



# ECO-EFF™

NATURAL PRESERVATION MOULD GROWTH AND SPOILAGE  
PREVENTION in PITAYA (Dragon Fruit)

*(Hylocereus trigonus)*

Eco-Eff™

FOOD PROTECTING FOOD

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### Eco-Eff™

100% Natural-Mineral Food Solution  
Toxic-Free Preservatives-Free  
Worldwide Authorized Mineral Ingredients  
Safe & Effective / Simple & Easy  
Unrivalled Cost-in-Use

### Overview

The absence of economically competitive alternative technologies for the preservation of *Pitaya* fruits has slowed the development of this fruit agro-chain in the country. Colombia is one of the main *Pitaya* producers but with a minimal market share.

Post harvest management deficiencies are reflected in a short shelf life, significant postharvest losses and a wide price fluctuation, which limits the agro-business growth and its positioning in the international market.

To offer alternative solutions to this problem, the use of low temperatures and passive modified atmospheres are being applied on the conservation of *Pitaya*.

Fruit can be stored at 10°C (positive cold) in two stages of maturity (green and/or yellow green), with and without packaging, and with or without polyethylene or polypropylene wrap, with and without perforations.

Post harvest analysis of % of deteriorated area, skin colour, weight loss and firmness, soluble solid content and acidity are quality parameters to evaluate.

Eco-Eff™ direct instant dip bath (3% solution) in fresh water results in a Natural Preservation-Mould Growth and Spoilage Prevention in *Pitaya*.

Despite the fact that this is a natural cost-effective system for fruit preservation and quality improvement, when combined with described systems the main advantages are the reduction in fruit dehydration, natural colour maturation, mould and fungi growth prevention and longer shelf life.

Best results were found in green *Pitaya* packaged in non-perforated polyethylene film stored at 10°C, after instant bath in Eco-Eff™ fresh water solution (3% w/w) where fruit reached a shelf life of 18 days with a deterioration rate less than 5% and at 21 days with a deterioration rate less than 10%.

An instant dip/bath of fruit in a 3% Eco-Eff™ solution maintains *Pitaya* at least 12 days (ambient storage unprotected) without significant changes. (See picture 2 for real results of this stage)

Real Results after 12 days ambient exposure after simple bath in a 3% Eco-Eff™ Solution (Water)



### Photo 2.

Showing actual real results of *Pitaya* @ ambient storage (12 days after Dip/Bath in an Eco-Eff™ solution (3% w/w).

Left image (control piece without any treatment)

Right Image (treated *Pitaya* with a bath in 3% Eco-Eff™ water solution. Image courtesy of Green Control System SAS - Colombia.

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Protect, Preserve and Transport your Products with full confidence and guarantee no matter packaging options available.

### Benefits of Pitaya consumption

*Pitaya* stands out for its great contribution of Vitamin C that its consumption provides, helping to strengthen the immune system by its antioxidant action. Antioxidants increase resistance to infections and help to destroy free radicals within the body, reducing the risk of cardiovascular, degenerative diseases and/or cancer. The presence of antioxidants such as phenols, beta-cyanine and beta-alanine, multiply their ability to absorb free radicals.

Health benefits and nutritional properties of *Pitaya* or dragon fruit strive in its high levels of vitamins B1, B2 and B3 helping to hydrate the skin and actively fighting skin diseases.

It is also a very moisturizing fruit due to its high water content, used to combat fluid retention, in all kinds of population.

The *Pitaya* is a fruit that contributes very a few calories, due to its low carbohydrate content, which makes it ideal to combine with other fruits with more nutrients. It increases the absorption of iron in combination with other foods, with specialists actively recommending its consumption in cases of iron deficiency anemia.

Dragon fruit is a good source of fiber, a great regulator of the digestive system. Its consumption is recommended as a complement in the treatment of digestive diseases such as irritable bowel or gastritis, but it is not for people with diverticulosis since the seeds can remain in the diverticula triggering spasm and thus far, painful episodes.

The seeds of *Pitaya* are edible, rich in fiber and containing fatty acids that provide low levels of protein and fat, being mostly the mono-unsaturated type.

Recent studies have recognized the presence of a substance called *Captina* capable of regulating muscle contractions of the heart, helping to combat arrhythmias and heart accidents.

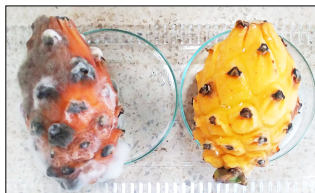
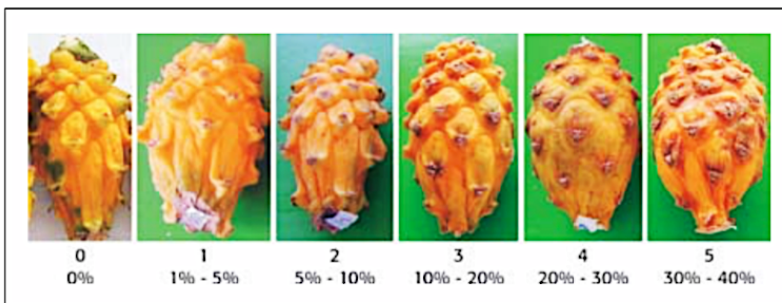


Photo 3  
Control v. Treatment  
After 12 days (ambient)



### Eco-Eff™ · The Savings Maker

Thousands of tons of *Pitaya* are retired and wasted every year due to premature spoilage, so just see how this simple and effective treatment can help you and your business to improve numbers since thousands of tons of *Pitaya* will not be discarded by such reasons.

Photo 4  
Visual Scale of Dragon Fruit Deterioration  
Image property of CTA 2008 (9)(I), 30-39

We have studied in-vitro natural eco-friendly control for spores through our wide-known best-sell product Eco-Eff™ Powder, that shows spectacular results @ 3% (w/w) dosage conforming a promissory Natural Mineral Non-Toxic Control of spoilage inducing species playing an active role in the preservation, maturation and control system and product shelf life Production of Crops in Pitahaya (Dragon Fruit).

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### Mode of Use

On a solution of fresh water (even tap water and/or municipal/chlorinated) prepare a solution of 3% of Eco-Eff™ Dip/Submerged a full basket of *Pitaya* (after elimination of external leaves). Dry ambient, prepare and store under the selected method. Film, Positive Cool (around 8-10°C) and product will be ready for inspection and dispatch.

PRODUCT	DOSIS (%)	MOULD COLONIES (as CFUs)	% Control (@ 14 days)
Eco-Eff	3	0	100
CONTROL	0	85	0



### Simple & Easy / Cost-Effective

In a cost-effective way, without need of complications and/or sophisticated machinery difficult to transport, move, adjust and manipulate or maintain.

**Just Water & Eco-Eff™  
TO ACHIEVE SUPERB RESULTS**

Inhibition Rate  
Eco-Eff (%)  
100%



Final Colony Counting as CFUs  
(85%)  
Control Group



  
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