

**Avoid Laundry Detergent Allergies
Through
Biodegradable and Food Grade
Ingredients**

LIQUID LAUNDRY DETERGENT



Shepros Sdn. Bhd.

What is Laundry Detergent?

Laundry detergent is a substance that is a type of cleaning agent that is added for cleaning laundry. Detergent is similar to soap but is less affected by hard water. Most detergent is delivered in powdered form.

Modern detergent formulations generally contain several components. Three main ingredients approximately by weight are builders (50%), alkylbenzenesulfonate surfactant (15%), and bleaches (7%).

- **Builders**

Builders are water softeners. They are used as agents to remove calcium ions by complexation or precipitation. Typical builders are sodium carbonate, complexation agents, soap, and zeolites. They function by sequestering or precipitating the problematic ions. The most common builders is sodium triphosphate, which is used on very large scale for this application.

- **Bleach**

Bleaches are used to oxidize vegetable origin stains such as chlorophyll, anthocyanin dyes, tannins, humic acids, and carotenoid pigments. Typical oxidizers in laundry detergent are sodium perborate or sodium hypochlorite. Bleach activator such as tetraacetythylenediamine is also added to enhance the effectiveness of the bleaching agent.

- **Enzymes**

Many laundry detergents contain enzymes. The amounts of enzyme can be up to about 2% by weight of the product. These agents are required to degrade recalcitrant stains composed of proteins, fats, or carbohydrates. Each type of stain requires a different type of enzyme, i.e., protease for proteins, lipases for greases, and amylases for carbohydrates.

- **Other ingredients**

Many other chemical agents are also added for specific application, i.e., foaming agents, solvents, corrosion inhibitors, dye transfer inhibitors and anti-redeposition agents.

Optical brighteners, fabric softeners, perfumes and colorants are also added in the laundry detergent to improve its aesthetic properties.

Environmental Concerns

Detergents can have poisonous effects in all types of aquatic life if they are present in sufficient quantities, and this includes the biodegradable detergents. They are a lot of detergents which claim to be biodegradable; but it takes months to achieve the biodegradability.

Non biodegradable synthetic surfactant such as nonyl phenol (NPE) is a general group of synthetic surfactants in laundry detergent. This chemical biodegrades slowly and leaves trace amounts in the soil

and water. Researchers have found that NPE in water can cause feminization of male fish. It is also thought to increase the risk of breast cancer as it mimics female hormone activity in mammals.

Slow degrading detergents also have higher probability of destroying the external mucus layers and damage the gills which expose to the fish to bacteria and parasites attack. Besides that, it also kills fish eggs. Detergents also create problem for aquatic life by lowering the surface tension of the water. Organic chemicals such as pesticides and phenols are then much more easily absorbed by the fish. It causes fish to absorb double the amount of chemicals they would normally absorb, although that concentration itself is not high enough to affect fish directly.

Phosphates in detergents can lead to freshwater algal blooms that release toxins and deplete oxygen in waterways. The pollution of phosphates can generate algal blooms on the excess phosphorus and consumed most of the oxygen in the waters, killing fish and plants.



Pollution and environmental problems from synthetic detergents

Signs & Symptoms of Laundry Detergent Allergies

Laundry detergent is used in every household up to several times a week. Detergent packaging promises to make clothes cleaner, brighter and fresher but may not list everything it contains. This is because detergent companies are not required by law to reveal all ingredients.

However, many chemicals in household washing powders and liquids can cause allergies, asthma, skin and eye irritation and increase the risk for certain cancers. The perfumes and other chemicals used in laundry detergents can cause an allergic reaction in some people known as contact dermatitis. There are a few basic signs and symptoms of contact dermatitis.

- Rash

Contact dermatitis may cause a rash made up of tiny red bumps over any skin that has in come in contact with the clothing washed in the laundry detergent. From far away, the rash may look like one solid red area with the individual bumps only visible from close up.

- Discomfort

Contact dermatitis may cause moderate to severe itching in areas that have come in contact with fabrics washed in the laundry detergent. This may occur alongside with other symptoms.

- Patches

Another type of skin discoloration that may occur from an allergy to laundry detergent is dry red patches. These patches often resemble minor burns and are located in areas that have come in contact with the laundry soap through clothing.

