

THE ADVANTAGES OF GEL CLEANING

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Animal houses, and particularly milking parlours, should be kept as clean as possible. Those places are vital parts of the food production chain. National standards and E.U. regulations attach more and more importance to milk production in clean circumstances.

Disinfection without real cleaning is not effective. It's impossible to disinfect manure nor biofilms. You first have to remove the manure and biofilms (in which micro organisms thrive) , to get the surface as free of organics as possible , so the disinfectant can reach the surface.

Cleaning is the management of **dirt** that can be seen *partially* : to **separate** and **remove** this dirt from a surface, through **water** and a **detergent**.

This dirt will be a mix of

- heavy loads of excrements
- dust particles
- scale and urine stone
- attached organic layers, also known as “*biofilms*”, rather invisible.

It's easy to “scoop away” the manure.

The dust can be blown, but it will re-adhere elsewhere.

For breaking up the organic biofilms (in which bugs live) , a chemical action will be required.

Let's zoom in the latter.

What should detergents do ?

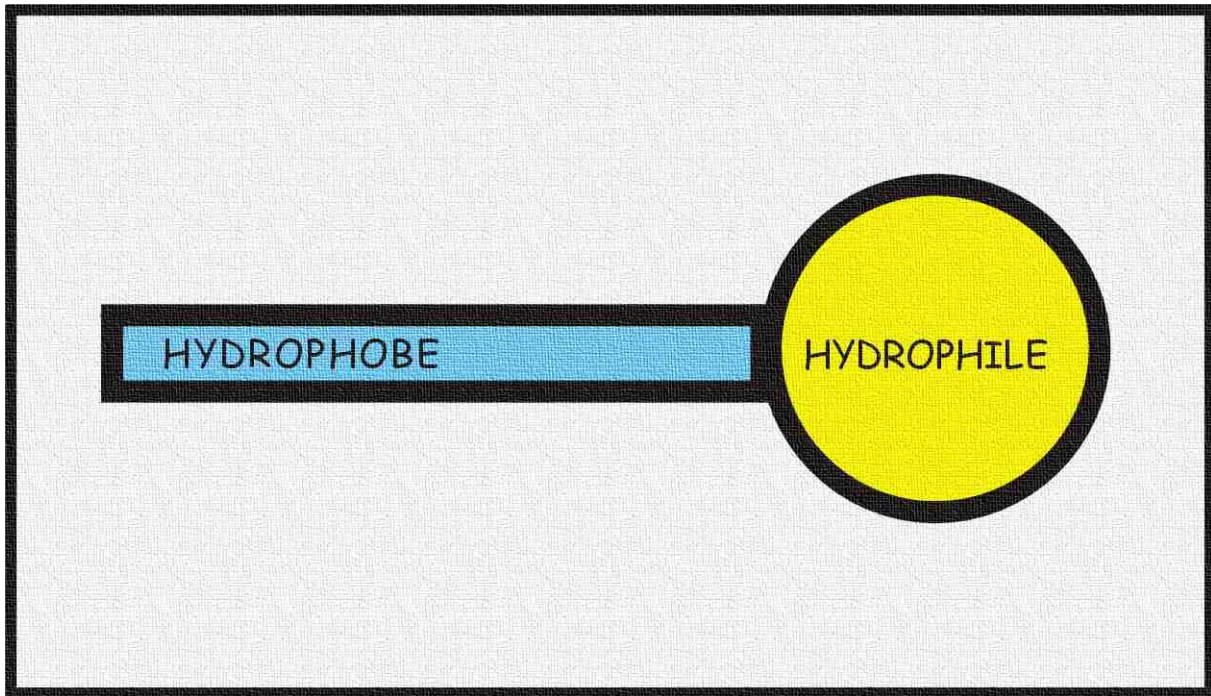
The characteristics of a detergent are explained in table 1 :

Table 2 : CHARACTERISTICS OF DETERGENTS :

- Wetting : decrease *surface tension*
- Dispersing : split up dirt particles
- Emulsifying : *float* oil and fat
- Suspending : *float* dirt particles
- Carrying : of dirt to the sewage
- Sequestering : dissolve salts (in case of hard water)

How do they do this ?

