

UNITED STATES PATENT OFFICE

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IODINE DETERGENT

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16 Claims. (Cl. 252-121)

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This invention relates to an iodine detergent, and more particularly, to a detergent composition usable, for example, for thoroughly cleansing the hands of the user and containing elemental iodine in solution as a disinfecting agent, the detergent composition being stable against loss of iodine by evaporation or chemical reaction with other ingredients of the composition and also stable against precipitation of iodine upon dilution of the composition with water.

Iodine has long been recognized as a particularly effective disinfectant for destroying bacteria or inhibiting or preventing bacterial growth. There has been an outstanding need for some practical method of utilizing iodine for sterilizing the hands of doctors, dentists, nurses or even laymen handling sterile materials. The iodine preparations heretofore available have had serious defects. Perhaps the most serious has been the intense and persistent stains which such preparations as tincture of iodine have imparted to the skin. Also the repeated use of such preparations has resulted in irritation and cracking of the skin. Furthermore, such preparations are not stable and are unsuitable for employment in convenient dispensers such as ordinary liquid soap dispensers. It is not practicable to maintain such dispensers hermetically sealed and elemental iodine as well as other constituents in the iodine preparations now available will rapidly evaporate from the dispenser. The iodine preparations heretofore available have also had no detergent action and will not remove soil from the hands of the user even if employed with water.

The present invention is concerned with a detergent composition containing elemental iodine in solution. The composition may be in liquid form suitable for dispensing from liquid soap dispensers although, if desired, it may be produced in the form of a paste for delivery from suitable dispensers, collapsible tubes or other containers. The detergent composition as a whole is non-volatile and is stable against evaporation of the highly volatile iodine from the composition and stable against chemical reaction with the iodine which would render the iodine ineffective as a disinfectant. In this connection, it is of importance to note that elemental iodine in solution is the effective sterilizing agent and that in general, iodine in chemical combination with other materials has no appreciable antiseptic properties. Also the compositions of the present invention are completely miscible with water in

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all proportions and dilution with water even in large amounts does not precipitate iodine even though iodine is substantially insoluble in water. The compositions as supplied or dispensed can, therefore, contain a substantial proportion of water and if the amount of water is not excessive it will also not evaporate from the composition.

The composition of the present invention also contains an effective detergent which produces a copious suds or lather with water. It can therefore be employed in the same manner as a hand soap to cleanse the hands. If it already contains water such lather can be easily worked up on the hands or the hands can be moistened if the composition is substantially water-free. The detergent action removes soil from the hands to leave a clean surface. During application of the detergent a transient iodine stain is produced on the skin showing effective application of iodine thereto but upon rinsing of the lather from the hands, this stain is lifted to produce a clean unstained skin. It is apparent, however, that there is some accumulation or penetration of iodine on or in the skin as a distinct odor of iodine persists for several hours even after repeated washing of the hands with ordinary detergents such as soaps. The amount of iodine thus retained by the skin has a continued germicidal action but is not enough to irritate or cause cracking of the skin since repeated applications of the detergent composition over extended periods of time have failed to produce such results.

The composition of the present invention includes a polyalkylene glycol preferably containing at least two ether linkages as a non-volatile solvent for the iodine which also prevents evaporation of the iodine from the composition. It also includes a substantial proportion of glycerin. Glycerin is also a non-volatile solvent for elemental iodine but iodine relatively rapidly evaporates therefrom. Mixtures of glycerin and polyalkylene glycol, however, retain the property of the glycol of preventing evaporation of iodine. Also glycerin is a much more effective solvent for detergents of the type contemplated by the present invention than the glycol, and mixtures of glycerin and glycol retain this solvent property of the glycerin. Mixtures of glycerin and glycol also enhance the germicidal properties of the iodine.

