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METHOD OF SANITIZING CULINARY UTENSILS AND TABLEWARE

George A. Stearns, Madison, Wis., assignor to George Stearns Chemical Corp., Madison, Wis., a corporation of Wisconsin

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My invention relates generally to method for sanitizing culinary utensils, a glassware such as drinking glasses, china, and similar articles, and is adapted for use particularly by restaurants, taverns, and the like.

It is the principal object of the invention to provide an improved method of sanitizing articles used in the consumption of liquids and foods so as quickly to reduce the bacteria count to a value lower than that which is permissible under the health and sanitary regulations and ordinances of governmental bodies.

It is a further object to provide an improved sanitizing method which is easily and quickly followed by unskilled personnel.

Other objects will appear from the following description.

The commonly used chlorine bearing bactericides fall into two classes, inorganic and organic. The inorganic (hypochlorites) are characterized by a rapid bacterial organism kill rate, but are unstable and also leave the utensil with an undesirable odor and taste. This combination of desirable and undesirable characteristics of such inorganic bactericides has led to some conflict in interest between health authorities, who in the interest of sanitation recommend their use in taverns and public eating places, and the operators of such establishments who shun their use in the interest of satisfying customers who may object to any distastefulness of tableware while remaining unaware of a high bacterial count. One of the organic bactericides, N-Sodium-N-Chloro-P-Toluenesulfonamide, commonly and hereinafter called "Chloramine T," has the advantage of leaving sterilized articles odorless and tasteless. However, this bactericide normally has a slow kill rate, which is not conducive in the dishwashing practices of taverns, for example, to the high order of sterilization demanded by health departments.

The improved sanitizing method of the present invention, which is highly satisfactory to both health authorities and the operators of taverns, restaurants, and the like, produces a fast bactericidal action, comparing favorably to that of inorganic bactericides, by the use of a solution of Chloramine T, which leaves the sanitized articles clean, odorless, and tasteless.

More specifically, the method of the invention is carried out in three steps, by first immersing the utensil, which will hereinafter be referred to as a glass, in an alkaline aqueous solution which will be effective to remove therefrom any grease or soils. This first step is preferably performed immediately preceding the second and third steps, but in some rare instances there may be a delay of hours between the first step and the second step.

After immersion in the alkaline solution, coupled with agitation and scrubbing if it is necessary, the glass is in condition to have the second step performed.

The second step comprises rinsing the glass in an acidic aqueous solution, such as a solution of citric, gluconic, or hydroxyacetic acid, preferably containing also a nonionic

detergent such as octyl or nonyl phenol ethylene oxide condensate, or anionic detergents (other than soaps), such as alkyl-aryl sulphates or sodium lauryl sulphates which may be substituted for the nonionic detergent, or used in combination therewith. In general, most surfactants, except those which are products of saponification, may be utilized in solution in carrying out the second step of the sanitizing method. The detergent in the solution serves to remove any residual grease which failed to be removed during the first step. When the solution used in the second step is used in the two-step method, it acts as a cleaner as well as a conditioner, and the use of the detergent is therefore more important in the two-step method, hereinafter to be described, than in the more efficient three-step method. The acid solution used should be nontoxic and nonirritating to the skin of the operator. In general, any acid which yields a nearly vertical straight line titration curve between the pH of 3.5 and 5.5, and specifically between pH 4.0 and 5.0 when a one tenth N (normal) solution of the acid is titrated with a one-tenth N solution of an alkali (such as sodium hydroxide) will be satisfactory. Citric acid fulfills this requirement.

In this second or acidic step of the method any calcium carbonate or any other lime-like inorganic chemical, which may not have been removed from the glass by the first step, is removed.

After these two steps of the washing operation, the glass is clean in appearance, but may nevertheless have pathogenic organisms on its surface, and there will be a thin film of the acidic solution adhering to the surface of the glass.

