



Potential Application of Biological Herbicides in Sustainable Agriculture

Florence Litrico*

Department of Agronomy, Côte d'Azur University, Nice, France

DESCRIPTION

Agrochemicals known as herbicides are used to stop or obstruct typical plant growth and development. In addition to railroad companies, landscapers, greens keepers, sports field management, governments, and individual gardeners, they are increasingly employed to manage weeds in agriculture. The existence of tough weeds is one of the tightest obstacles in modern agriculture that hinders output. These phenomena may be driven by the dynamics of the ecosystem itself, but the herbicides that are employed to eradicate these plants are mostly to blame for the development of resistance. Large, dense patches that endanger the ecology can be found in various types of terrain and property, including rural, urban, coastal, national parks, and private farms.

Bioherbicides are a developing technique for biological control in several nations. There aren't many bioherbicides on the market, and the most are designed for the organic market and lack technical information on how much they cost to apply. As a result, obtaining this information is extremely difficult because it cannot be found in published scientific or patent journals or in the public domain. More than 20 bioherbicides have been formally registered in various countries thus far. Due to the expenses of manufacture and marketing, several of them have already experienced a decline in sales. Others are currently undergoing testing to overcome obstacles to commercialization and competition from less expensive synthetic herbicides.

Instead of labor-intensive weeding, they target physiological processes in weeds that can be controlled by herbicide sprays. It is challenging to locate a particular biochemical target in the weed without endangering the crop with phytotoxicity. Therefore, weed control is frequently the most challenging duty in pesticide plant protection management. Weeds are managed by mechanical or so-called cultural methods such as mowing, mulching, crop rotation, cover crops, modifications to crop density, burning, and soil solarization in organic (ecological) farming and other systems that forbid the use of synthetic herbicides. An estimated 43% of crop yields are lost globally due to weeds.

In real life, control is not easy. With weed infestation, the influence on crop yield is sigmoidal rather than linear. There is none at extremely low weed densities. The impact is scarcely perceptible as density rises. Even at very high densities, not all agricultural plants are destroyed; production reduces swiftly as density rises but never reaches zero. Farmers sometimes need numerous treatments to achieve the desired results since an efficient broad-spectrum herbicide seldom completely eradicates all weeds. Farmers frequently want more control than is necessary to prevent output loss.

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Correspondence to: Florence Litrico, Department of Agronomy, Côte d'Azur University, Nice, France, E-mail: litrico@florence.edu.fr

Received: 30-Nov-2022, Manuscript No. AGT-22-19262; **Editor assigned:** 02-Dec-2022, PreQC No. AGT-22-19262; **Reviewed:** 16-Dec-2022, QC No. AGT-22-19262; **Revised:** 23-Dec-2022, Manuscript No. AGT-22-19262; **Published:** 30-Dec-2022, DOI:10.35248/2168-9891.22.11.296

Citation: Litrico F (2022) Potential Application of Biological Herbicides in Sustainable Agriculture. Agrotechnology. 11:296

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To attain sustainability in agriculture, bioherbicides may be a better choice and more ecologically responsible alternative to conventional herbicides. Nevertheless, a number of obstacles are addressed, such as weed resistance and high manufacturing costs, by acquiring raw materials, altering the procedure, adding adjuvants, repeating the application, etc. The study's approach

to lowering manufacturing costs for a bio molecule was integrating the circular economy idea into biotechnological operations. Utilizing biomass created by industrial operations is a way to refine effluents to create the comparatively inexpensive raw material.