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Cleaner. Greener. Smarter.

BIO FORMULATION SOLUTIONS

Product Data Sheet and Formulation guidelines for MCES 50 NF- 10x, 20x, 50x and 100x Non-formulated spore concentrates

MCES offers a comprehensive series of liquid bacterial concentrates that are designed for the onward manufacture of bio enzyme products offering a high bacterial specification, multi-strain, and spore based product for use in the degradation of organic waste and maintenance applications.

Overview

MCES introduces a series of high bacterial specification, multi-strain, spore based concentrate formulas for onward manufacture of products specifically for the degradation of organic waste, hard surface cleaning agents, grease traps, and drain line maintenance.
Blockages caused by the build-up of grease in drains causes disruption to normal organisational operations as well as creating malodours and even pest issues.
The installation of grease traps are seen as a highly effective way to prevent these situations occurring and grease traps have become an important part of the effective operation of many businesses and organisations.
For grease traps to work effectively they require biological products to operate alongside the physical elements of their design.
The cleaning of hard surfaces soiled with organics is problematic without the addition of biologicals to the surfactant based cleaning product is beneficial in the degradation of such organics

Product Applications

A specifically targeted product for:

- Greasetraps
- Heavy duty drain line maintenance
- Waste water - fats, oilsand greases
- Hard surfaces and all-purpose cleaners
- Odour control

Technical features of MCES 50 NF concentrates series

Use to manufacture an 'environmentally responsible' yet highly effective range of products that are based on bio-enzymes as opposed to chemical action

- Non-caustic and non-corrosive
- MCES 50 NF is complimented by its principle in' quality controlled manufacturing process which ensures high degree of product purity
- Very high bacteria specification for maximum effectiveness in this tough environment
- Specifically selected highly effective bacteria multi-strain formula for:

Production of lipase to cleave fats
Production of other extracellular enzymes to degrade food solids and sludge
Ability to survive in the low pH environment of an active grease trap and drain line

- Product contains Bacillus bacteria in 100% spore form for:

Extended product life
Product stability
Maintenance of original product specification

- Non-formulated to enable manufacture of custom products
- Product offers maximum compatibility with a wide range of common ingredients e.g. surfactants, dyes and fragrances to enable manufacture of custom products

Product format

There are a range of product options available to suit a formulators needs:

Concentrate	Dilution	Bacteria count before dilution
MCES 50 NF 10X	10:1 or 10%	2.0×10^8 /ml
MCES 50 NF 20X	19:1 or 5%	4.0×10^9 /ml
MCES 50 NF 50X	49:1 or 2%	1.0×10^{10} /ml

Final products will deliver a count of greater than 2×10^8 bacterial spores per ml following dilution of the concentrate according to instructions.

Advantages of MCES 50 NF concentrate series:

- Most formulators have the capability to produce liquid products. These products allow formulators to have a presence in the lucrative bio enzyme product market without extensive specialist knowledge

The most common ‘bio’ products in the industrial, institutional and consumer market are liquids - our concentrates series are designed specifically for this use

- Simple format that is easily dilutable in soft water
- Concentrates are easy to handle and store
- Simple dilution format for easy calculation in formulation
- Advantages of biological degraders
- Highly effective and proven natural technology
- Reduces the requirement and frequency of mechanical treatment to unblock drains due to grease build-up or degradade organics built up on hard surfaces
- Highly effective odour control
- Product can be sold to service companies, be retailed as part of their regular maintenance service programs
- Oils, fats and grease is partially degraded by the time it reaches treatment plants, reducing system overload
- Dirt, grime and organics are degradaded on hard surfaces and in nooks and crannies or hard to reach areas

Technical specification of MCES 50 NF concentrate series.

enzyme production	• protease • esterase • cellulase • lipase • amylase • urease • xylanase
bacteria	specifically selected bacillus spore blend
typical properties	appearance - straw coloured fragrance - neutral form - liquid shelf life - 24 months (in un-opened container) pH - 7.5–8.5 (10X) 7.0-8.0 (20X) 7.5-8.5 (50X) 8.0-9.0 (100X)
performance properties	effective pH range - 5.0 - 10.0 temperature range 5 to 50°C
packaging	25 litre containers

MCES 50 NF is also available in RTU (Ready to USE) format.

General formulation guidelines with MCES Probiotics 10 X, 20 X, 50 X, 100 X:
Mix the non-formulated microbial spore product in its original container for a minimum of 30 minutes with an appropriately sized mixer. Ensure that mixer blades are close to the bottom of the container. Spores are biological materials and their colour may vary slightly from batch to batch. The presence of spores in the final formulated product should simply make the product homogeneously slightly turbid to turbid. Note that spores settle over time, depending on the viscosity of the final formulated product.