The preferred determents employed in the present invention are preferably of the water-soluble organic anionic sulfated type of non-soap

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synthetic detergents. These detergents should have any aliphatic radicals, such as fatty acid radicals, contained therein completely saturated to avoid reaction with iodine and for the same reason should not contain any other groups such as aldehyde or free amino groups which are oxidized by or otherwise react with iodine. The detergent should not be appreciably alkaline and is preferably neutral or slightly acidic in nature as an alkaline detergent will also render the iodine inactive. Ordinary fatty acid soaps are therefore not suitable as the sole detergent since effective detergent soaps are alkaline. Small amounts of such soaps in conjunction with detergents of the type above discussed may be employed to provide a lubricating action (soapy feel) without seriously affecting the disinfecting action of the composition but are preferably omitted. The composition will also contain a small amount of an alkali metal iodide such as sodium or potassium iodide. Such iodide has no germicidal action but functions as a solubilizing agent for the elemental iodine in the glycol and glycerin mixture and also prevents precipitation of elemental iodine upon dilution of the composition with water. The resulting composition represents a completely stable material which not only thoroughly cleanses and sterilizes the hands of the user but also rinses cleanly from the hands leaving no stain and producing no irritation. While the iodine detergent of the present invention is primarily useful for cleansing and sterilizing the hands of the user it may be employed upon any portion of the skin or even to clean and sterilize wounds. It may obviously also be employed to clean and sterilize such materials as fabrics, or surfaces of solid materials such as wood, metal, rubber, etc.

It is therefore an object of the present invention to provide an improved detergent composition containing elemental iodine as a disinfectant.

Another object of the invention is to provide a detergent composition containing iodine which is chemically stable and which is stable against evaporation of iodine therefrom.

A further object of the invention is to provide a detergent composition containing iodine in solution in a mixture of polyalkylene glycol and glycerin in which the stabilizing effect of polyalkylene glycols against evaporation of iodine is employed in conjunction with the solvent properties of glycerin for synthetic detergents and the disinfecting enhancing properties of the mixture upon iodine.

A still further object of the invention is to provide an improved detergent composition containing iodine in which a glycerol-polyalkylene glycol solvent is employed to hold both iodine and a detergent in solution.

Other objects and advantages of the invention will appear in the following detailed description of the invention.

The primary composition of the present invention as indicated above contains a solvent mixture of a polyalkylene glycol and glycerin having in solution therein elemental iodine, an alkali metal iodide and a detergent compatible with the other ingredients of the composition, which detergent is predominantly an anionic sulfated synthetic detergent. To this primary composition small amounts of other materials may be added such as an alkylated cellulose or stiffening agents to modify the physical properties of the composition as long as such mate-

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rials do no deleteriously react with iodine. Also, a substantial amount of water may be added to the primary composition. The composition is preferably a liquid material but may alternatively be prepared in semisolid form or paste form.

In my copending application Serial No. 56,657, filed October 26, 1948, I have disclosed a liquid iodine composition in which the unique properties of polyalkylene glycols in preventing evaporation of iodine from solution therein are employed to enable a stable liquid iodine composition to be prepared. As disclosed therein, polyalkylene glycols, particularly those containing at least two ether linkages, i. e., triethylene glycol, and polyalkylene glycols of greater molecular weight form stable iodine solutions. Such polyalkylene glycols are non-volatile, are solvents for elemental iodine and iodine does not appreciably evaporate from solution therein although elemental iodine evaporates relatively rapidly from all other known solvents for the iodine. The compositions of my copending application referred to also preferably contain an alkali metal iodide as a solubilizing agent for the iodine. Although elemental iodine is soluble in polyalkylene glycols and does not evaporate from solution therein, dilution of such solutions with water in the absence of alkali metal iodides causes undesirable precipitation of elemental iodine. The alkali metal iodides prevent such precipitation upon dilution with water and are therefore employed in the composition of the present invention even though they have no appreciable disinfecting or germicidal action.

In accordance with the present invention, it has been found that glycerin in addition to the polyalkylene glycols discussed above is an important constituent of iodine detergent compositions. Glycerin has been suggested as a solvent for iodine which depresses the vaporization rate of iodine. The evaporation rate of iodine from glycerin, however, is rapid when compared to the evaporation rate of iodine from polyalkylene glycols. The property of polyalkylene glycols of preventing evaporation of iodine persists even when the polyalkylene glycol is admixed with relatively large quantities of glycerin. The presence of a polyalkylene glycol, even in amounts as small as 10 to 15% of the total mixture of glycerin in the glycol measurably retards evaporation of dissolved elemental iodine and compositions containing 25% or more of polyalkylene glycol on the basis of the total glycerin and glycol content have substantially the same resistance to evaporation of elemental iodine as the polyalkylene glycols alone. Also the glycerin is, in general, a much more powerful solvent for synthetic detergents than are the polyalkylene glycols. As discussed below, mixtures of polyalkylene glycols and glycerin also enhance the disinfecting properties of the iodine.

