Available online at
www.agrospheresmagazine.vitalbiotech.org

ISSN (E): 2582 – 7022

Agrospheres:e-Newsletter, (2022) *3*(9), 23-24

Article ID: 435

Azolla – A Multifaceted Biofertilizer

Davinder Paul Singh[1], Arjun Singh[2*], Sakshi Sharma[3]

[1]M.Sc, Department of Soil Science and Agriculture Chemistry, Sher-e- Kashmir University of Agricultural Sciences and Technology, Jammu, India.
[2]Ph.D. Scholar, Department of Agronomy, CSK HPKV, Palampur, HP, India-176062
[3]Ph.D. Scholar Department of Plant Pathology, Sher-e-Kashmir University of Agricultural Sciences and Technology, Jammu, India

Open Access

*Corresponding Author
Arjun Singh*

Article History
Received: 13. 09.2022
Revised: 19. 09.2022
Accepted: 24. 09.2022

INTRODUCTION

Intensive farming has surely increased agricultural output in order to meet global population growth demands. However, some of the techniques are now harmful to the environment and difficult to sustain. Inadequate cultural practises and the overuse of chemical fertilisers alone accelerated soil deterioration, endangering the productivity of crops. The use of biofertilizers like Azolla not only increases the crop productivity but also improves the long term soil fertility. Azollais a rapidly developing aquatic pteridophyte that works in symbiosis with the blue-green algae Anabaena azollae to fix atmospheric nitrogen. The Greek words azo (to dry) and allyo (to kill) are the roots of the term Azolla, which indicates that a plant dies as it dries. J. B. Lamark created the genus Azolla as early as 1783 and was assigned to the Salvinaceae family under the Salviniales phylum. Taxonomists, however, have now classified it as monotypic, the Azollaceae family.

Azolla as Biofertilizer

In a typical subtropical region, azolla is utilised as a biofertilizer and generates about 300 tonnes of green bio-hectare each year, which is equivalent to 800 kg of nitrogen (1800 kg with urea). The crucial element in employing Azolla as a Rice crop biofertilizer is its rapid breakdown in soil and effective nitrogen availability to the rice plant.The ability of Azolla to multiply quickly and decompose quickly has emerged as a crucial component to use as Bio-fertilizer in rice crop fields.When used in a rotating rice-wheat farming system, azolla is advantageous to wheat. The use of Azolla with Sesbania was proven to be advantageous and grain yield is increased by 56–69%.The characteristics that make Azolla suitable as a biofertilizer are as follows: Significant amounts of nitrogen are fixed by azolla. Azolla grows quickly. Azolla cannot compete with rice for light and space because it floats at the water's surface. A rice canopy, in its early and intermediate stages of growth, may easily offer the partial shade that Azolla like to flourish in most climates.

Beneficial Effects on Physio-chemical Properties of Soil

Azolla, which includes *Azollapinnata*, *Azolla filiculoides*, and *Azolla Africana*, is used as a source of nutrients in soil for crops, and this is a promising alternative to traditional agricultural methods. It considerably enhances the soil's chemical and physical characteristics, as well as its microbial activities. It aids in the release of cations like sodium, calcium, and magnesium as well as the addition of organic matter. With the help of azolla, it is possible to increase the amount of total nitrogen, available phosphorus, exchangeable potassium, and nitrogen-uptake by rice in the soil. Along with improving soil properties, azolla also has a strong potential for bioremediation of heavy metals like Cd, Cr, Cu, and Zn. Azolla reduces agricultural greenhouse gas emissions. Azolla dual cropping reduced CH_4 emission in the flooded rice habitat by 40% compared to urea alone while simultaneously promoting CH_4 oxidation.

Sometimes, azolla used as mulch or green manures in the soil to increase its fertility. In the case of bananas, Azolla is used as mulch around the plant bases on the soil's surface. Azolla can be combined with rice straw to create compost when it is produced in excess. Fresh Azolla, in the amount of 6-24 t/ha, considerably improved the soil's ability to retain water and increase availability of nutrients in the soil for the plant.

Other usages of Azolla in agriculture

When it comes to irrigation, using water of poor quality necessitates more intricate management procedures and stricter monitoring procedures than water of high grade. Azolla can be utilised to manage wastewater for later use in agriculture by reducing the concentration of contaminants in wastewaters. *Azolla microphylla* can act as a biofilter in municipal wastewaters to remove pollutants. It was discovered that the heavy metals iron and copper were removed from polluted water by *Azolla pinnata* and *Lamna minor*. Pollutants with low concentrations can be cleaned up by being processed via ponds and then used again for agricultural purposes. It can also suppress the weed growth, particularly the predominant weed *Monochoria vaginalis*.

CONCLUSION

Azolla is a multifaceted biofertilizer that can be used to address important issues of concern on a worldwide scale. Utilizing azolla reveals beneficial trends in soil fertility, bioremediation of hazardous contaminants and agriculture productivity. Azolla can reduce the energy demand required for fertilizer production. Due to its multiple uses, it is also called a ‘green gold mine.’ By applying azolla in the soil, farmers can help in improving soil properties and also environmental conditions. That’s why; every farmer should contribute in enhancing soil conditions by adopting the strategic use of azolla in the soil.

REFERENCES

H.K. Svenson, The new world species of *Azolla Tam. Fern.* J. 1944 pp. 34-69.

Kollah, B.; Patra, A.K.; Mohanty, S.R. Aquatic microphylla Azolla: A perspective paradigm for sustainable agriculture, environment and global climate change. Environ. Sci. Pollut. Res. 2016, 23, 4358–4369.

R.N. Konar, R.K. Kapoor, Anatomical studies on *Azoll apinnata* Phytomorphol. 22 (1972) 211-223.