Indian Journal of Traditional Knowledge
Vol 18(4), October 2019, pp 849-854

Marine microalgal extracts on cultivable crops as a considerable bio-fertilizer: A Review

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Received 30 July 2018; revised 11 July 2019

Around the globe, all countries whether developing or developed depend on agriculture. Nowadays due to advances in science and agricultural technology, the usage of chemical fertilizers, pesticides and genetically modified crops is increasing day by day to meet the demand of the rising population. This looks helpful to meet our demand but this is a great threat for the future generation as the water and food will be more toxic due to accumulation of pesticides and chemical fertilizers which in turn reduces the soil fertility and contaminate the ground water. Due to this condition, the food web is getting totally collapsed. Because of realization of these problems, people are shifting to organic farming. Current researchers are focusing on terrestrial organic sources for agro production but there are immense sources in the wide marine environment. The marine sources will play a substantial role on agricultural development in the future. Microalgae are the best, as they are cheap, renewable source, easily available and are cultural organisms. Moreover, microalgae contain all the essential nutrients needed for plant growth. The majorities of microalgae are capable to fix the atmospheric nitrogen and are effectively used as bio-fertilizers. This review focuses on the broad overview of bio-fertilizers with special reference on marine derived microalgal bio-fertilizers and its role in increasing crop production by altering various physiochemical parameters of diversified agricultural crops.

Keywords: Agriculture, Chemical fertilizer, Marine source, Microalgae, Pesticide

IPC Code: Int. Cl.[19]: A01D 91/00, A23B 7/022, A01H 13/00, A47G 25/58

Agriculture is the process of crop production by cultivating soil, for economic purpose. Due to population explosion and urbanization of farm lands, there is a great demand for production to fulfil the growing food needs[1]. There have been so many changes like exploitation of native crops and usage of new genetically hybridized crops which lead to alteration of the biological cycle and causes serious threats to the future generation[2]. Acidification of soils and pollution has a profuse impact on ground water. Aquifers, where the excess fertilizers get accumulated in the environment, are the main areas prone to this pollution. Aquifers are contaminated by nitrogen, which is very toxic and unhealthy and primarily causes long term illness in children leading to methaemoglobinemia in children and affects adults with gastric and oesophageal cancer[3,4]. Pests and useful insects are been killed by these chemical fertilizers and insecticides. Crops are made more resistant and high yielding, highly palatable, and highly productive and hence which naturally loses their natural resistance and productivity.

Eutrophication is caused by the nutrient rich fertilizer run off water from (ponds, rivers, lakes, bays, etc) which causes blooms in water and which automatically cutoff the oxygen supply and deliberately causes mass mortality. This eutrophication is highly deadly as it can kill all the bacteria and fungi holding the soil together which results in soil erosion loss of top soil, which will only give a temporarily yield which in a nutshell destroys productivity of the land. People nowadays are shifting towards bio products and biofertilizers avoiding chemical agents as are eco-friendly, more productive and efficient, economical and available to all at marginal rates. Moreover beneficial microbes accelerate the plant growth and protect from harmful pests[5]. Biofertilizers has the capacity to be renewable, eco-friendly and supplementary nutrients which are important components of integrated nutrient management.

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