Active packaging for control of post harvest disease and eradication of citrus canker bacteria

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What is active packaging?

Active, intelligent and smart packaging refer to packaging systems used with products to help extend shelf life, monitor freshness, improve safety and convenience.

All are closely related: active usually means having active functions beyond the inert passive containment and protection of the product (desiccant).
Active packaging is becoming more common as shelf life and quality expectations change.
Fresh citrus market needs a step to eradicate possible live Xcc from fruit to open markets and extend shelf life of fruit

Previous studies with chlorine dioxide in packaging did not work due to many environmental parameters necessary to make packaging active.

Studied active packaging with new formulation of chlorine dioxide: new packaging does not have same restriction as previous chlorine dioxide trials
Chlorine dioxide is a strong sanitizer. It is biocidal and rapidly kills a broad spectrum of organisms.

Strong oxidizer: oxidizer over a wide pH range

Most well known use as an approved water purifier
Scrubs industrial odors from the environment

Used as an antimicrobial and sanitizer in produce flumes

Used in the paper/pulp industry to bleach wood fibers
Teeth whitener

1990’s ClO$_2$ packets to remove mold from old books and manuscripts
Began ClO$_2$ packaging studies with strawberries in commercial clamshells

ClO$_2$ in packaging  No ClO$_2$ in packaging
ClO$_2$ packaging with blueberries
Experimental ‘packaging’ for citrus

ClO₂ packet
No ClO$_2$ packet
Cells in periphery of lesion are killed
Ten days at 50º F: no Xcc isolated from lesions with ClO₂ exposure

No ClO₂ packet in packaging  ClO₂ packet in packaging
Future studies:

Experimenting with concentrations that are best for fruit and still efficient for destroying Xcc

Scale-up with cooperators to study actual effect in boxes under commercial conditions