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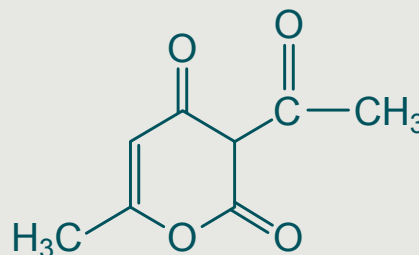
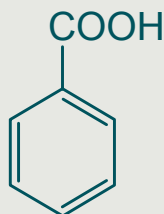
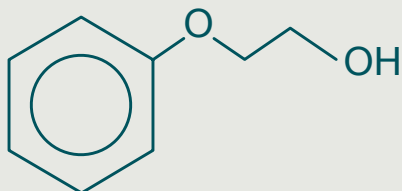
# Optiphen® ND

## Description

Optiphen® ND is a broad spectrum liquid preservative system that does not contain any halo-organic components, formaldehyde, or formaldehyde releasers and is paraben free. It is effective against Gram-positive and Gram-negative bacteria, yeast, and mold. Optiphen® ND, a globally approved system, was designed specifically for personal care formulations with a pH below 6.0 due to the inclusion of the organic acids.

## Chemistry

INCI name: Phenoxyethanol (and) Benzoic Acid (and) Dehydroacetic Acid



### CAS Numbers

|                    |          |
|--------------------|----------|
| Phenoxyethanol     | 122-99-6 |
| Benzoic Acid       | 65-85-0  |
| Dehydroacetic Acid | 520-45-6 |

### EINECS Numbers

|                    |           |
|--------------------|-----------|
| Phenoxyethanol     | 204-589-7 |
| Benzoic Acid       | 200-618-2 |
| Dehydroacetic Acid | 208-293-9 |

## Typical Properties

| Property           | Specification                 |
|--------------------|-------------------------------|
| Appearance         | Liquid                        |
| Color              | Colorless to light yellow     |
| Density            | 1.124-1.130 g/cm <sup>3</sup> |
| Phenoxyethanol     | 79.0-81.0%                    |
| Benzoic Acid       | 11.5-12.5%                    |
| Dehydroacetic Acid | 7.7-8.3%                      |

## Recommended Applications

Optiphen® ND can be used in a wide variety of personal care products with a pH not higher than 6.

Applications include:

### Rinse-off Products

Shampoos  
Shower Gels  
Body Washes  
Foam Baths

### Skin Care

Creams  
Lotions  
Emulsions  
Gels  
Wet Wipes

## Formulation Guidelines

- Recommended use level: 0.2-1.2%
- Can be added into any phase of the manufacturing process including the water phase of emulsions; tolerates temperatures up to 80°C
- In aqueous systems with low amounts of emulsifiers, intensive mixing is recommended to achieve uniform dispersal of the active ingredients
- May be de-activated by non-ionic surfactants and emulsifiers; as a result, these materials should be minimized or avoided

## Safety and Regulatory Profile

**Optiphen® ND** has an excellent safety and toxicological profile and is safe to use in a wide range of personal care applications.

**Optiphen® ND** is approved globally.

## Challenge Testing

The challenge test is a 28-day test used to verify the effectiveness of a preservative system in a finished personal care formulation. Selected personal care formulations were inoculated with microorganisms at the onset of testing (0 hours), then sampled for one month in seven day intervals. At 21 days the formulations were re-inoculated with the same microorganisms. Pass/fail criteria were based on modified CTFA\* protocol.

*\*Cosmetic, Toiletry and Fragrance Association*



### Facial care emulsion preserved with 1.2% Optiphen® ND

#### Inoculum Concentration (CFU/g)

| Test Organisms     | 0 hours             | 21 days             |
|--------------------|---------------------|---------------------|
| A. niger 16404     | 2.2x10 <sup>5</sup> | 1.8x10 <sup>5</sup> |
| B. cepacia 25416   | 3.0x10 <sup>6</sup> | 2.7x10 <sup>6</sup> |
| C. albicans 10231  | 2.8x10 <sup>6</sup> | 6.2x10 <sup>6</sup> |
| E. coli 8739       | 7.5x10 <sup>6</sup> | 9.1x10 <sup>6</sup> |
| P. aeruginosa 9027 | 6.2x10 <sup>6</sup> | 6.4x10 <sup>6</sup> |
| Staph. aureus 6538 | 2.1x10 <sup>6</sup> | 5.6x10 <sup>6</sup> |

#### Preservative Efficacy (CFU/g)

| Test Organisms         | 48 hours            | 7 days | 14 days | 21 days | 28 days |
|------------------------|---------------------|--------|---------|---------|---------|
| Aspergillus niger      | 2.7x10 <sup>4</sup> | <10    | <10     | <10     | <10     |
| Burkholderia cepacia   | <10                 | <10    | <10     | <10     | <10     |
| Candida albicans       | 5.4x10 <sup>5</sup> | <10    | <10     | <10     | <10     |
| Escherichia coli       | <10                 | <10    | <10     | <10     | <10     |
| Pseudomonas aeruginosa | <10                 | <10    | <10     | <10     | <10     |
| Staphylococcus aureus  | 1.7x10 <sup>3</sup> | <10    | <10     | <10     | <10     |

