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**Scope of low temperature plasma in futuristic agriculture.<sup>1</sup>**

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Low-temperature plasmas are increasingly investigated for agricultural applications. In this presentation, an assessment of plasma treatment as an alternative to two existing agricultural practices of artificial dormancy release and seed scarification will be presented. Crops from cold climates have a cyclic behavior, where in fall they go into a state of slow growth (crudely sleep) called dormancy. Dormancy is present in both annuals (planted every year such as potato and tulips, etc.) and perennials (planted once and harvested yearly such as grape, apples and peaches, etc.). The plant growth cycle resumes once the plant has been through a particular duration of chilling (sub-5° temperatures). In the absence of the required chilling period, the crop yield is significantly reduced. Growers rely on artificial chilling in refrigerators for annuals, if natural chilling is insufficient. For perennials, a deficiency in natural chilling can be compensated by spraying chemicals (such as hydrogen cyanamide). Using grape buds and seeds as test crops, it was observed that plasma treatment could effectively release the dormancy; similar to or better than the natural chilling. The plant enzymes indicate that the plasma treatment can induce stress in plants identical to the natural chilling and hydrogen cyanamide spray. Seeds with tough coats have a low germination as their outer skin is a barrier for the water and air permeation. Growers traditionally soak these seeds in acids to improve germination; a method known as seed scarification. It was observed that plasma treatment can improve the germination of such seeds similar to the acid scarification. Both the plasma-based alternatives are environmentally friendlier than the existing agricultural practices, which make them promising alternatives for further investigation and development.

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