Compare this to tropical species of kelps that grow out at sea. These produce higher levels of cellulose which has no benefit at all for plant growth.

Plant hormones or analogues

It is known that *Ascophyllum nodosum* contains plant hormones and when seaweed extracts are applied to plants the crop exhibits similar responses to when purified/synthetic plant hormones are applied. However, it is questionable whether these responses are actually due to plant hormones themselves. Instead, the current accepted position is that seaweed extracts contain plant hormone analogues. These analogues have a different chemical structure to the hormone, but induce a similar response when applied to the plant. This results in positive growth responses similar to the action of cytokinin and/or auxin.

Algal polysaccharides, monosaccharides and sugar-alcohols

The principal components of brown seaweeds is alginates, fucans and laminarin. These have been found to induce positive responses when applied to crops and are linked to plant defence mechanisms activating jasmonic acid, salicylic acid and ethylene signalling pathways.

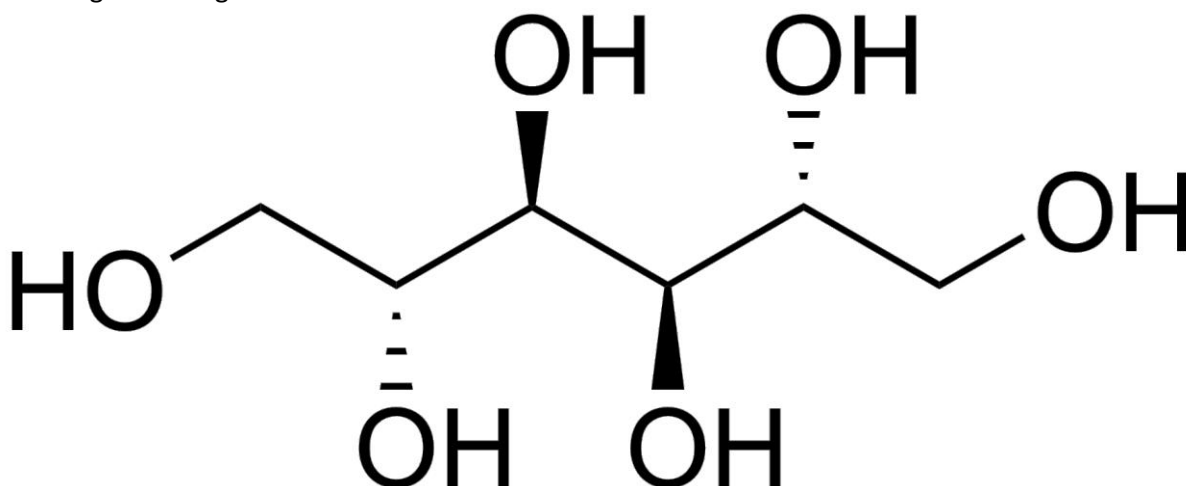
Alginates (alginic acid)

In agriculture, alginates are thought to act as a protective film and also as a feed and nutrient source for beneficial microbes.

Mannitol

Mannitol is a multifunctional compound and has three main areas of activity:

1. Antioxidant. Mannitol is able to “mop up” the reactive oxygen species (ROS) that create the free radicals that damage plant tissues. These are produced when plants are under stress so seaweed extract is a good choice in stressful growing conditions.
2. Mannitol is able to form a complex with boron atoms, effectively chelating this important plant nutrient.
3. Signalling in fungal attack. Pathogenic fungi also use mannitol to quench ROS (reactive oxygen species) when attacking a plant. As a result, seaweed is not recommended for plants suffering from fungal attack



Fucans

Unfortunately, there is a scarcity of studies on how fucans function when applied to plants. However, their use and effects on animals and human is far better studied.

Vitamins and minerals

- Iodine - It is well known that seaweed is a good source of iodine. As is the case for fucans, the function of iodine in human/animal health is far better understood and as most of you will know iodine is regarded as being beneficial in the prevention of facial eczema in cows.
- Vitamin B12 (cobalamin)
- Vitamin-B12-Chemical-Structure - If you study vitamin B12's chemical structure, you will see it is a natural chelator of cobalt.

All of the polysaccharides, minerals, vitamins, alginates and plant hormone analogues combine to make Gibb-Gro Seaweed Concentrate flake a great addition for pasture and crop use and also as a tonic or supplement for stock.