- Blisters

Very severe cases of contact dermatitis caused by laundry detergents may result in large, fluid-filled blisters. These may be more common when the soap itself is touched rather than clothes that have been washed in the soap.

- Untreated Dermatitis

If the skin is repeatedly exposed to the irritant in the soap over an extended period of time, it may become thick and scaly. Long-term cases of untreated dermatitis may also cause hair loss in affected areas.



Symptoms of Laundry Detergent Allergies

Our Technology in Green Laundry Detergent

Nano Biotech Colloidal Micelles (NBCM)

SHEPROS combines the knowledge of nanotechnology and biotechnology in using the unique colloidal chemistry to generate a state of the art formulation that produces the innovative Nano Biotech Colloidal Micelles (NBCM). NBCM are mild but are amazingly powerful colloidal micelles made from non-toxic plant based extracts, plant derivatives and biodegradable surfactants.

NBCM are very fine molecules with spherical aggregate structure which remain in suspension indefinitely and are not affected by gravity when dispersed in a liquid colloid. It is surrounded by a cloud of tightly bound ions. The NBCM aggregates form in order to minimize the free energy of the solution. They are dynamic but equilibrium structures and able to rearrange in response to changing environmental conditions. They also undergo thermal fluctuations and Brownian motion. It works well with hard, soft, cold, hot, fresh and salt water.

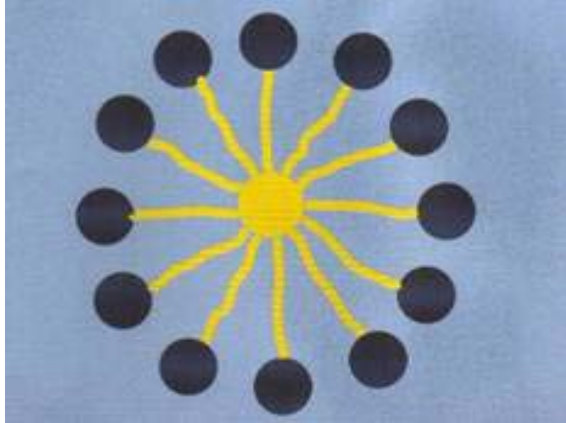


Illustration of Nano Biotech Colloidal Micelles.

The hydrophobic poles attract to each other forming interior micelles cluster and the hydrophilic poles form a powerful outer surface.

NBCM in colloidal chemistry can be explained as a sub-division of physical chemistry comprising of the phenomena characteristic of matter when one or more of its dimension lie in the range between 1 nanometer and 100 nanometer. In this nature of science, the dimension of NBCM is more important than the nature of the material. In the size range of nanometer, the surface area of NBCM is much greater than its volume that unusual phenomena of colloidal micelles will occur as following:

- a. They do not settle out of the suspension of gravity.
- b. They will be small enough to pass through the unreachable exterior areas of the plants.
- c. They will move in at least one dimension randomly.
- d. They will have tremendous wetting capacity.
- e. They will reduce the surface tension in water or water solutions.
- f. They have the velocity that will move endlessly without stopping.
- g. They will have sterilizing effect by disrupting the DNA or RNA of the virus, prokaryotic cell of bacteria, and eukaryotic cell of algae, protozoa and fungi.

How do NBCM destroy bacteria?

A cell wall protects bacteria cell from the effects of osmotic pressure. NBCM destroy the peptidoglycan layer of the bacteria cell walls, but not to human beings and animals which do not have cell wall. In the absence of unstable formed peptidoglycan, growing bacteria cells will be weakened and destroyed through the following exposures:

1. Inhibition of cell wall synthesis

Generally, a bacterium is in a hypotonic solution and water tries to move in to the bacterium from a higher water concentration to the lower water concentration. When the cells are less resistant to the effect of osmotic pressure; the underlying cytoplasmic membrane bulges through the weakened portions of cell wall as water moves into the cell, and eventually the cell lyses.

