

PIONINTM

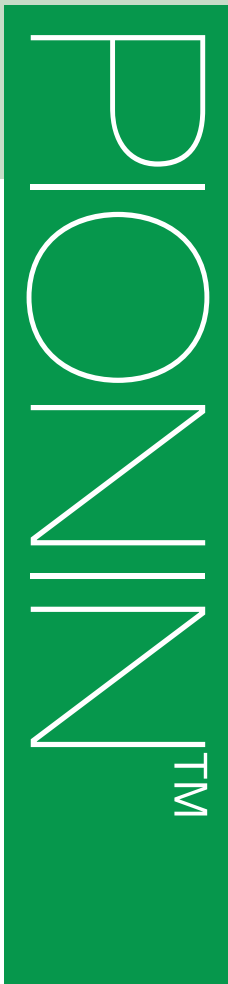


effective
antimicrobial
agent from
Nagase Viita

PIONINTM

for anti-acne, anti-dandruff, deodorant

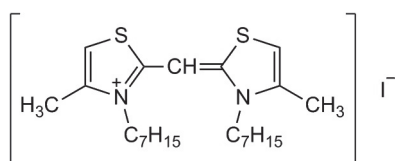




effective antimicrobial agent from

The wide variety of antimicrobial activities of PIONIN™ have been known in Japan since the 1950's, which makes PIONIN™ ideal for use in cosmetics. In 1962, the Pharmaceutical Affairs Bureau, Japanese Ministry of Health and Welfare authorized PIONIN™ for use in a quasi-drug (notice No. 464). PIONIN™ is listed in the Japanese Standards of Quasi-drug Ingredients, formerly known as the Japanese Standards of Cosmetic Ingredients established in 1967.

Structure of PIONIN™



PIONIN™, a yellow crystalline powder, is a cyanine dye. The thiazole structure is created by two nitrogen-containing heterocyclic molecules that are bound to identical heptyl groups at the N site. The antimicrobial activity of PIONIN™ is reported to be associated with the length of the N-alkyl groups.

Chemical formula: C₂₃H₃₉IN₂S₂

Molecular weight: 534.60

Chemical name: 3-Heptyl-2-[(3-heptyl-4-methyl-3H-thiazol-2-ylidene)methyl]-4-methylthiazolium iodide

Efficacy

1

Antimicrobial activity

PIONIN™ has a wide range of antimicrobial activities. PIONIN™ is used in many cosmetic products as an effective antimicrobial preservative.

Minimal Inhibitory Concentration (MIC) using the Broth microdilution method

Gram-positive bacteria	MIC(%)	Gram-negative bacteria	MIC(%)
<i>Staphylococcus aureus</i> ATCC 6538	0.00008	<i>Escherichia coli</i> ATCC 8739	0.00063
<i>Staphylococcus aureus</i> JCM 8702	0.00016	<i>Serratia marcescens</i> ATCC 14041	0.005
<i>Enterococcus faecalis</i> JCM 5803T	0.00016	<i>Pantoea agglomerans</i> ATCC 27155	0.00031
<i>Enterococcus faecalis</i> ATCC 29212	0.00016	<i>Enterobacter cloacae</i> AHU 134	>0.005
<i>Enterococcus faecium</i> ATCC 6057	0.00031	<i>Klebsiella pneumoniae</i> ATCC 10031	0.00031
<i>Enterococcus faecium</i> ATCC 19434	0.00031	<i>Klebsiella pneumoniae</i> ATCC 9621	0.00063
		<i>Pseudomonas aeruginosa</i> IFO 3453	0.00008
		<i>Pseudomonas aeruginosa</i> ATCC 9027	0.0025

Efficacy

2

Anti-acne activity

PIONIN™ has antimicrobial effects against *Cutibacterium acnes*, which is a causative agent of acne.

Antimicrobial activity for *C. acnes*

Bacteria strain	MIC (%)
<i>Cutibacterium acnes</i> JCM 6425	0.0008
<i>Cutibacterium acnes</i> JCM 6473	0.0004
<i>Cutibacterium acnes</i> ATCC 11827	0.0008

The test was performed according to the standard method of the Japanese Society of Chemotherapy. A two-fold serial dilution of PIONIN™ was made (range: 0.00001% to 0.005% for antimicrobial activity and 0.00005% to 0.0128% for anti-*C. acnes* activity) with broth. The culture broth containing PIONIN™ was inoculated with a specific amount of microorganisms. Growth of each microorganism was examined after incubation. The lowest concentration of PIONIN™ which inhibited microbial growth was considered the MIC.

