

PLANTÉRIA™

CITRUS EXTRACTS



7

KEY BENEFITS

- Inhibit Total Plate Count (TPC)
- Improve oxidative stability
- Shelf-life extension
- Clean-label

NATURAL ANTI-TPC EXTRACTS

The "clean-eating" trend has inspired a back-to-basics approach in product development; food producers feel the pressure to find clean-label ingredients to protect food shelf life and stability. Citrus and mushroom-sourced ingredients are a perfect fit for the trend towards clean and healthy eating with antimicrobial activities that have long been consumer favorites.

At Handary, we provide Plantéria® CF which is natural water-soluble extracts derived from citrus fruits that contain a group of GRAS ingredients from bioflavonoids, polyphenols, citric acid and ascorbic acid. They are mainly used as a multi-hurdle antimicrobial in a variety of foods.

OUR BRANDS

PLANTÉRIA® CF
Citrus extracts



FEATURES

Brands	Plantéria® CF	Mushria™	Chitoly® AB	Chitoly® OM
Code	0701	0711	0721	0722
Product name	Citrus fruits extracts	Mushroom extract	<i>Agaricus bisporus</i> chitosan	Oyster mushroom chitosan
Sources	Citrus fruits	<i>Dacryopinax spathularia</i> <i>Agaricus bisporus</i> , Oyster mushrooms	<i>Agaricus bisporus</i>	Oyster mushroom,
SPECIFICATIONS				
Active ingredient	Citrus extract ≥15%	Mushroom Glycolipids ≥75% Chitosan ≥5%	Chitosan ≥ 90%	Chitosan ≥ 90%
Dry matter, loss on drying (w/w)	/	≤ 10%	≤ 10%	≤ 10%
HEAVY METALS				
Total heavy metal (mg/kg)	≤ 1	≤ 2	≤ 2	≤ 2
Arsenic (mg/kg)	≤0.5	≤1	≤1	≤1
Lead (mg/kg)	≤0.5	≤1	≤1	≤1
Mercury (mg/kg)	≤0.5	≤0.2	≤0.2	≤0.2
Cadmium (mg/kg)	≤0.5	≤0.2	≤0.2	≤0.2
MICROBIOLOGICAL SPECIFICATIONS				
Total plate count (cfu/ml)	≤110		≤1,000	≤1,000
PHYSICAL / CHEMICAL SPECIFICATIONS				
Appearance	Honey colored viscous crystalline liquid	Grey to brownish powder	Off-white to brownish powder	Off-white powder

*The exact percentage and appearance variations may occur from batch to batch.

MIC (Minimum inhibitory concentrations)

Targeted microorganisms	Plantéria® CF (mg/L)	Mushria™ (mg/kg)	Chitoly® AB (mg/kg)
Gram-negative bacteria			
<i>Escherichia coli</i>	40		20-100
<i>Pseudomonas fluorescens</i>	200-1700		200-1700
<i>Salmonella typhimurium</i>	40		200
<i>Shigella dysenteriae</i>	250		250
Gram-positive bacteria			
<i>Acetobacter pasteurianus</i>		9	
<i>Bacillus cereus</i>	220		1000
<i>Bacillus coagulans</i>	10		
<i>Bacillus subtilis</i>	15		
<i>Brochothrix thermosphacta</i>	117		
<i>Clostridium tyrobutyricum</i>	120		
<i>Lactobacillus brevis</i>	110	9	1000
<i>Lactobacillus bulgaricus</i>	100		150-800
<i>Lactobacillus plantarum</i>	90	12	200-800
<i>Listeria monocytogenes</i>	120		
<i>Staphylococcus aureus</i>	50		
Yeasts			
<i>Candida acutus</i>	40		
<i>Candida albicans</i>			500-1000
<i>Candida parapsilosis</i>		7	
<i>Pichia membranaefaciens</i>	40		
<i>Pichia pastoris</i>	40		
<i>Rhizopus chinensis</i>	90		
<i>Saccharomyces cerevisiae</i>	40	5	
<i>Zygosaccharomyces bailii</i>		8	
<i>Zygosaccharomyces rouxii</i>		8	
Molds			
<i>Aspergillus fumigatus</i>			2000
<i>Botrytis cinerea</i>			10
<i>Drechstera sorokiana</i>			10
<i>Fusarium oxysporum</i>			100
<i>Penicillium roqueforti</i>		11	
<i>Trichoderma virens</i>		5	
<i>Aspergillus brasiliensis</i>		5	
<i>Byssoschlamys nivea</i>		11	
<i>Aspergillus niger</i>	200		

* MIC is only used for reference. It was collected from different sources, end-user should only use it depending on real cases.



Plantéria® CF

Citrus extracts

As modern consumers are becoming highly scrupulous about ingredients of food products before making a purchase, a burgeoning number of food manufacturers are replacing chemical preservatives with citrus extracts.

Plantéria® CF is a natural organic compound derived from citrus fruits and is mainly used as a multi-hurdle antioxidant and antimicrobial in a variety of foods.

