



JEECIDE® NAS-CC

A Natural Antimicrobial Ingredient

Introduction

Considering the need in the global market for natural preservatives, JEEN offers **Jeecide® NAS-CC** - a natural preservative for personal and health care products - which was developed as an alternative to synthetically-derived preservative systems.

Jeecide® NAS-CC is a natural antimicrobial ingredient comprised of curry leaf oil, cinnamon leaf oil, and sesame oil. The curry and cinnamon plants are cultivated on a plantation spread over 100 acres and the extraction process is carried out in a GMP processing unit that is FDA approved.

Jeecide® NAS-CC is a broad spectrum natural liquid preservative system suitable for personal care and cosmetic applications. It has been designed specifically for formulations with a pH < 6.0 but is effective at a pH range of 3 - 7. It is effective against Gram-positive and Gram-negative bacteria, yeast, and mold and is very safe and effective to use.



KEY BENEFITS:

- Broad spectrum
- Wide application
- Non-toxic
- Excellent bacterial and fungal control



PRODUCT APPLICATIONS:

- Rinse-Off Products
- Shampoos
- Shower Gels
- Body Washes
- Foam Bars
- Skin Care
- Creams
- Lotions
- Emulsions
- Gels

Preserved by Nature

Various naturally occurring essential oils are commonly used around the world for preservation. **Jeecide® NAS-CC** is based on two key essential oils: Cinnamon Leaf Oil (*Cinnamomum Zeylanicum*) and Curry Leaf Oil (*Murraya Koenigii*).



Cinnamon Leaf

Botanical Description

Though highly recognized today as a culinary spice, the use of cinnamon for medicinal and religious purposes dates as far back as 2700 BC. It was used in ancient Egypt/Middle East for embalming and controlling bacterial and viral outbreaks. Chinese records during that period took note of its efficiency as a valuable treatment for fever, diarrhea, and menstrual ailments. Cinnamon is a member of the Lauraceae family and is native to Sri Lanka. Cinnamon is harvested from a particular variety of evergreen tree that can grow as high as 60 feet and thrives best in tropical forests. The bark has a reddish brown hue marked with tiny, yellow flowers and leather-textured leaves that give off a spicy aroma.

Therapeutic Properties

It is known that cinnamon leaf essential oil strengthens the immune system against diseases caused by fungi, viruses, and bacteria. It has stimulating properties that help combat congestion and improve digestion, as well as soothe abdominal spasms and increase circulation. Because it is anti-spasmodic, it is a valuable treatment for various digestive ailments such as stomach or intestinal cramps, colitis, flatulence, nausea, diarrhea, and indigestion. Cinnamon leaf oil has also long been popular as a mouthwash and breath freshener.

Aromatherapeutic Use

Its warm fragrance makes it excellent for calming and soothing mind and emotions.

Constituents

The oil from the cinnamon leaf is composed mainly of eugenol.

Cinnamon Leaf	
Botanical Name	<i>Cinnamomum Zeylanicum</i>
Family	Lauraceae
Part Used	Leaf
Extraction Method	Steam
Distillation Origin	India



Curry Leaf

Botanical Description

The small deciduous curry plant is native to India. It grows in abundance in jungles and farmlands almost everywhere, excluding the higher reaches of the Himalayas. It is also found in Burma and Malaysia.

Curry leaves are extensively used in South Indian and Sri Lankan cuisine, while curry powder is a British invention conceived to imitate the exotic taste and flavors of Indian cuisine.

Curry leaves are highly aromatic and possess anti-oxidant, anti-microbial, anti-inflammatory properties. The leaves are small and narrow, often resembling the leaves of the neem tree, which is why curry leaves are sometimes referred to as 'black neem'.

Constituents

The chemical constituents present in curry leaves are carbazole alkaloids.

Curry Leaf	
Botanical Name	Murraya Koenigii
Part Used	Leaf
Extraction Method	Steam Distillation



FORMULATING GUIDELINES:

The recommended use level is 0.75 – 1.2% for complete microbial protection.

Method of Addition

Jeecide® NAS-CC provides excellent protection at pH 6 and can be widely used at pH 3-7.

Jeecide® NAS-CC can be added into any phase of the manufacturing process including the water phase of emulsions. It can tolerate temperatures up to 60°C.

Jeecide® NAS-CC requires intense mixing for uniform dispersal of the active ingredients when low amounts of emulsifiers are in the system.

It is fully compatible with a wide range of formulations as well as most types of herbal extracts, proteins and anionic systems.

Broad Spectrum Activity

Jeecide® NAS-CC provides excellent protection against various types of common organisms in typical facial creams, hand creams, shower gels, and moisturizing lotions at a pH of 6.

