

Plasma and pulsed power applications for agriculture

K. Takaki

Iwate University, 4-3-5 Ueda, Morioka, Iwate 020-8551, Japan

e-mail : takaki@iwate-u.ac.jp

Plasma and pulsed power applications for agriculture and fishery are described. Repetitively operated compact pulsed power generators with a moderate peak power were developed for the applications in several stages of agriculture and fishery. Types of pulsed power that have biological effects are caused with gas discharges, water discharges, and electromagnetic fields. The discharges yield free radicals, UV radiation, intense electric field, and shock waves. Biologically based applications of pulsed power are performed by selecting the type that gives the target objects the adequate result from among these agents. For instance, intense electric fields form pores on the cell membrane, which is called electroporation [1], or influence the nuclei. The radicals in water react with cell membrane of bacteria. These applications are mainly based on biological effects and can be categorized as germination of plant seeds; control of growth rate of the vegetables and fruits such as *Fragaria* × *ananassa*, *Spainacia oleracea* and *Raphanus sativus* var. *sativus* [2]; improvement of yielding rate of mushroom [3-5]; keeping freshness for a relatively longer period of perishables such as fish and shellfish [6]; decontamination of air and liquid to inhibit degradation of agricultural products [7]. These applications can contribute a food supply chain in Japan and the world.

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