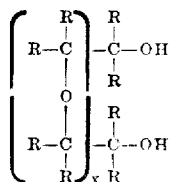
A considerable number of synthetic detergents now available on the market are useful in the compositions of the present invention. In general, such detergents should not contain groups which react with iodine. That is to say, any aliphatic groups in such detergents are preferably saturated since iodine reacts readily with aliphatic groups containing double or triple bonds. Furthermore, such detergents should be free of other groups which react with iodine such as aldehydes or free amino groups. Such detergents should, in general, not be substantially alkaline as alkaline materials also react with

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iodine to decrease its germicidal properties. Ordinary soaps, i. e., alkali metal and ammonium salts of fatty acids, can be employed as a minor part of the detergent in the present invention primarily to provide a lubricating action if the fatty acids thereof are saturated but are not satisfactory as the sole detergent since effective detergent soaps are alkaline.

The preferred detergents of the compositions of the present invention are organic anionic sulfated synthetic detergents, any aliphatic groups of which are saturated. Thus sodium lauryl sulfate or the ammonium salt of sulfated glyceryl monolaurate are particularly suitable. Other saturated fatty acid radicals or mixtures thereof can, of course, be substituted for the lauryl acid and either the ammonium, potassium or sodium salts may be employed. Furthermore, such anionic sulfated synthetic detergents may contain aromatic groups, i. e., they may be aryl-alkyl sulfated synthetic detergents.

The polyalkylene glycols useful in the compositions of the present invention have the general formula:



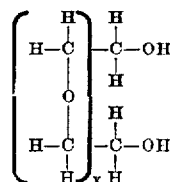
in which the various radicals denoted by R may be either alkyl groups or hydrogen and X is a whole number. Useful glycols should be water-soluble and are preferably liquid at any atmospheric temperature likely to be encountered, for example, at temperatures as low as 0° C. The water solubility and freezing points of the various polyalkylene glycols depend upon several variables including molecular weight and chemical structure. In general, water solubility decreases with increase in size of any alkyl groups and increases with the number of ether linkages present. Also in general, the freezing point of the liquid material as well as its viscosity increases with increase of molecular weight. The number of variables renders it impracticable to attempt to definitely correlate water solubility and freezing point with chemical structure, although the ranges discussed below with respect to the polyethylene glycols are generally applicable. It is sufficient to state that the polyalkylene glycols contemplated are miscible with water in all proportions and are preferably liquid at temperatures between approximately 0° and 55° C., since these physical properties are the important characteristics.

In case it is desired to produce a semi-solid composition, it is even possible to employ polyalkylene glycols which are semi-solid within the temperature range just given so long as they are completely miscible with water. Solutions of iodine in admixtures of such polyalkylene glycols and glycerin retain their iodine concentration substantially constant over extended periods of time since both the glycols and the glycerine are substantially non-volatile at temperatures up to 55° C., and the polyalkylene glycols substantially prevent evaporation of iodine from solution. Polyalkylene glycols having a value of X of at least two are most effective in preventing evaporation of iodine.

Of the polyalkylene glycols, polyethylene glycols

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are preferred. The polyethylene glycols have the general formula:



in which X is a whole number. Such polyethylene glycols or mixtures thereof having average molecular weights up to approximately 600 are liquid at temperatures as low as 0° C., and are miscible with water in all proportions. For semi-solid compositions, the average molecular weight may be as high as 6000 since such polyethylene glycols retain their water solubility. Again, a value of X of at least 2 is preferred since values of X greater than 1 render the glycol more effective in preventing evaporation of iodine. For liquid preparations, this means that triethylene glycol is the preferred material since it has the lowest viscosity of any of the polyalkylene glycols having values of X greater than 1. Various mixtures of polyalkylene glycols, including polyethylene glycols may be employed with glycerin and are available commercially, being sold on the basis of average molecular weight. For liquid compositions, the average molecular weight of usable polyalkylene glycols may range from approximately 108 to 600, the preferred range being between approximately 150 to 600. The broader range corresponds to an average value of X extending from approximately 1 to 12 and the preferred range corresponds to an average value of X from approximately 2 to 12. For compositions containing semi-solid polyalkylene glycols the value of X may range up to approximately 120. It will be appreciated that even in the preferred compositions where a value of X of at least 2 is contemplated that this value is an average value and mixtures may contain substantial amounts of polyalkylene glycols having a unit value of X or even ordinary glycols such as ethylene glycol or propylene glycol having a zero value of X as long as the average value of X is at least 2.