2. Inhibition of metabolic pathways

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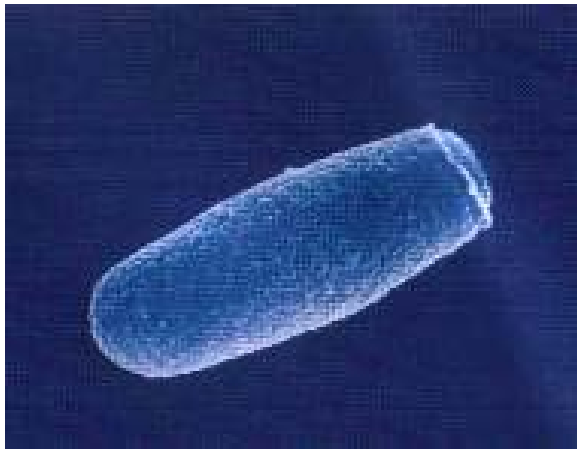
3. Inhibition of metabolic pathways

A damaged cell wall will affect all the chemical reactions in metabolism of the bacterium. The unstable metabolic pathways will result in unstable enzyme activity, temperature and pH in the cell.

3. Disruption of cytoplasmic membranes

The disruption of cytoplasmic membranes will severely damage the cytoplasm which is composed with primary 90% of water and proteins. The contents of cytoplasm such as nucleoid and ribosomes will be destroyed.

NBCM Aspects of Disinfectants in Bacteria



A scanning electron micrograph of bacteria cell before the inhibition of cell wall synthesis; inhibition of protein synthesis; and disruption of cytoplasmic membrane.



A scanning electron micrograph of bacteria cell bursts from osmotic pressure due to the integrity of peptidoglycan is not maintained. This is due to the inhibition of cell wall synthesis; inhibition of protein synthesis; and disruption of cytoplasmic membrane.

How do NBCM work in Cleaning and Degreasing?

NBCM cleaning are different from traditional cleaning technology which use the molecular attraction of cationic (positive ions) and anionic (negative ions). NBCM do not have any ionic groups and do not react with hard water ions. They have hydrophilic poles and hydrophobic poles. In a colloidal solution, if the amount of NBCM is increased, there will come to a point where they can no longer accumulate at the surface. The NBCM molecules will find other ways of shielding their hydrophobic tails from water. The NBCM molecules will aggregate into a cluster in which the tails point inwards. The head groups will form a water soluble shell in the outer surface.

When NBCM are in contact with oil (hydrocarbon) molecules, the center of NBCM bonds to a similar hydrophobic oil (hydrocarbon). They surround and separate (emulsify) oil (hydrocarbon) molecules from each other and/or the surface to which they cling. Once the oil (hydrocarbon) is surrounded and separated through the disruption in the attraction to the other oil (hydrocarbon) molecules and/or to the surface, the oil (hydrocarbon) can be uplifted from the surface and rinsed or wiped away easily.

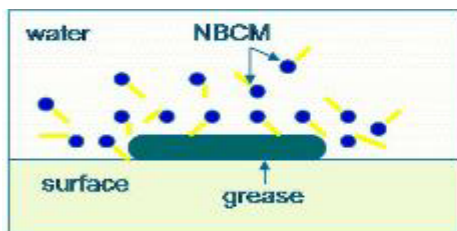


Figure 1.
NBCM attack the particle of grease.

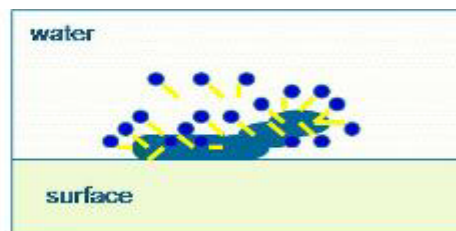


Figure 2.
NBCM surround the particle of grease.

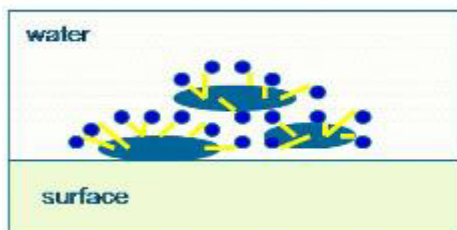


Figure 3.
NBCM break the particle of grease.

