

**COLD ATMOSPHERIC-PRESSURE PLASMA USED TO  
APPLY ACTIVE PACKAGING DIRECTLY ONTO THE  
SURFACE OF FRUITS AND VEGETABLES.**

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Active packaging of fruits and vegetables involves the use of coverings that absorb or contribute molecules, affecting one or more properties of the treated produce. Active thin film packaging is a relatively new technology that can have a major impact on food safety and food quality.

Atmospheric pressure cold plasma (APCP) processing can be used to activate a monomer with concomitant deposition of an organic plasma-polymerized film which can act as an inert matrix material that houses the active packaging's bioactive molecules. APCP thin film processing can take place at or below room temperature. The APCP process does not require heat transfer at the substrate, a characteristic unique to APCP, and a major advantage over other thin-film deposition processes. As a proof of concept, the main objectives of this work is the application of thin active packaging film directly to produce and the design of a reactor that will allow embedding an antimicrobial in the matrix material. For this process an array of high voltage needles will be used with a perpendicular gas flow with the gas stream containing argon carrier gas and acetylene as the precursor species for the plasma-polymerized matrix material. The plasma zone in the reactor will be obtained by increasing the voltage on a multiple needle electrode structure until the electric field in the feed material (Argon + acetylene) is sufficiently high to yield electron avalanches and streamers. The produce will be placed in a treatment chamber downstream from the activation zone. Bioactive molecules will be introduced downstream from the plasma zone but upstream from the produce (substrate).