NEW GERM KILLERS FOR THE DAIRY INDUSTRY

Their Possibilities and Limitations

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A germicide kills germs. For several years chemical germicides have had important uses as germ killers on the dairy farm, in milk processing and milk products manufacturing plants. As a satisfactory germicide for these uses the chemicals should, (1) be good germ killers in dilute solutions; (2) be harmless to the skin or other living tissue in strengths needed to kill germs; (3) not be materially corrosive to metal or glass surfaces; (4) be fairly stable with respect to germ killing power when held, or in the presence of organic soil; (5) easily and accurately tested for germ killing strength under practical operating conditions.

During recent years a new group of germ killing chemicals have been introduced on the market. One of the more promising of these compounds is a group known as the quaternary ammonium germicides. While there is not much definitely known about these compounds, they do seem to show considerable promise for use in the food industries, such as milk and dairy manufacturing plants, dairy farms, restaurants and so forth. On the basis of present knowledge of quaternary compounds the apparent possibilities and limitations of them should be considered.

Some quaternary ammonium compounds are powerful germ killers in dilute solutions. They are however, rather specialized with regard to their germ killing powers against the germs. A germicide which readily kills one kind of germ at a given concentration may be quite ineffective against other tvpes of germs under like conditions.

The germ killing power of quaternary ammonium germicides is affected to a large degree by the reaction of the solution. For example, Zephiran (alkyl-dimethyl-benzyl ammonium chloride) is many times more powerful in germ killing in an alkaline than in an acid solution. On the other hand Ceepryn (Ceetyl-pyridinium Chloride) is not affected materially in its germ killing power whether the solution is neutral or alkaline in reaction. The germicidal power of a quaternary compound is greater at high than at low temperatures.

Quaternary ammonium germicides are relatively stable in regard to their abilities of maintaining their germ killing powers. They do not seem to be weakened materially by organic matter, but are made inactive by soap, polyphosphates and lecithin as well as certain other materials. The germ killing potency of these chemicals is much greater in distilled and soft waters than in hard water. This is probably due to the presence in hard water of some inactivating substances.

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Quaternary ammonium germicides do not form precipitates in most water supplies. This quality is of advantage when they are used for sterilizing metal and glass surfaces like those represented by milk equipment. Precipitates build up surface deposits of water minerals plus milk proteins, commonly known as "milk stone." Such deposits usually harbor heat resistant and heat loving germs which often cause trouble by the way of high bacteria counts in pasteurized milk.

Quaternary ammonium compounds have a softening effect on the skin when used in dilutions recommended for germicidal treatment. Thus, they are especially suited for sanitizing cows udders and teats before milking, as they do not cause the skin to chap.

Due to the relatively stable character of quaternary ammonium germicides, they apparently have a prolonged germicidal action on surfaces treated with them. In order to get the greatest benefit from their germicidal properties, milking utensils and equipment should be treated with a germicidal solution after they have been washed, thus permitting the residue of the germicide to keep down germ growth on the surface during storage.

There are some definite limitations in the use of quaternary ammonium products some of which have been indicated. Since quaternary ammonium germicides are represented by a host of different chemical compounds, each possessing definite and distinct germicidal properties, a lack of uniformity in regard to performance would be expected. In order to get the most satisfactory results with a quaternary compound, it would be advisable to have an understanding of its limitations as a germicide as well as the conditions under which satisfactory results could be expected.

The specific germicidal nature of quaternary compounds suggests that they should not be relied on as the only germicide to be used (under routine conditions). It would seem advisable to alternate their use with other approved germicides, such as the chlorine compounds. These are powerful germ killers and less specialized in regard to germicidal action on different types of organisms than the quaternary ammonium compounds. It should also be remembered that hot water (185°-200°F.) treatment is very effective in killing germs on dairy utensils and equipment and could be alternated with any type of chemical germicides.

Finally, on account of the variable chemical make-up of quaternary ammonium compounds a satisfactory test for estimating the germ killing power of a solution quickly and easily, has not been found. This is probably one of the more important limitations with regard to the use of these chemicals for sanitizing food equipment and utensils.