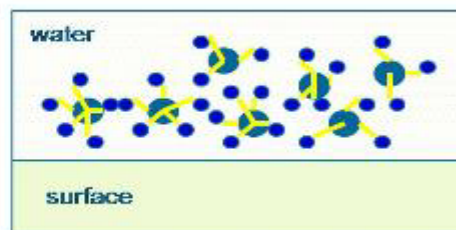


Figure 4.
The particles of grease come off to the surface & remain suspended in the water.



Liquid Laundry Detergent

Product Description

SHE Liquid Laundry Detergent can serve as an excellent alternative of synthetic laundry detergents. It is specially formulated with ingredients which are non-toxic, food grade, low foaming, non-skin irritating, biodegradable and environmental friendly. It is made of powerful Nano Biotech Colloidal Micelles (NBCM) of *Nano Alpha 10* which is formulated using natural plant extracts and plant derivatives. NBCM has the power and capacity to break down almost all types of oils. It also offers disinfecting and sanitizing capabilities through NBCM's antimicrobial properties.

The formulation of SHE Liquid Laundry Detergent does not use the normal ingredients of synthetic laundry detergent such as builders, enzyme, bleach, foaming agents, solvents, corrosion inhibitors, dye transfer inhibitors, optical brighteners, perfumes, colorants and anti-redeposition agents.

SHE Liquid Laundry Detergent also does not contain petroleum distillates, soaps, chemical thickening agent, nitrate, phosphate, alcohol, animal fatty acid, hydrocarbon toxic solvent, non-biodegradable surfactants and ozone depleting substances.



Application

SHE Liquid Laundry Detergent effectively removes the toughest stain such as rust, oil and grease from all types of washable fabrics without damaging the fibers of the fabrics. It is safe for colorfast washables.

Directions

Machine Wash: Add 18mL to 54 mL (1 to 3 cap – depending on the laundry load) of Liquid Laundry Detergent before or when the wash cycle has begun.

Hand Wash: Add 18 mL (1 cap) of Liquid Laundry Detergent to $\frac{3}{4}$ pail (approximately 10 liters) of water. Soak for five minutes. Wash and rinse.

Stubborn Stains: Soak garments for 5 minutes in solution of 9 mL (1/2 cap) of Liquid Laundry Detergent to 2 liters of water. Rinse and wash.

Acute Toxicity Test of Nano Alpha 10

Test Method: OECD Guideline for Testing of Chemicals Method 203 Fish

Result: Not hazardous to the aquatic environment.



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RESULTS SUMMARY

Company Name : Shemical International Sdn Bhd

Address : Lot 109A, Jalan Gebeng 1/6,
Kaw. Perindustrian Gebeng
26080 Kuantan, Pahang
(Attn : Mr. Ng)

Request : 96-hour Fish (Tilapia), Acute Toxicity Test of Nano Alpha 10

Your Ref No.	
SIRIM Ref. No.	237/16/712
Job No.	J026/08
Report No.	R054/08
Date of Issue	17/03/08
No. of pages	11

SAMPLE DESCRIPTION

One liquid sample coded as "Nano Alpha 10" was received on 01 Feb 2008.

TEST METHOD

(1) *Fish acute toxicity test according to OECD Guidelines for Testing of Chemicals - Method 203 Fish, Acute Toxicity Test

RESULT:

Sample Code	Appearance	LC ₅₀ (96 hour) (v/v)
Nano Alpha 10	Brownish	880 mg/L (0.088%)

Note: Refer to Appendix A – R054-1/08 for details.

INFERENCE

The classification system for substances hazardous to the aquatic environment according to The Globally Harmonised System (GHS) of Classification and Labeling of Chemicals (2005) is shown below.

Toxicity Category (Acute toxicity for 96 hr LC ₅₀ for crustacea)	Classification Limit
Acute I	≤ 1 mg/l
Acute II	> 1 - ≤ 10 mg/l
Acute III	> 10 - ≤ 100 mg/l

Based on the criteria for the harmonized classification system for substances, the "Alpha Nano 10" is classified as "Not hazardous to the aquatic environment" as the LC₅₀ value is above 100 mg/l.

