

**ORAL PRESENTATION**

**Application of cold plasma in agriculture**

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Today, given the rapid growth of the world's population and the importance of healthy food production, it has revealed the need to find new ways in the food and agricultural industries. Many countries have invested in the use and expansion of cold plasma in food, agriculture, and related industries. The increasing and significant increase of studies, research, and commercial projects in recent years on various topics related to this field is a clear reason for this claim. The effect of plasma on the inactivation of microorganisms, changing the surface properties of materials, creating a chemical environment active in plasma, and its interaction with the surface of the material are some of the capabilities of plasma, which has made traders and companies in the field lucky enough to use plasma in the food, packaging and agriculture industries. Consumption, preparation, and storage of food safely and without harmful contaminants, while preserving nutrients is one of the most important areas in maintaining health and hygiene. Consumption of fruits and vegetables, especially in raw form and with minimal processing as important resources in the food basket of communities, increases the need to develop safe and efficient methods in food processing, storage, packaging, and distribution. On the other hand, in the agricultural sector, the use of advanced and efficient technologies to increase productivity and gain a better economic position, especially in Iran, which is facing the problem of water shortage and other inputs, is an inevitable necessity. According to the results obtained on plant samples grown with water under plasma treatment, nitrogen and oxygen species produced in water are effective in increasing growth rate, improving plant yield, reducing water consumption, and increasing rooting rate. In another study, disinfecting seeds and subsequently increasing plant growth in greenhouses using plasma technology provided organic products without the use of pesticides. However, the development of plasma technologies for agricultural operations requires significant efforts by the plasma research community.

**Keywords:** plasma; seed germination; plant growth; plant sustainability; stress tolerance; reactive species

**Tarımda soğuk plazma uygulaması**

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**Özet**

Günümüzde dünya nüfusunun hızla artması ve sağlıklı gıda üretiminin önemi göz önüne alındığında, gıda ve tarım endüstrilerinde yeni yollar bulma ihtiyacını ortaya çıkarmıştır. Birçok ülke gıda, tarım ve ilgili endüstrilerde soğuk plazmanın kullanımı ve yaygınlaştırılmasına yatırım yapmıştır. Son yıllarda bu alanla ilgili çeşitli konularda yapılan çalışmaların, araştırmaların ve ticari projelerin artması ve önemli ölçüde artması bu iddianın açık bir nedenidir. Plazmanın mikroorganizmaları etkisiz hale getirmesi, malzemelerin yüzey özelliklerini değiştirmesi, plazmada aktif kimyasal bir ortam oluşturması ve malzemenin yüzeyi ile etkileşimi üzerindeki etkisi, plazmanın yeteneklerinden bazılarıdır. Plazmayı gıda, ambalaj ve tarım sektörlerinde kullanacak kadar şanslı. Besinleri korurken, gıdaların güvenli ve zararlı kirleticiler olmadan tüketilmesi, hazırlanması ve saklanması, sağlık ve hijyenin korunmasında en önemli alanlardan biridir. Toplulukların gıda sepetinde önemli kaynaklar olarak özellikle ham formda ve minimum işleme ile meyve ve sebzelerin tüketimi, gıda işleme, depolama, paketleme ve dağıtımda güvenli ve verimli yöntemler geliştirme ihtiyacını artırmaktadır. Öte yandan tarım sektöründe, özellikle su ve diğer girdi sıkıntısı çeken İran'da verimliliği artırmak ve daha iyi bir ekonomik konum elde etmek için ileri ve verimli teknolojilerin kullanılması kaçınılmaz bir zorunluluktur. Plazma muamelesi altında su ile yetiştirilen bitki örneklerinde elde edilen sonuçlara göre, suda üretilen azot ve oksijen türleri büyüme hızının artmasında, bitki veriminin iyileştirilmesinde, su tüketiminin azaltılmasında ve köklenme oranının artmasında etkilidir. Başka bir çalışmada, tohumların dezenfekte edilmesi ve ardından plazma teknolojisi kullanılarak seralarda bitki büyümesinin arttırılması, pestisit kullanılmadan organik ürünler sağladı. Bununla birlikte, tarımsal operasyonlar için plazma teknolojilerinin geliştirilmesi, plazma araştırma topluluğu tarafından önemli çabalar gerektirir.

**Anahtar Kelimeler:**plazma; tohum çimlenmesi; bitki büyümesi; bitki sürdürülebilirliği; stres toleransı; reaktif türler

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**Abstract**

Today, given the rapid growth of the world's population and the importance of healthy food production, it has revealed the need to find new ways in the food and agricultural industries. Many countries have invested in the use and expansion of cold plasma in food, agriculture, and related industries. The increasing and significant increase of studies, research, and commercial projects in recent years on various topics related to this field is a clear reason for this claim. The effect of plasma on the inactivation of microorganisms, changing the surface properties of materials, creating a chemical environment active in plasma, and its interaction with the surface of the material are some of the capabilities of plasma, which has made traders and companies in the field lucky enough to use plasma in the food, packaging and agriculture industries. Consumption, preparation, and storage of food safely and without harmful contaminants, while preserving nutrients is one of the most important areas in maintaining health and hygiene. Consumption of fruits and vegetables, especially in raw form and with minimal processing as important resources in the food basket of communities, increases the need to develop safe and efficient methods in food processing, storage, packaging, and distribution. On the other hand, in the agricultural sector, the use of advanced and efficient technologies to increase productivity and gain a better economic position, especially in Iran, which is facing the problem of water shortage and other inputs, is an inevitable necessity. According to the results obtained on plant samples grown with water under plasma treatment, nitrogen and oxygen species produced in water are effective in increasing growth rate, improving plant yield, reducing water consumption, and increasing rooting rate. In another study, disinfecting seeds and subsequently increasing plant growth in greenhouses using plasma technology provided organic products without the use of pesticides. However, the development of plasma technologies for agricultural operations requires significant efforts by the plasma research community.

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