The primary disinfecting detergent compositions of the present invention therefore contain a solvent mixture of one or more glycols and glycerin containing in solution elemental iodine, alkali metal iodide and one or more detergents, the glycol content of the composition being predominantly polyalkylene glycol and the detergent content being predominantly organic anionic sulfated non-soap synthetic detergent. In the solvent mixture the glycerin may range from approximately 25% to 75% of the solvent mixture, and similarly, the glycol content may range from approximately 25 to 75% of the solvent mixture. This is a weight ratio of glycerin to glycol ranging between approximately 1 to 3 and 3 to 1. On the basis of the total weight of the primary composition, the amount of solvent mixture may range from approximately 55 to 97%, i. e., the amount of glycol present may range from approximately 14 to 73% and the same is true of the glycerin. A mixture of approximately equal proportions of polyalkylene glycol and glycerin is preferred in an amount ranging from approximately 55 to 97% of the primary composition, i. e., an amount of polyalkylene glycol ranging from approximately 27.5

to 48.5% of the primary composition and an equal amount of glycerin. The amount of elemental iodine in the primary composition will range from approximately 0.1% to 10% by weight, the usual range being between approximately .25% and 2%. The amount of alkali metal iodide, such as sodium iodide, in the primary composition will range from approximately $\frac{1}{2}$ that of the iodine content, up to 1.5 times the iodine content, i. e., from approximately 0.05% to 15%, the usual amount being approximately 1.2 times the amount of iodine. The amount of detergent will ordinarily range from approximately 3% to 20% of the primary composition. In general it has been found that amounts of detergent less than 3% will not produce an effective detergent action. To such a primary composition may be added any of the several minor ingredients such as gelling agents or stiffening agents if a semi-solid composition is desired. Also water can be added in any desired amounts although the amount of water in the composition dispensed will not usually exceed 25% based on the weight of the primary composition.

The entire composition is preferably a liquid composition, i. e., the polyalkylene glycols are preferably liquid. That is to say, the polyalkylene glycols contemplated by the present invention will usually have an average molecular weight not greater than 600, the preferred liquid polyalkylene glycol being triethylene glycol. Such liquid compositions, prepared in accordance with the present invention, are stable against loss of iodine by evaporation as well as loss by evaporation of the other constituents of the composition. They are also chemically stable and are particularly suitable for dispensing as detergents and disinfectants from ordinary liquid detergent dispensers and may be employed as a disinfecting detergent by doctors, nurses, etc., in cleaning and sterilizing their hands.

While liquid detergent compositions, in accordance with the present invention, are preferred it is entirely possible to prepare such compositions in paste form suitable for dispensing from collapsible tubes or jars. For example, solid polyalkylene glycols may be employed to produce a semi-solid composition or various stiffening and thickening agents, such as bentonite, pectin, agar-agar and sugars, etc., may be added in amounts up to approximately 15% of the primary composition. Such stiffening agents should not contain groups such as aldehyde groups which will react with iodine. Gel compositions such as those disclosed in my co-pending application, Serial No. 760,516 filed July 11, 1947, now Patent No. 2,550,622, granted April 24, 1951, in which a small amount of water-dispersible alkylated cellulose, such as methyl cellulose or hydroxyethyl cellulose is used to produce a gel structure with polyhydroxy alcohols may likewise be employed to provide a semi-solid composition. Thus semi-solid gel structures may be produced from the primary liquid detergent composition above described containing a mixture of liquid polyalkylene glycol and glycerol as a solvent for the iodine, alkali metal iodide and detergent by employing an alkylated cellulose in amounts ranging between 0.3% and 15% of the primary liquid composition with an amount of water ranging from approximately 1 to 30% of the primary composition.

