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DETERGENTS FOR THE DAIRY FARM

Detergents have an important place in maintaining dairy hygiene—but they must be properly used if they are to be really effective. In this article Dairy Instructor H. Maslin, M.D.D., describes the qualities of a good dairy detergent and explains how it should be fitted into the regular cleaning routine.

CLEANLINESS in both the physical and bacteriological sense is essential to the production of high quality dairy products, and high quality in these products is essential to both the health of the community and the successful and economic operation of the industry.

The prime object of using detergents in the dairy is to remove milk residues and other material which can provide food for bacterial growth.

Except in the case of certain detergents which are strongly alkaline and can be used at a high temperature, little actual killing of organisms is done by detergents. Their action is largely one of providing a physically clean surface which is an unsatisfactory environment for micro-organisms, and removing from this surface the bacteria-laden deposits.

In many cases the cleaning by detergents is followed by sterilisation either by steam or chlorine, the latter usually in the form of sodium hypochlorite solution.

In no case must the sterilising procedure be regarded as modifying or superseding the detergency treatment. Without the proper use of detergents the food-rich environment will persist after this treatment and afford a good breeding ground for new colonies of organisms.

The nature and condition of the deposit or soil, and the composition and condition of the surface, are both important factors in detergency.

The nature of the surface is important for two reasons:

- The surface material may impose limitations on the kind of detergent used. For example, aluminium requires a detergent which does not

contain alkalis, as these will rapidly cause corrosion, while stainless steel can be cleaned with the most powerful detergents.

- The physical condition of the surface—whether polished, smooth or rough—will determine to some extent the degree of adhesion of the deposit, and therefore the degree to which bacterial infection will survive after the cleaning process.

Hard, polished surfaces are ideal for the dairy; glass is probably the most satisfactory, but obvious limitations prevent its use except in a few places.

Care must be taken with any abrasive cleaning materials, as the scratching of metal surfaces is likely to encourage bacterial growth. In fact, the use of abrasives should be restricted to the absolute minimum.

THE CLEANING ROUTINE

The sequence of cleaning and sterilising operations in the dairy industry can, in general, be reduced to a basic routine of four steps:

1. Rinse with cold water or preferably lukewarm (not hot) water to remove all loose material and some of the butterfat, which may be partly liquefied by warm water.

2. Wash with hot cleaning or detergent solutions—by soaking, swilling, swabbing, brushing or jetting.

3. Rinse thoroughly, preferably with hot water. Inspection after this step should reveal a clean, bright surface.

4. A final sterilising operation is necessary for all equipment and utensils, using steam, boiling water or chlorine.

This general routine should be followed for all dairy cleaning, with some additions and variations for specific tasks which will be dealt with later.

Note that the efficiency of the second step depends on the temperature of the solution and the time and method of its application, but mostly on the nature and concentration of the detergent selected.

Modern dairying detergents are based on the following alkalis and salts: caustic soda, sodium metasilicate, sodium orthosilicate (and sometimes the more silicious silicates, e.g. water glass) sodium carbonate, trisodium phosphate, tetra-sodium pyrophosphate, sodium hexametaphosphate, soaps, and organic wetting agents.

Sometimes the crude alkali is used alone with no other ingredients, but research has shown that detergents for various purposes require special products which are not to be found in any one substance.

Manufacturers who cater for the dairy industry have produced balanced detergents which incorporate properties essential for dairying use. These include saponification or hydrosis of milk fats and proteins, emulsification and deflocculation, wetting, rinsibility, buffering, and sterilising power.

REQUIREMENTS OF A DETERGENT

A detergent or cleaning solution is characterised by the following requirements:

(a) It must be capable of wetting the soiling matter and removing it from the surface to be cleaned.

(b) It must be capable of dispersing the soiling matter after removal from the surface, in the solution itself.

(c) It must be capable of retaining the soiling matter in suspension during the

washing operation and the subsequent rinsing.