Table 1 Plantéria® CF Applications

Ingredient	Applications		Benefits	Dosage
Plantéria® CF	Bakery	Cakes	Growth control of <i>Bacillus cereus</i> and yeasts	0.05-0.15 g/kg
	Beverage	Fruit and vegetable juice (concentrate)	Prevent mold and browning	0.3 g/kg
		Water-based drinks (e.g. Apple juice drink, lemonade, orange drink, fruit punch, flavoured-fruit drinks, energy drinks, coconut, oatmeal, rice, sugar cane beverages and RTE- tea drink)	Growth control of Total Plate Count	0.3 g/kg
	Confectionery	Sweet syrups and toppings	Growth control of <i>Bacillus cereus</i>	0.25 g/kg
	Culinary	Emulsified sauces	Growth control of Total Plate Count	1 g/kg
		RTE soups and broths	Growth control of Total Plate Count	1 g/kg
	Dairy	Cheese	Growth control of <i>L. monocytogenes</i> and <i>Clostridium spp.</i>	1 g/kg
		Dairy-based pudding	Growth control of <i>Bacillus cereus</i> , <i>L. monocytogenes</i>	1 g/kg
		Fruit or flavoured yogurt	Growth control of Total Plate Count (TPC)	1 g/kg
	Fruits & Vegetables	Salads	Growth control of <i>L. monocytogenes</i>	1 g/kg
Fruit fillings for pastries		Growth control of <i>Bacillus cereus</i> and yeasts	1 g/kg	

Fresh salad

Fresh salad was inoculated with *L. monocytogenes* culture, and treated with Plantéria® CF at 100 or 200 mg/kg after 30 minutes, the result as **Figure 1** shows that *L. monocytogenes* was below the detection limit of 1 CFU/cm² after 12 days storage at 7°C.

L. monocytogenes

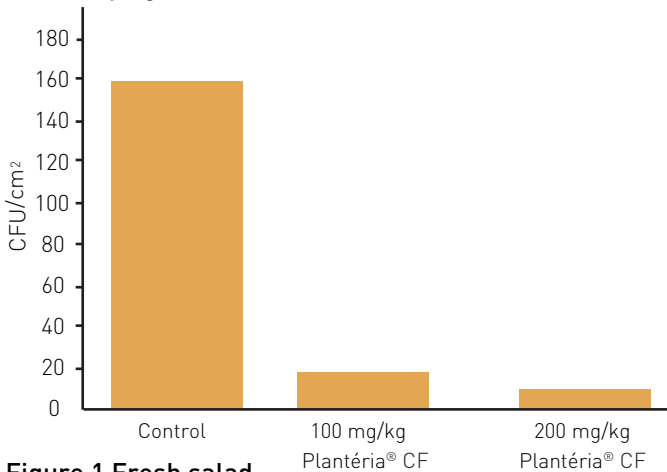


Figure 1 Fresh salad

Orange juice

Figure 2 shows the inhibition effect of Plantéria® CF in orange juice. The yeast density of untreated orange juice reached 10⁴ - 10⁵ CFU/ml at the end of storage (21 days). Meanwhile the yeast density of the sample treated with Plantéria® CF remained below 100 CFU/ml. The result confirmed the preservative efficacy in orange juice against yeast particularly against *Saccharomyces cerevisiae*, *Zygosaccharomyces bailii*, and *Candida lipolytica*.

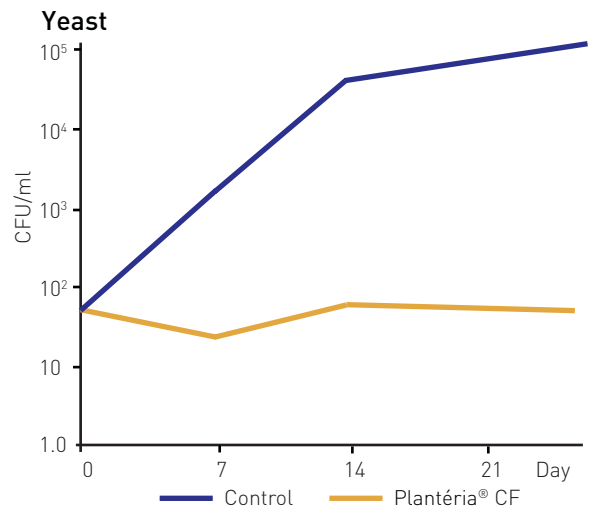


Figure 2 Orange juice

Regulatory

Plantéria® CF is described as Citrus extracts by US FDA and is approved as GRAS, to be used as an antimicrobial and preservative in all the majority of foods. All individual components of the ingredient have FDA GRAS status, compliant with proposed rule 21 CFR 170.36. Plantéria® CF composite are GRAS ingredients of Citrus extracts (CAS No. 8008-57-9 / 8008-31-9 / 8008-57-9), Glycerin (CAS No.56 81 5), Fructooligosaccharides (CAS No. 308066-66-2), L-lactic acid (CAS No. 79-33-4), and Citric acid (CAS No. 77-92-9).

