

## ACTIVE PACKAGING FOR PRECUT FRUITS AND VEGETABLES

### DESCRIPTION OF THE INVENTION

ITENE has developed a combination of active ingredients (citral, hexanal y linalool) with antimicrobial activity, which presents a synergistic effect for the preservation of foodstuffs, therefore extending the shelf life of packaged foodstuffs.

The aforementioned composition can be applied to packages for foodstuffs, for example via injection or extrusion, or as a coating; thus obtaining active packages. Once applied on

the package, the active ingredients of the composition are released from the package towards the headspace, thus exerting their effect of preserving the packaged food for longer time.

Such active packages are preferably used for the packaging of fresh fruits and vegetables, particularly precut and peeled fruits and vegetables. The efficiency of these active packages has been validated for precut fruit.

### APPLICATION BUSINESS SECTORS

**Fruit and vegetable growers, suppliers, and packers.**

**Packaging and packaging materials manufacturers** may also be interested in implementing this active packaging technology.

### TECHNICAL ADVANTAGES AND BUSINESS BENEFITS

The combination of 3 antimicrobial active ingredients (citral, hexanal and linalool) presents a synergistic effect as a preservative for foodstuffs, which allows extending the shelf life of packaged foodstuffs, more specifically the shelf life of precut and peeled fruits and vegetables. Such antimicrobial active composition may be used for the production of active packages, through different production methods such as injection or extrusion, or through the application of coatings on the package.

Some of the technical advantages of the invention are as follows:

- )] Extension of the shelf life of precut fruits and vegetables, which have a very short shelf life due to their unprotected surfaces and damaged plant tissues. The extension of the shelf life of these kinds of products will make it possible to reinforce their position as a market alternative due to:
  - )] The reduction of wasted precut fruits and vegetables
  - )] The increase of marketing channels and the possibility to access new markets while ensuring product quality.
- )] Synergistic and unexpected antimicrobial effect against yeasts species such as "Saccharomyces cerevisiae" and moulds such as "Aspergillus niger" and "Penicillium aurantiogriseum".
- )] Use of natural substances (citral, hexanal, linalool) as antimicrobial agents, avoiding the use of chemically synthesized additives. What is more, these natural substances are incorporated into the package itself; not the foodstuff.
- )] The synergistic combination of these active ingredients, as well as the fact that such active ingredients are incorporated into the package (not the foodstuff), allows to use smaller amounts of these antimicrobial compounds, which presents the following advantages:



GENERALITAT  
VALENCIANA



BANCO DE  
PATENTES

**REDIT**  
INNOVATION NETWORK

## ACTIVE PACKAGING FOR PRECUT FRUITS AND VEGETABLES

- ) Lower variation of the organoleptic properties of fruits and vegetables.
  - o Lower build-up of volatile compounds.
  - o Lower production costs.

### STATUS DEVELOPED OF THE TECHNOLOGY

The ITENE research group that developed this invention has great experience and know-how for the implementation of this kind of technology in the companies of the food packaging sector.

The development of this technology has been validated at pilot scale. The efficiency of this active package for the storage of precut fruit (more precisely precut orange and pineapple) has been tested and confirmed. Currently, work is being done to evaluate the efficiency of this active package for other fruits and vegetables.

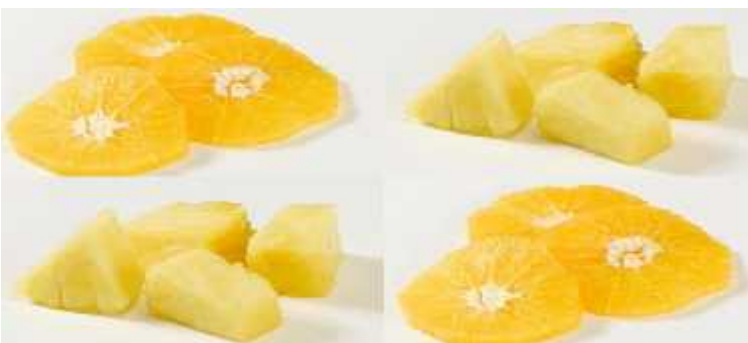
### INTELLECTUAL PROPERTY RIGHTS

Patent protection has been sought for the use of the combination of citral, hexanal and linalool for food packaging, and for the packages containing the aforementioned combination of active ingredients. Patent applications have been filed in Europe, China, Israel, Japan, USA and Tunisia, based on the international patent application PCT WO2017/055424: <https://patentscope.wipo.int/search/es/detail.jsf?docId=WO2017055424>

### COLLABORATION SOUGHT

We are looking for packaging and packaging materials manufacturers and/or user companies interested in exploiting this technology, in order to reach with them **licensing agreements** for the manufacture, use or commercialization of the invention.

### RELATED IMAGES





**GENERALITAT  
VALENCIANA**



**BANCO DE  
PATENTES**

**REDIT**  
INNOVATION NETWORK

## **ACTIVE PACKAGING FOR PRECUT FRUITS AND VEGETABLES**

### **CONTACT DETAIL**

**Adelaida Prieto Edo**

**INSTITUTO TECNOLÓGICO DEL EMBALAJE, TRANSPORTE Y LOGÍSTICA (ITENE)**

Parque Tecnológico

C/ Albert Einstein, 1.

46980 PATERNA (VALENCIA)

ade.prieto@itene.com

Main: (+34) 96 182 00 00

Direct line: (+34) 96 182 0135

www.itene.com