The third step comprises immersing the glass for about thirty seconds, in the aqueous disinfecting solution which contains buffered Chloramine T, buffered to yield a pH of 7.7 to 8.5, preferably a pH of 8.2. This solution comprises approximately one to two ounces per three gallons of water of a mixture comprising about 18% Chloramine T and about 82% inert ingredients. The inert ingredients will ordinarily consist of phosphates and borates in such ratio that the aforementioned pH will be realized. Such solution will have approximately 100 to 200 parts per million of available chlorine.

The Chloramine T solution is buffered with one or more alkaline buffering agents to have a hydrogen ion concentration (pH) of approximately 8.2 and within the range of 7.7 to 8.5. The buffering agent used is preferably a mixture of sodium tetraborate, sodium tripolyphosphate, sodium acid pyrophosphate, monosodium phosphate, and tetrasodium-pyrophosphate as adjusted to give a pH of 8.2 when dissolved in water at the concentration of two ounces per three gallons of water. As the acid film on the glass comes into contact with the buffered Chloramine T solution, the normally relatively stable Chloramine T immediately surrounding the surface of the glass becomes highly bactericidally reactive. By virtue of the reaction of the acidic film on the glass with the buffered Chloramine T solution, a chemical reaction takes place which is more or less concentrated directly on the surface of the glass, so as to result in an extremely effective bactericidal action, and results in rapidly sanitizing the glass to a very high degree so that when it is removed from the buffered Chloramine T solution the film on its surface will have a bacteria count much below that permitted by the most stringent regulations and ordinances.

After removal of the glass from the solution of organic acids, as previously mentioned, the glass should, and will ordinarily, be free from all physical contamination so that if immersed in pure water the latter will flow therefrom in so called "sheet" flow, and will not collect in droplets or rivulets, indicating that the glass will be physically clean. Thus, after the third step of the method and the sanitizing thereof to kill bacteria, the glass will

be completely sanitized and shall emerge from the last solution free from organic or inorganic contaminating deposits.

The result is rapid sterilization by a fast bactericidal action, comparable favorably with that of inorganic bactericides, while at the same time preserving the odorless and tasteless sanitized condition of articles, which is characteristic of the use of Chloramine T as a bactericide.

When the water employed in carrying out this method is of a hardness in excess of 18 grains per gallon as calcium carbonate, it is desirable to condition the water used in the third step by an organic chelating agent, such as the sodium salt of ethylene diamine tetra acetic acid.

Upon removal of the glass from the Chloramine T solution the glass is clean; that is, it is free from any foreign particles on its surface, which can be tested in several ways. One of the most common ways of testing a glass for cleanliness is to immerse it in clear water. If, when the glass is removed from the water, the water "sheets" from the glass and does not form beads or rivulets, the glass is considered clean. On the other hand, if the glass is dirty the water will drain off in rivulets and separate into droplets or spots, indicating that the surface of the glass is coated with some foreign materials such as lime, grease, or some other soil, providing a surface effect which adversely affects the draining tendency of the water. As these water droplets evaporate, any solute which may be present will be deposited upon the surface of the glass, giving an undesirable and unsanitary spotty appearance to the glass.

When employing the method of the present invention, the glass will be found to be clean, as defined in the preceding paragraph, and the bacteria count as tested by the usual technique of swabbing the utensil and incubating the swab in a nutrient broth, will show that the amount of bacterial organisms per glass is well below the safe upper limit of tolerance.

