

Development of non-thermal plasma system for liquid food sterilization

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Project Objectives

- To design and develop, an atmospheric pressure Non-Thermal Plasma (NTP) system for sterilizing liquid food products.
- To study the effect of different plasma intensity on the sterilization of milk in terms of physical and chemical stability and microbial loads.
- To develop computational model for predicting the plasma dynamics to scale up the process suitable for industry.

Description

Plasma has been employed for several useful applications and one such useful application is sterilization. Common sterilization techniques such as chemical sterilization, irradiation and autoclaving have inherent disadvantages such as: these processes are time consuming, cannot be used for heat sensitive materials, toxic and irradiation may cause undesirable changes as well as many safety concerns to operator. Extensive literature survey reveals that only handful of studies have been carried out on the NTP system development and the application of NTP for the sterilization of liquid foods. Very few works have been conducted in India using cold plasma technology on liquid food systems. Raw milk is a natural, highly nutritious product and a quick and easy supplement for human dietary requirements. Elimination of bacteria in milk has been a problem for decades and new methods of non-thermal applications which do not harm the chemical composition of milk, are currently under investigation. Therefore, this proposal was submitted with broad objectives of designing and developing an indigenous plasma sterilization system for liquid foods. Although there has been increasing interest into the use of plasmas as a sterilizing technique; this is the first project that tests the use of cold plasma on liquid food products sterilization.