

PO3058

Plasma processed water (PPW) – an alternative for fresh-cut salad sanitation?Uta Schnabel¹, Jörg Stachowiak¹, Oliver Schlüter², Mathias Andrasch¹, Jörg Ehlbeck¹¹INP Greifswald e.V., Greifswald, Germany ²Leibniz Institute of Agricultural Engineering Potsdam-Bornim, Potsdam, Germany

uta.schnabel@inp-greifswald.de

Fresh and fresh-cut produce have a limited shelf life of several days, which allows only a regional distribution of that produce. The limited shelf life and the associated losses of fresh produce have various causes, but especially depend on microbial contamination at all stages in the value chain: production, processing, transport, deployment and also before preparing. In general, a great demand regarding gentle sanitation in the production and processing of fresh produce exists because of the significant economic importance of current losses. As an alternative, non-thermal plasma at atmospheric pressure could be a versatile tool. Therefore, an experimental set-up based on a microwave-plasma source which generates plasma processed air (PPA) containing manifold RNS-based chemical and antimicrobial compounds was used. The PPA was introduced into distilled water or tap water to generate plasma processed water (PPW) which can be applied for the decontamination of packaging material and fresh produce. This is a new and innovative method for the generation of antimicrobial active water. In our experiments, PET stripes, fresh-cut lettuce, and fresh sprouts were contaminated with six different bacteria; *Escherichia coli* K12 (DSM 11250), *Pseudomonas fluorescens* (DSM 50090), *Pseudomonas fluorescens* (RIPAC), *Pseudomonas marginalis* (DSM 13124), *Pectobacterium carotovorum* (DSM 30168) and *Listeria innocua* (DSM 20649); in a concentration of 10^8 cfu ml⁻¹ and subsequently treated with PPW. For PPW production, the plasma was ignited for 5, 15 or 50 s. After a post-plasma treatment with PPW of maximum 5 minutes, a decrease of bacterial load up to 6 log were detected for *P. fluorescens* (DSM-strain) on PET as well as *P. marginalis* and *P. carotovorum* on salad. For all other bacteria and specimen the inactivation rate was lower. The characteristics of plasma and its generated cocktail of long living chemical compounds in air and in water leading to a high bacterial inactivation and offering a wide range of possible applications.

Keywords

Decontamination

Non-thermal atmospheric pressure plasma

Food processing