Typical Properties

INCI Name	Murraya Koenigii Leaf Oil (and) Cinnamomum Zeylanicum Leaf Oil (and) Sesamum Indicum (Sesame) Seed Oil
Appearance @ 25°C	Liquid
Odor	Mild
Color	Pale yellow
Specific Gravity	0.92 ± 0.01
Vapor Pressure (mm Hg)	<0.75 mm Hg
Recommended Use Level	0.75 - 1.2%

Solubility Data

Ingredient	Compatibility
Mineral Oil	Dispersible
Cyclomethicone	Insoluble
Dimethicone 200/100 cst.	Dispersible
Caprylic/Capric Triglycerides	Soluble
Water	Dispersible
Propylene Glycol	Soluble
Ethanol 190 Proof	Soluble
Isododecane	Soluble
C12-15 Alkyl Benzoate	Soluble
Isopropyl Myristate	Soluble
Butylene Glycol	Soluble
Phenyltrimethicone	Soluble

Microbiological Challenge Studies

A study was conducted using 2 formulations: a face wash preserved with 0.75% **Jeecide® NAS-CC** and a cream base preserved with 0.75% **Jeecide® NAS-CC**. All samples were inoculated at the start of the study and sampled at 7 days, 14 days, 21 days, and 28 days.

Face Wash Preserved With 0.75% Jeecide® NAS-CC

Test Organism	Inoculum Density / 0.1 ml	Weight of Sample	Expected Count per gm of Sample
<i>Staphylococcus aureus</i>	3.2×10^7 cfu/ml	20.09 g	1.6×10^6 cfu/g
<i>Escherichia coli</i>	3.3×10^7 cfu/ml	20.42 g	1.6×10^6 cfu/g
<i>Pseudomonas aeruginosa</i>	4.1×10^7 cfu/ml	20.13 g	2×10^6 cfu/g
<i>Aspergillus niger</i>	3.8×10^6 cfu/ml	20.30 g	1.8×10^5 cfu/g
<i>Candida albicans</i>	1.8×10^7 cfu/ml	20.00 g	9×10^5 cfu/g

Test Organism	Count at Zero Hour	Count at 7 th Day	Count at 14 th Day	Count at 21 st Day	Count at 28 th Day
<i>Staphylococcus aureus</i>	1.3×10^6 cfu/g	< 10 cfu/g	< 10 cfu/g	< 10 cfu/g	< 10 cfu/g
<i>Escherichia coli</i>	1.2×10^6 cfu/g	< 10 cfu/g	< 10 cfu/g	< 10 cfu/g	< 10 cfu/g
<i>Pseudomonas aeruginosa</i>	1.8×10^6 cfu/g	< 10 cfu/g	< 10 cfu/g	< 10 cfu/g	< 10 cfu/g
<i>Aspergillus niger</i>	1.1×10^5 cfu/g	< 10 cfu/g	< 10 cfu/g	< 10 cfu/g	< 10 cfu/g
<i>Candida albicans</i>	7.2×10^5 cfu/g	< 10 cfu/g	< 10 cfu/g	< 10 cfu/g	< 10 cfu/g

Toxicity Information

Mainly due to legislation in Europe, which imposes various marketing restrictions, **Jeecide® NAS-CC** preservative has not been tested on animals. Therefore, toxicity testing information regarding the blended material will not be generated. However, each of the **Jeecide® NAS-CC** ingredients has been tested extensively over the years. Overall, the ingredients in **Jeecide® NAS-CC** have been carefully chosen due to their global acceptance as well as excellent toxicity profiles.

Cream Base Preserved with 0.75% Jeecide® NAS- CC

Test Organism	Inoculum Density / 0.1 ml	Weight of Sample	Expected Count per gm of Sample
<i>Staphylococcus aureus</i>	3.2 x 10 ⁷ cfu/ml	20.09 g	1.6 x 10 ⁶ cfu/g
<i>Escherichia coli</i>	3.3 X 10 ⁷ cfu/ml	20.13 g	1.6 x 10 ⁶ cfu/g
<i>Pseudomonas aeruginosa</i>	4.1 x 10 ⁷ cfu/ml	20.08 g	2 X 10 ⁶ cfu/g
<i>Aspergillus niger</i>	3.8 x 10 ⁶ cfu/ml	20.02 g	1.9 x 10 ⁵ cfu/g
<i>Candida albicans</i>	1.8 x 10 ⁷ cfu/ml	20.14 g	8.9 x 10 ⁵ cfu/g

Test Organism	Count at Zero Hour	Count at 7 th Day	Count at 14 th Day	Count at 21 st Day	Count at 28 th Day
<i>Staphylococcus aureus</i>	1.2 x 10 ⁶ cfu/g	< 10 cfu/g	< 10 cfu/g	< 10 cfu/g	< 10 cfu/g
<i>Escherichia coli</i>	1.3 X 10 ⁶ cfu/g	< 10 cfu/g	< 10 cfu/g	< 10 cfu/g	< 10 cfu/g
<i>Pseudomonas aeruginosa</i>	1.5 x 10 ⁶ cfu/g	< 10 cfu/g	< 10 cfu/g	< 10 cfu/g	< 10 cfu/g
<i>Aspergillus niger</i>	1.2 x 10 ⁵ cfu/g	< 10 cfu/g	< 10 cfu/g	< 10 cfu/g	< 10 cfu/g
<i>Candida albicans</i>	5.1 x 10 ⁵ cfu/g	< 10 cfu/g	< 10 cfu/g	< 10 cfu/g	< 10 cfu/g

Safety and Regulatory Profile

Jeecide® NAS-CC has an excellent safety and toxicological profile and is safe to use in a wide range of personal care applications.



Please contact your JEEN Representative or visit our website at www.JEEN.com to learn more about our products, our technologies, and how we can help you reduce your carbon footprint and produce a greener product.

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