(d) It must be of such a nature that it can be easily and completely rinsed from the equipment.

(e) It must not corrode or otherwise adversely affect the material in the equipment being cleaned.

(f) It must not be too expensive.

(g) The detergent material used to prepare the solution must be capable of softening the water in areas where only hard water is available.

When it is considered that both the soiling matter and materials of construction vary over quite a range it will be seen that the perfect detergent solution has to comply with quite a diversity of requirements.

As yet, no one chemical is known which is suitable under all circumstances, but as we will see later, it is usually possible to select a mixture of alkalis, acids or auxiliary chemicals which will satisfactorily cope with the normal combinations of circumstances which occur.

It will be found that after draining the detergent solution from the equipment there will remain a surface film of the solution together with dispersed soiling matter, and it is necessary to rinse the solution away with warm water. If this step is omitted some of the soiling matter, as well as some of the detergent material itself, is left in the equipment and the subsequent sterilising operation loses a great deal of its effectiveness. Warm or hot water is better than cold as it helps to keep the remaining soiling matter in suspension and thus to remove it from the equipment.

Caustic Soda:

In the past, caustic soda was the substance recommended for cleaning milking equipment, and the results obtained were, in most respects, satisfactory.

However, it was recognized that caustic soda was not the ideal cleaning compound. Not the least important of its disadvantages was the relative danger and inconvenience of its handling. Many farmers suffered from a dermatitis condition after using caustic soda to wash equipment.

Further disadvantages of caustic soda are its poor wetting and penetrating power and its poor rinsing properties. These characteristics make it a relatively inefficient cleaner of metal surfaces. Although, at the strengths used in milking machine cleaning, a caustic soda solution can dissolve some casein, it is unable to remove more than a small percentage of the fat absorbed by rubberware.

THE IDEAL CLEANER

The demands made on a milking machine cleaner are such that no single substance can fulfil all of them adequately. The ideal cleaner must be a mixture of various compounds, each one of which adds some desired property to the final mixture.

A suitable mixture of alkalis, wetting agents and dispersing agents must be used to remove milk fats and proteins, but such a mixture will not always prevent or remove a milkstone deposit derived from the minerals of milk and hard wash waters.

Milkstone:

To remove the mineral portion of milkstone, the milking machine must be treated periodically with an acid cleaner.

This treatment must be independent of the alkali treatment, as alkalis and acids neutralize one another and cannot be used in the same solution.

Needless to say, the acid cleaner should be non-corrosive at the strengths employed, and should be used as a preventive rather than as a cure. If strong deposits of milkstone are allowed to form before the acid cleaner is used, removal will then be more difficult.

Suitable alkaline cleaners and non-corrosive acid cleaners are available for cleaning of dairy equipment.

CHOICE OF DETERGENT

Choice of the best detergent to use on any farm depends on the quality of the cleaning water available. The presence of various mineral salts in difficult samples of hard water greatly complicates the situation and makes choice of an efficient detergent much more difficult.

It is strongly recommended that every farmer should try to have a rainwater supply of at least 6,000 gallons reserved for cleaning purposes each year. This allows standardisation of the detergent to be used and ensures successful cleaning if the recommended routine is followed.

EXPORT LAMB COMPETITION

The Royal Agricultural Society is again conducting an Export Lamb Competition, in conjunction with the Australian Meat Board.

R.A.S. Secretary J. B. Marshall has announced some variations this year which aim to make the competition more equitable to growers in the different districts.

The main variation was that there would be two divisions, one for lambs delivered to the killing works between July 1 and September 30 and the other for lambs delivered to the works between October 1 and December 31.

Similar classes to previous competitions had been provided in each division with prize money offered in each class.

There would be no champion or State-wide awards, and no judging in London. Lambs would, however, be sent to London for display purposes.

Pamphlets giving full particulars will be available shortly, and interested growers should apply early for copies.