We recommend:
Starting with a clean mixing tank, free of all sanitisers or disinfectants from cleaning or that of a previous product
Formulating by using the weight of all components where possible
Formulating with soft or DI water (tap water is not recommended, but may be acceptable)
Maintaining pH between 5 to 9.5
Mixing all ingredients thoroughly and adjusting pH before adding microbial spores and re-adjusting pH after microbe addition if necessary
Microbial spore counts are made on the final formulated product to ensure that it contains the desired count

Surfactant recommendations:
Anionic surfactants, non-ionic surfactants, and blends of these two surfactants are generally acceptable for use in spore-containing formulations
Mix all surfactants thoroughly before use
Do not use cationic surfactants as these may cause spore instability and spore clumping
The total surfactant content (anionic surfactant and non-ionic surfactant) may be up to approximately 15%
It is important to use same grade water (soft, DI or tap) in formulation development as you will use in the full-scale process

Preservatives:
The MCES 50 NF non-formulated spore concentrates generally contain enough preservatives to preserve an end-use formulation when correctly diluted.
A preservative efficacy study should be completed
Do not use reactive preservatives such as glutaraldehyde as these may kill spores and/or prevent germination
Do not use any preservatives known to function by generating or releasing formaldehyde or that may be sporicidal
In the US, preservatives can only be used if they have been registered and approved for the particular end use by the USEPA
Consult the preservative label or manufacturer for approved usage
Any conditions or restrictions specified in the authorisation and on the preservative label shall be followed and respected by the user
Please follow regional and national laws
Do not formulate with chlorine, peroxide or peroxygen compounds

Dyes, fragrances and builders:
Dyes and fragrance may be added if stable in the formulation as these generally do not impact spore stability
Fragrance must be added with caution as it can cause phase instability with the surfactant system (a surfactant system that may be stable with one fragrance may be completely unstable with a different fragrance)
Phase stability testing must be performed each time the fragrance or the amount of fragrance is changed
Inorganic builders may be used but avoid high concentrations of divalent cations
Inorganic builders can cause phase stability issues with the surfactant system, and testing the phase stability of the entire formulation without spores is recommended

Order of addition:
Charge the mixing tank with the appropriate amount of water and begin mixing
Two critical factors that insure a good formulation are adequate mixing and tight control of the amount (preferably weight) of ingredients added
Surfactants are generally added after the water and before the other ingredients
The exact order of addition of surfactants depends on the individual formulation and must be determined during formulation development
Check and adjust pH at various points during the formulation, points to be determined during formulation development
Caustic soda (40%) and phosphoric acid are generally used, although other acids may be used with proper safety precautions
Organic acids may be used, but may place additional burden on the preservative system
Add builders or other organic or inorganic materials and check/adjust pH as necessary
Add any dyes or colorants
Fragrances should be added as the next-to-last ingredient (before spores) resulting in a completely homogeneous formulation
Ensure adequate mixing; check/adjust pH as necessary
Spores should be added as the last ingredient in the formulation
Allow adequate mixing time before sampling for QC
Make sure the sampling port has been flushed so a representative sample of the formulation is obtained

Stability test recommendations:
For new formulations, we recommend that the surfactant system be tested for phase stability from 5 ° to 45 °C, as well as freeze/thaw
This testing should be done without spores, dyes, or pacifiers as these materials can potentially mask any phase instability of the surfactant system
This testing can be done when choosing the surfactant system, when the entire formulation (surfactant system, fragrance, and inorganic builders) has been developed, or both
Microbial spore count stabilities have to be conducted on the final formulated product to ensure that it contains the desired count and that this count is stable in time (not affected by any parameter of the formulation)
We recommend testing at room temperature and at least 35 °C

Physical and spore stabilities should be repeated in case of fragrance addition or change (concentration or supplier) as a different fragrance may affect physical and microbial stability)
Inorganic builders can cause phase stability issues with the surfactant system so phase stabilities have to be conducted in the case of addition or change of such compounds

Materials	Microorganisms
Water	Soft, DI or tap water
Anionic surfactants	In general, good compatibility with anionic surfactants. Blends with non-ionic are generally acceptable.
Non-ionic surfactants	In general, good compatibility with non-ionic surfactants. Blend with anionic are generally acceptable.
Cationic surfactants	**To be avoided as these may cause spore instability. Quaternary amine type compounds are not recommended.**
Coupling agents/hydrotrope	MPG best. In general, good compatibility with hydrotrope agents. Buffers Keep pH between 5 to 9.5 for optimal stability in liquids.
Builders	Inorganic builders may be used. Avoid high concentrations of divalent cations. Keep pH at 5 – 9.5 for optimal stability.
Preservatives	Green Worx CS non-formulated spore concentrates generally contain enough preservatives to preserve an end-use formulation when correctly diluted (check the PDS for formulation recommendations) **Do not use reactive preservatives such as glutaraldehyde as these may kill spores and/or prevent germination** **Do not use any preservative known to function by generating or releasing formaldehyde or that may be sporicidal**
Oxidisers	**Do not formulate with percarbonate, perborate, peroxide or peroxygen compounds. Avoid chlorine, bleaches.**
Thickener	In general, good compatibility with thickening agents. Cellulose based thickeners have to be avoided.
Dyes	In general, good compatibility with dyes, they do not impact spore stability.
Perfumes	Due to the complex mix of perfumes, check the compatibility with micro-organisms through stability test in time.

Blended and supplied by Managed Care Eco Solutions
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