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Food Science and Technology Notes

Extension Division Department of Food Science and Technology Virginia Polytechnic Institute Blacksburg, Virginia

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COMPLYING WITH GOVERNMENT REGULATIONS AND PRACTICAL APPLICATION OF SANITIZERS

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There are certain factors concerning the application of sanitizers which, if followed, will give effective use. Governmental agencies, and particularly the United States Department of Agriculture, establish limits for each type of sanitizer to be used in inspected plants and they also establish concentration limits for each type of sanitizer. By following these regulations with good procedures of application the resulting program should be very effective.

GOVERNMENT REGULATIONS

All sanitizers must be registered with the U. S. Department of Agriculture, Pesticide Regulation Division. This is a branch of the Agriculture Research Service. This agency reviews the labeling of insecticides, fungicides and pesticides sold in Interstate Commerce. This includes all sanitizers and bactericides which are used to kill or control organisms. Labels must be registered on such products and a text must include the ingredient statement, a precautionary statement, use instructions, claims for efficacy and the United States Department of Agriculture registration number.

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It must be demonstrated that the sanitizer at the concentration recommended by the manufacturer will give a 99.999% kill of the test organisms in 30 seconds in order to pass the requirements of this agency. Also, the sanitizer must be registered for a certain condition of use and for certain products. These conditions must appear on the label of the container.

Further government regulations must be met to comply with the Department of Agriculture, Consumer and Marketing Service, Technical Service Division. This agency approves all chemical compounds including sanitizers for use in officially inspected meat, poultry, rabbit and egg processing plants. With respect to sanitizers it divides them into categories according to their formulation or active ingredients. These categories are (1) inorganic chlorine, (2) organic chlorine, (3) five different types of iodine, and, (4) the acid wetting agent type sanitizer. A brief description of these sanitizers and regulations are as follows.

Inorganic chlorine type sanitizers refer to the hypochlorites. They are limited to a maximum concentration of 200 ppm available chlorine for their use in inspected plants. It is not necessary to rinse food contacted surfaces with potable water after application of these types of sanitizers as ordinary equipment drainage is acceptable. The organic chlorines are the isocyanurate hydantoin type in formulation with alkaline salts. These are limited to 100 ppm maximum concentration of available chlorine. Again, as with the hypochlorites, ordinary drainage of solution from food contacted surfaces is acceptable.

Solutions containing iodine and with other components generally recognized as safe, are limited to 25 ppm on food contacted surfaces. Rinsing is not required in inspected poultry plants.

The acid wetting agent with other components generally recognized as safe are limited to 400 ppm active agent. Ordinary drainage is acceptable in USDA inspected poultry plants.

EFFECTIVE APPLICATIONS

Sanitizers should be applied to clean food contacted surfaces at a constant rate to be effective. With all such compounds concentrations, time of contact and temperature have a bearing on the effectiveness. The method of application is very important.

Before recent developments sanitizers were brushed over the clean surfaces. This left much to be desired as many surfaces were not accessible by this method. If the objects were small enough, the entire unit could be sanitized by immersion in the container of the solution. Spray and circulation of sanitizing solutions has improved the application tremendously. Circulation is possible in piping and vats and in the further processing areas. This more or less limits the application to spray methods which are effective in poultry operating plants. There are certain factors which should be taken into consideration in application of sanitizers.

1. Constant Rate of Concentration

The solution should be mixed according to the manufacturer's directions to obtain the desired concentration. If automatic feeding or mixing is done, adjust the equipment and check at least once a day to see that it is functioning properly. There are several devices on the market to obtain constant rate concentration in automatic feeding. This would be Venturi type injectors, piston type and diaphragm type pumps. The Venturi type feeding device is operated by water flow. The feed rate is variable by mechanical adjusting but does not vary automatically with the flow. The same condition applies to electrically operated piston or diaphragm pumps. The feed rate must be mechanically adjusted as the water flow rate changes. There are some diaphragm and piston type pumps that are operated by water type motors. These will automatically either increase or decrease the feed rate as the flow rate is varied. They are ideal for so-called central systems where application may be made of sanitizers at 2 or 3 or even 5 or 6 stations.

2. Corrosiveness

Containers and piping systems in application hoses and nozzles should be corrosion resistant material. Chlorine type sanitizers are corrosive even to stainless steel in the vapor phase. Use of PVC containers or piping are not affected by the corrosive action of chlorine. Iodine and wetting agent type sanitizers are on the acid side and would be corrosive to such metals as iron, steel and galvanized surface. Limit the application equipment to PVC or stainless steel.

3. Pressure and Temperature

Application of sanitizers does not have to be with high pressure. Use of pressures in the range of 20 lbs. per square inch and discharge rates of 2 to 3 gallons a minute is entirely sufficient. The pattern of the spray nozzle should be in the full cone type as hollow cones or fan shaped type nozzles would give possibilities of not reaching all surfaces. If the surfaces are properly cleaned and rinsed, all that is necessary is to supply enough sanitizing solution to thoroughly wet the surface.

4. Temperature Factor

As temperature is a factor in any chemical solution, it is recommended that sanitizing solutions be applied between 70° and 100° F. This is an accepted temperature range for this type of material and concentrations and formulations of sanitizers are generally prepared to be effective in this range. Also, it is the range of tap water so it is easily available. In some instances sanitizers, particularly chlorine sanitizers, are applied in the range of 150° to 160°. This would be when they are sanitizing heat processing equipment such as high temperature short time. However, this is a questionable method. At this temperature the chlorine vapors can be released more readily than at tap water temperatures. Release of the chlorine vapors could possibly cause corrosion. Iodine sanitizers more or less follow this same category. You'll find that most manufacturers limit application of iodine type sanitizers to a maximum of 100°F.

5. Time of Application

Government regulations accept ordinary drainage rather than rinsing as little or no residue will remain if sufficient time is given for drainage. To set up a correct time for applications of sanitizers to obtain maximum drainage would be difficult. Different surfaces drain at different rates. Even a polished surface will have a bearing on drainage. In this instance we have to take an overall practical approach to the problem. I would suggest application to start 15 to 20 minutes before the surface is contacted by the product. This would give the necessary 2 minutes contact time required by regulatory agencies and still plenty of time for drainage. Contamination of a surface after sanitizing would be kept to a minimum in this short time.

Sanitizing of other than food contacted surfaces is also a major problem in some of the plants. This refers to structural surfaces, transportation vehicles and so forth. The application of sanitizers is very important in this phase of the operations. All live trucks should be rinsed to remove as much organic material as possible and then sanitized to prevent contamination between one load and another.

However, there is a correct way and an incorrect way to control mold. Many prefer to wash the surface and sanitize after it. To correctly control mold it should be killed with a good sanitizer before the mold mycelia have a chance of being spread to other areas by washing methods. If they are not killed, the small plantlike mold mycelia can be caught in air drafts and spread from one room to another. By sanitizing with as much as 500 ppm of a sanitizing solution and then washing the area will prevent the spread of mold mycelia. After the area has been washed and rinsed again, it should be sprayed with a 500 ppm sanitizing solution. Mold control, in my opinion, should be with a quaternary ammonium type sanitizer. This gives longer lasting effectiveness as the active ingredient does not vaporize into the air. The use of this method has given very good mold control in some areas for up to four weeks.

CONCLUSION

Sanitizing, as with any other phase of sanitation, must be done properly to be effective. There are government regulations to follow as well as proper application methods. Following these suggestions will result in an effective sanitizing program.

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