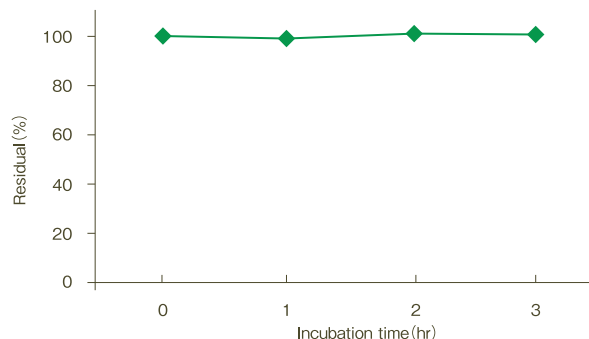


Property

1

Heat stability

PIONIN™ is heat-stable.



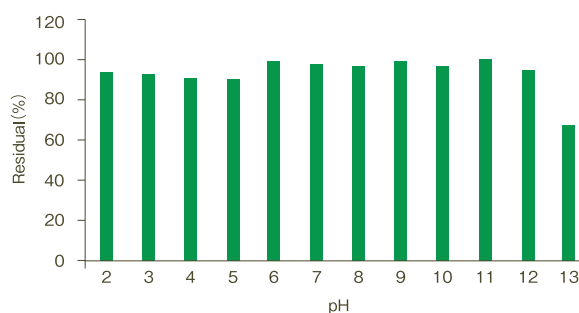
A lotion containing 0.005% (w/v) PIONIN™ was incubated at 85°C for 3 hours. The absorbance at 411nm of the lotion was measured hourly to calculate the residual % of PIONIN™.

Property

2

pH stability

PIONIN™ is stable over a wide range of pHs (pH2-12).



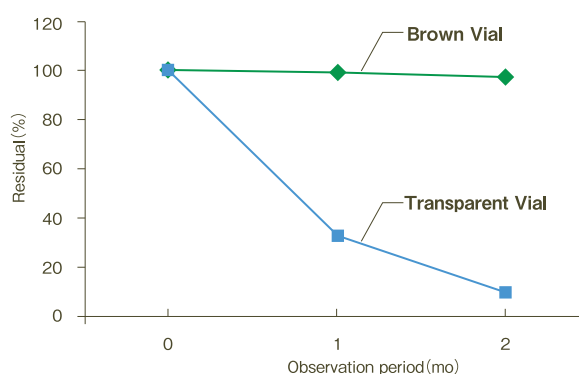
Solutions containing 0.001% (w/v) PIONIN™ with pH ranging from 2 to 13 were stored at 40°C for 6 months. Before and after storage the absorbance at 411nm of each solution was measured to calculate the residual % of PIONIN™.

Property

3

Photostability

PIONIN™ is stable when protected from light.



A lotion containing 0.002% (w/v) PIONIN™ was placed in brown and transparent vials, which were stored at room temperature for 2 months. The absorbance at 411nm of each lotion was measured monthly to calculate the residual % of PIONIN™.

[INFORMATION] INCI name : Quaternium-73

Tips for PIONIN™ formulation

- to enhance PIONIN™ in your formulation

PIONIN™ is effective at relatively low concentrations in cosmetic products. A 0.1% PIONIN™ solution prepared with ethanol, 1,3-butylene glycol or other appropriate solvents can be added to cosmetic formulations. In case PIONIN™ crystallizes in your formulation, solubilizers can be used. Lightproof containers should be used for stability.

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Please visit our website for further information.



Nagase Viita has received EcoVadis Platinum rating in sustainability for two consecutive years. EcoVadis is an independent institution that assesses sustainability of over 150,000 supplier companies operating in more than 185 countries across more than 250 industries. Platinum is the highest possible rating given by EcoVadis, awarded to companies whose overall score rank in the top 1% of all eligible companies.

PIONIN™ is manufactured by Nagase Viita Co., Ltd. in Japan

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