As specific examples of preferred primary

liquid compositions in accordance with the present invention, the following are given:

Example 1

	Per cent
Iodine -----	1
Sodium iodide -----	1.2
Sodium lauryl sulfate -----	8
Triethylene glycol -----	44.9
Glycerin -----	44.9

Example 2

Iodine -----	1
Sodium iodide -----	1.2
Ammonium salt of sulfated glyceryl monolaurate -----	4
Triethylene glycol -----	46.9
Glycerin -----	46.9

Example 3

	Percent
Iodine -----	1
Sodium iodide -----	1.2
Ammonium salt of sulfated glyceryl monolaurate -----	10
Triethylene glycol -----	43.9
Glycerin -----	43.9

In the above examples, all the percentages are by weight.

The compositions of Examples 1, 2 and 3 are slightly acidic and remain so on dilution with water. This is desirable as the iodine is more stable in slightly acidic compositions and there is no danger of inactivation of the iodine by reaction with an alkali.

Example 4

	Percent
Iodine -----	1
Sodium iodide -----	1.2
Sodium lauryl sulfate -----	8
Potassium laurate -----	2
Triethylene glycol -----	43.9
Glycerol -----	43.9

In the above example, care should be taken that the potassium laurate or other saturated fatty acid soap should be substantially neutral as otherwise the disinfecting efficiency of the iodine will be impaired, i. e., water solutions of the composition should have a pH of less than 9. Even so, the disinfecting efficiency of the composition of Example 4 is ordinarily not quite as great as that of the compositions of Examples 1, 2 and 3 containing no fatty acid soap.

In any of the above examples the iodine and sodium iodide content can be varied within the ranges previously given. Also, the amount of synthetic detergent can be varied and other anionic organic sulfated synthetic detergents or mixtures thereof, including those containing aryl groups, can be substituted as long as any aliphatic groups are saturated and no other groups reactive with iodine are present. Other water-soluble fatty acid soaps including potassium soaps can be substituted in Example 4 as long as the detergent content is predominantly a synthetic detergent of the type discussed and the fatty acid radicals of the soap are saturated. That is to say, the synthetic detergent is preferably at least 75% by weight of the total detergent present, i. e., the weight ratio of synthetic detergent to soap is preferably at least 3 to 1. Other glycols including solid glycols or mixtures thereof can be substituted for the triethylene glycol as long as the total glycol content is predominantly polyalkylene glycol having at least two ether

linkages per molecule. Also, that ratio of glycerin to such glycols can be varied from approximately 1:3 to 3:1 by weight. Stiffening or gelling agents in amounts varying from approximately 2% to 15% of the weight of the primary composition may be added to obtain a desired semi-solid consistency, so long as such agents do not react with iodine and are not alkaline. Also, water in amounts up to approximately 25% of the weight of the primary compositions may be added. A desirable addition to any of the compositions of the above examples to improve its lubricating properties while still leaving the composition liquid is .5% sodium carboxymethyl cellulose and 2.5% water, these percentages being based on the weight of the primary compositions given in the examples, the amount of the sodium carboxymethyl cellulose being variable between approximately .25 and 1% and the amount of water between approximately 2 and 25%.

To show the enhanced disinfecting efficiency of iodine in mixtures of glycerin and polyalkylene glycol over compositions in which a polyalkylene glycol or glycerin alone is present, the data from penetration tests employing the Federal Drug Administration agar cup plate method using *S. aureus* 209P incubated at 37.5° C. are given below a comparison with a 2% tincture of iodine USP xiii also being given:

Composition	Undiluted	Width of zone in cms.— 1 part composition, 4 parts water
2.0% I; 2.4% NaI in triethylene glycol.	2.0	0.6 + 0.4 partial inhibition.
2.0% I; 2.4% NaI in 1:1 triethylene glycol-glycerin.	2.6	1.0 + 0.5 partial inhibition.
2.0% I; 2.4% NaI in glycerin.	2.6	0.5 + 1.3 partial inhibition.
2% tinc. iodine USP xiii.	1.5	0.4.

It will be noted that the test employing iodine and sodium iodide in glycerin alone was substantially better than the test employing iodine and sodium iodide in triethylene glycol alone, and very much better than the test employing a 2% tincture of iodine. The test employing iodine and sodium iodide in a mixture of equal parts of triethylene glycol and glycerin was substantially the same as the test employing glycerin alone for the undiluted composition but was an improvement over the test employing either of these materials alone upon dilution with water.