Figure 1 : surfactants



The functions described above are achieved by the “surfactants” in the detergent. Surfactants or “tensio-actives” decrease the surface tension of the dirt. The lower this surface tension, the easier it is to remove the dirt.

The molecule of a surfactant (also called “wetting agent”) is composed by two parts : a soluble head (hydrophilic) and a non soluble tail (hydrophobic).

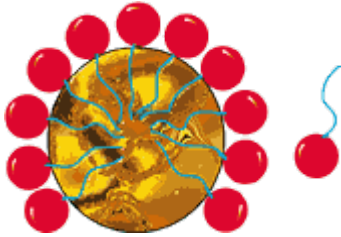
The tails will form a network of “threads”, called “micelles” to contain the fatty particles from inside and will finally encapsulate them by attaching themselves to it.

Basically, those steps are :

- formation of a group of surfactant molecules (micelles)
- the hydrophobic (water non soluble) tails are attracted to each other
- the hydrophilic heads integrate in the water solution
- the integrated micelle is ready to search for dirt particles
- in contact with dirt, the micelle ‘s tails orient themselves to the dirt particles
- the hydrophilic tails drag the dirt inside themselves

The “binded” dirt will act as an emulsion when agitated (at the rinsing).

Figure 2 : surfactants binding dirt



What determines the functioning of detergents ? .

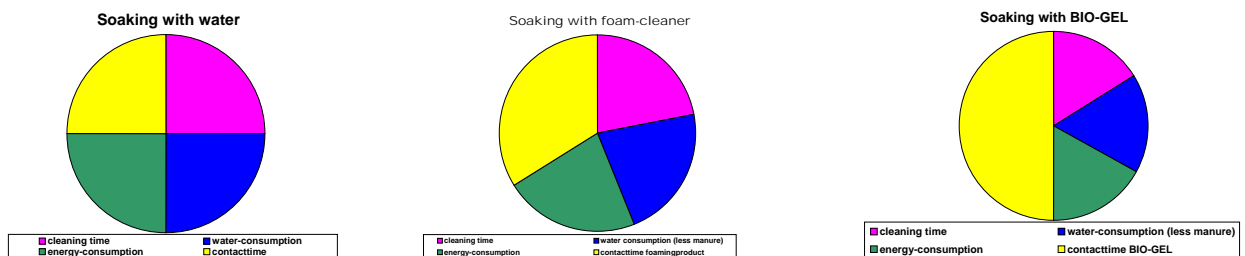
Four factors will determine the functioning of a detergent :

1. Chemical energy : pH and concentration. (Alkaline [pH > 8] detergents remove proteins and fat; acid [pH < 6] detergents remove mineral deposits like scale and urine stone)
2. Thermal energy (fat starts to dissolve as from 35 ° C or 95 ° F)
3. Physical energy (eg. a high pressure washer)
4. CONTACTTIME : this will enable the chemical energy to do it’s job. Moreover, it’s the only factor that does not cost any energy, its *Free Of Charge !*

Therefore, often FOAM is used in stead of a “classical detergent”, since it adheres longer. But today, a new generation of cleaners has been developed in the form of GEL (BIOGEL™). As gel hardly dries , it keeps on “doing the chemical action” . A foam may dry up and leave a residual film, more difficult to remove (requiring more water and high pressure to rinse off).

Increasing the contact time will allow to save on water consumption, labour (no more “*elbow grease*” needed) and energy, as shown in fig. 3 :

Fig 3 : contact time increased with foam and gel



Ideally, 40 bars (500 psi) pressure and a foam lance is required for application. BIOGEL™ doesn’t require hot water , if even forms a better gel in cold water, saving a lot of energy.

Doing a better , more efficient cleaning job will “*rejuvenate*” the equipment and will allow for a healthier production environment.