To summarize briefly, the three-step method of sanitizing glasses (representative of any culinary utensils, glasses, chinaware, and similair articles) comprises:

1. Immersing the glass and scrubbing it, if necessary, in an alkaline solution to remove soils including greasy and fatty substances (such as lipstick);

2. Immersing the glass in an acidic solution of an organic acid such as citric acid of a pH between 4.0 and 5.0 in the proportion of approximately one or two ounces of the organic acid in about two or three gallons of water, this solution also containing an anionic detergent plus a solubilizer. This step is designed to remove deposits of calcium carbonate and any other lime-like compounds which may be adhering to the glass;

3. Removing the glass from the organic acid solution without removing the film of the solution adhering to the glass, and immersing the glass in a solution of Chloramine T buffered to have a pH preferably of approximately 8.2, and within the range of 7.7 to 8.5. The reaction of the acidic film with the buffered Chloramine T solution will cause the reaction of the Chloramine T adjacent the surface of the glass to occur at a pH below 7.0, causing it to be highly effective as a bactericide, and equivalent in bactericidal activity to a solution of sodium hypochlorite which has an equivalent available chlorine concentration.

Upon removal from the Chloramine T solution the glass should be permitted to drain without drying by means of a towel, to avoid the possibility of recontamination.

The method of sanitizing should be carried out with the various solutions at room temperature, because at temperatures above 75° F. there is a tendency of chlorine being liberated from the Chloramine T, which of course reduces the concentration of the chlorine in the solution, and in addition results in a bad odor.

The three-step method above described may be reduced to a two-step method, that is, the second and third steps, provided that the glasses are washed at least once daily in an alkaline solution employed in the first step. It will be found that the sanitizing of the article by employing only steps two and three will be acceptable under such conditions.

This application is a continuation in part of my copending application Serial No. 504,360, filed April 27, 1955, now abandoned.

It will be apparent to those skilled in the art that the percentage concentration of the solutions used, as set forth above, may be varied substantially without greatly affecting the effectiveness of the sanitizing method. For example, as the buffered Chloramine T solution employed in the third step of the method is rendered less effective as it is used up in reaction with the acidic solution film adhering to the glass, a point will be reached where it will be necessary to replace or at least reinforce the Chloramine T solution with additional Chloramine T.

I claim:

1. The method of sanitizing culinary utensils and the like which comprises, immersing the utensil in an alkaline solution to remove any grease adhering thereto, rinsing the utensil in an organic acid solution and while a film of the latter solution is retained on the utensil immersing the utensil in a solution of Chloramine T buffered to have a pH value of between 7.7 and 8.5.

2. The method of sanitizing a utensil in an organic acid solution containing citric acid which buffers the solution to a pH value between 3.5 and 5.5, preferably between 4.0 and 5.0, and while a film of this solution is on the utensil immersing the latter in a solution of Chloramine T buffered to a pH value of 7.7 to 8.5, preferably at 8.2, thereby utilizing the residual film of acid on the glass available to act as an activator on the Chloramine T solution immediately adjacent thereto.

3. The method of sanitizing an article which comprises, rinsing the article in a solution of citric acid, and while a film of this acid solution remains on the article immersing it in a solution of N-Sodium-N-Chloro-P-Toluenesulfonamide buffered to have a hydrogen ion concentration of approximately 8.2, and drying the article by draining.

4. The method of sanitizing articles which comprises, rinsing the article in a nontoxic aqueous solution of a water soluble organic acid which is nonirritating to the human skin, and while a film of this solution remains on the surfaces of the article, immersing it in an aqueous solution of Chloramine T buffered to have a hydrogen ion concentration of approximately 8.2.

5. The method set forth in claim 4, in which the organic acid provides a buffered solution the pH value of which is between 3.5 and 5.5.

6. The method of sanitizing tableware and cooking utensils comprising, forming an aqueous alkaline detergent solution, forming an aqueous organic acid solution having a pH value of 3.5 to 5.5, forming an aqueous sanitizing solution including as the solute Chloramine T and buffered to have a pH value of between 7.7 and 8.5, immersing the utensil successively in the aqueous alkaline detergent solution, in the aqueous organic acid solution, and without removing the film of acid solution thereon immersing the utensil in the sanitizing solution, thereby causing the bactericidal reaction of the Chloramine T solution to occur immediately adjacent the surface of the utensil at a pH value of less than 7.0.

No references cited.