(The inferences expressed herein are outside the scope of accreditation)

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The results contained in this report relate only to samples /items received and analysed by SIRIM Environment and Bioprocess Technology Centre. This report shall not be reproduced in any form without the written approval of SIRIM Berhad.



Biodegradability Test of Nano Alpha 10

Test Method: Reference to International Standard ISO 10707:1994(E)

Result: Reach 96% of degradation at day 28 and it is readily biodegradable.

TEST REPORT: S08CHM01431-01-THY-CORR02
19 MAR 2008

Date: 19 MAR 2008 Tel: +65 68851291 Fax: +65 67784301
Client's Ref: CM-0108-107Rev2 Email: Huayi.CHEN@tuv-sud-psb.sg

Note: This report is issued subject to TÜV SÜD PSB's "Terms and Conditions Governing Technical Services".
The terms and conditions governing the issue of this report are set out as attached within this report.

SUBJECT
Analysis of SHEMICAL NANO ALPHA 10

CLIENT
SHEMICAL INTERNATIONAL Sdn Bhd
C/o East Coast Technology Park
Lot 109A, Jin Gebeng 1/B
Kawasan Perindustrian Gebeng
26080 Kuantan,
Pahang Darul Makmur
Malaysia

Attn: Ng Kee Wee

SAMPLE SUBMISSION DATE
31 Jan 2008

DESCRIPTION OF SAMPLE
One sample of SHEMICAL Solution was received.
1) SHEMICAL Nano Alpha 10

METHOD OF TEST
1) Reference to International Standard ISO 10707:1994(E)
Evaluation in an aqueous medium of the "ultimate" aerobic biodegradability of organic compounds – Method by analysis of Biochemical Oxygen Demand (Closed bottle test).

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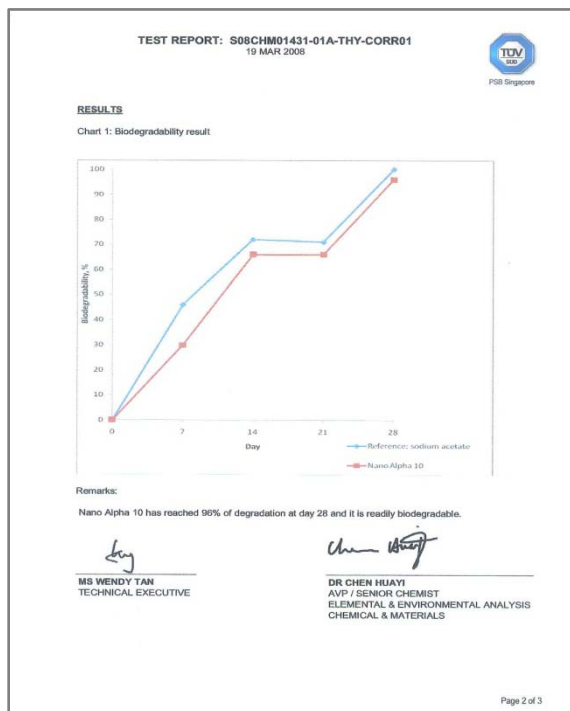
TEST REPORT: S08CHM01431-01A-THY-CORR01
19 MAR 2008

This Report is issued under the following conditions:

1. Results of the biodegradability in the form of a report will be issued immediately after the service has been completed or terminated.
2. Unless otherwise requested, a report shall contain only technical results. Analysis and interpretation of the results and professional opinion and recommendations expressed thereupon, if required, shall be clearly indicated and additional fee paid for, by the Client.
3. This report applies to the sample of the specific production/shipment given at the time of its biodegradability. The results are not used to indicate or imply that they are applicable to other similar items. In addition, such results must not be used to indicate or imply that TÜV SÜD PSB approves, recommends or endorses the manufacture, supplier or user of such production/shipment, or that TÜV SÜD PSB in any way "guarantees" the later performance of the production/shipment.
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January 2008

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International Standard ISO 10707:1994(E)

Evaluation in an aqueous medium of the
“ultimate” aerobic biodegradability

of organic compounds –

Method by analysis of

Biochemical Oxygen Demand

(Closed bottle test)



Optical microscopy image of nano and micro emulsions of oil and NBCM cleaner after rinsing with water.

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