### Hand cream emulsion preserved with 1.2% Optiphen® ND

#### Inoculum Concentration (CFU/g)

| Test Organisms     | 0 hours             | 21 days             |
|--------------------|---------------------|---------------------|
| A. niger 16404     | 2.0x10 <sup>5</sup> | 6.0x10 <sup>6</sup> |
| B. cepacia 25416   | 2.4x10 <sup>6</sup> | 4.9x10 <sup>6</sup> |
| C. albicans 10231  | 2.3x10 <sup>6</sup> | 4.0x10 <sup>6</sup> |
| E. coli 8739       | 3.7x10 <sup>6</sup> | 1.1x10 <sup>7</sup> |
| P. aeruginosa 9027 | 1.8x10 <sup>6</sup> | 6.8x10 <sup>6</sup> |
| Staph. aureus 6538 | 1.9x10 <sup>6</sup> | 5.2x10 <sup>6</sup> |

#### Preservative Efficacy (CFU/g)

| Test Organisms         | 48 hours            | 7 days | 14 days | 21 days | 28 days |
|------------------------|---------------------|--------|---------|---------|---------|
| Aspergillus niger      | 1.3x10 <sup>4</sup> | <10    | <10     | <10     | <10     |
| Burkholderia cepacia   | <10                 | <10    | <10     | <10     | <10     |
| Candida albicans       | 2.1x10 <sup>4</sup> | <10    | <10     | <10     | <10     |
| Escherichia coli       | <10                 | <10    | <10     | <10     | <10     |
| Pseudomonas aeruginosa | <10                 | <10    | <10     | <10     | <10     |
| Staphylococcus aureus  | <10                 | <10    | <10     | <10     | <10     |

### Shower gel preserved with 1.2% Optiphen® ND

#### Inoculum Concentration (CFU/g)

| Test Organisms     | 0 hours             | 21 days             |
|--------------------|---------------------|---------------------|
| A. niger 16404     | 1.0x10 <sup>6</sup> | 2.4x10 <sup>6</sup> |
| B. cepacia 25416   | 2.9x10 <sup>6</sup> | 2.2x10 <sup>6</sup> |
| C. albicans 10231  | 4.9x10 <sup>6</sup> | 6.6x10 <sup>6</sup> |
| E. coli 8739       | 7.0x10 <sup>6</sup> | 5.6x10 <sup>6</sup> |
| P. aeruginosa 9027 | 4.1x10 <sup>6</sup> | 3.5x10 <sup>6</sup> |
| Staph. aureus 6538 | 1.1x10 <sup>6</sup> | 2.3x10 <sup>6</sup> |

#### Preservative Efficacy (CFU/g)

| Test Organisms         | 48 hours | 7 days | 14 days | 21 days | 28 days |
|------------------------|----------|--------|---------|---------|---------|
| Aspergillus niger      | <10      | <10    | <10     | <10     | <10     |
| Burkholderia cepacia   | <10      | <10    | <10     | <10     | <10     |
| Candida albicans       | <10      | <10    | <10     | <10     | <10     |
| Escherichia coli       | <10      | <10    | <10     | <10     | <10     |
| Pseudomonas aeruginosa | <10      | <10    | <10     | <10     | <10     |
| Staphylococcus aureus  | <10      | <10    | <10     | <10     | <10     |

### Moisturizing lotion preserved with 1.2% Optiphen® ND

#### Inoculum Concentration (CFU/g)

| Test Organisms     | 0 hours             | 21 days             |
|--------------------|---------------------|---------------------|
| A. niger 16404     | 4.0x10 <sup>5</sup> | 2.7x10 <sup>6</sup> |
| B. cepacia 25416   | 6.0x10 <sup>5</sup> | 1.2x10 <sup>6</sup> |
| C. albicans 10231  | 7.0x10 <sup>5</sup> | 6.4x10 <sup>6</sup> |
| E. coli 8739       | 2.5x10 <sup>6</sup> | 1.1x10 <sup>7</sup> |
| P. aeruginosa 9027 | 2.8x10 <sup>6</sup> | 2.0x10 <sup>6</sup> |
| Staph. aureus 6538 | 1.7x10 <sup>6</sup> | 1.0x10 <sup>6</sup> |

#### Preservative Efficacy (CFU/g)

| Test Organisms         | 48 hours             | 7 days | 14 days | 21 days | 28 days |
|------------------------|----------------------|--------|---------|---------|---------|
| Aspergillus niger      | >1.0x10 <sup>6</sup> | <10    | <10     | <10     | <10     |
| Burkholderia cepacia   | <10                  | <10    | <10     | <10     | <10     |
| Candida albicans       | 6.7x10 <sup>5</sup>  | <10    | <10     | <10     | <10     |
| Escherichia coli       | <10                  | <10    | <10     | <10     | <10     |
| Pseudomonas aeruginosa | <10                  | <10    | <10     | <10     | <10     |
| Staphylococcus aureus  | <10                  | <10    | <10     | <10     | <10     |



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