Similar tests employing the compositions of Examples 1, 2 and 3 showed a width zone in centimeters for the undiluted compositions of 1.7. This is an excellent result when it is remembered that the iodine concentration was approximately one-half that of the compositions in the series of tests reported. The composition of Example 4 gave a width of zone of 1.1 centimeters which is still an excellent result although the presence of the fatty acid soap therein somewhat diminished the disinfectant efficiency of the composition.

The compositions of all of the above examples exhibited negligible evaporation of iodine at temperatures as high as 55° C. and the entire compositions were substantially non-volatile. Furthermore, the detergents were completely soluble in the glycol-glycerin mixture and the same is true of the iodine and sodium iodide so that the resulting composition was a clear solution. The compositions were miscible in all proportions with water and did not precipitate iodine upon mixture with water.

In use as a detergent for the hands, the com-

positions lathered freely and were effective cleansing agents. During initial application of the detergent to dry or previously moistened hands, a slight, transient iodine stain was produced on the skin. Upon mixture with further water and rinsing of the lather from the hands, the iodine stain was completely removed although the hands retained an iodine odor for several hours. Repeated applications of the iodine compositions caused no irritation of the skin and no permanent stain was imparted to the skin.

It will thus be seen that I have provided a novel and effective detergent and disinfecting composition which is chemically stable and which is also stable against evaporation of any of the constituents thereof.

I claim:

1. A disinfecting detergent composition, which comprises, a major proportion of solvent mixture of glycerin and at least one glycol in which the glycol is predominantly water-soluble polyalkylene glycol and in which the weight ratio of glycerin to glycol is between approximately 1 to 3 and 3 to 1, said solvent mixture containing in solution therein minor proportions of elemental iodine, alkali metal iodide and at least one detergent, the detergent content of said composition being predominantly anionic organic non-soap synthetic detergent and being inert to reaction with iodine, the amount of said detergent being between 3 and 20% of said composition by weight.

2. A disinfecting detergent composition, which comprises, a major proportion of solvent mixture of glycerin and at least one glycol in which the glycol is predominantly water-soluble polyalkylene glycol and in which the weight ratio of glycerin to glycol is between approximately 1 to 3 and 3 to 1, said solvent mixture containing in solution therein minor proportions of elemental iodine, alkali metal iodide and at least one detergent, the detergent content of said composition being predominantly anionic organic non-soap synthetic detergent and being inert to reaction with iodine, the amount of the solvent mixture in said composition being between approximately 55% and 97%, the amount of elemental iodine being between approximately 0.1 and 10%, the amount of alkali metal iodide being between approximately 0.05% and 15% and the amount of detergent being between approximately 3 and 20%, all percentages being based on the total weight of said composition.

3. A disinfecting detergent composition, which comprises, a major proportion of solvent mixture of glycerin and at least one glycol in which the glycol is predominantly water-soluble polyalkylene glycol having at least two ether linkages per molecule and in which the weight ratio of glycerin to glycol is between approximately 1 to 3 and 3 to 1, said solvent mixture containing in solution therein minor proportions of elemental iodine, alkali metal iodide and at least one detergent, the detergent content of said composition being predominantly anionic organic non-soap synthetic detergent and being inert to reaction with iodine, the amount of said detergent being between 3 and 20% of said composition by weight.

4. A disinfecting detergent composition, which comprises, a major proportion of solvent mixture of glycerin and at least one glycol in which the glycol is predominantly water-soluble polyalkylene glycol having at least two ether linkages per molecule and in which the weight ratio

of glycerin to glycol is between approximately 1 to 3 and 3 to 1, said solvent mixture containing in solution therein minor proportions of elemental iodine, alkali metal iodide and at least one detergent, the detergent content of said composition being predominantly anionic organic non-soap synthetic detergent and being inert to reaction with iodine, the amount of the solvent mixture in said composition being between approximately 55 and 97%, the amount of elemental iodine being between approximately 0.1 and 10%, the amount of alkali metal iodide being between approximately 0.05% and 15% and the amount of detergent being between approximately 3 and 20%, all percentages being based on the total weight of said composition.

5. A disinfecting detergent composition, which comprises, a major proportion of solvent mixture of glycerin and at least one glycol in which the glycol is predominantly water-soluble polyalkylene glycol, said solvent mixture containing in solution therein minor proportions of elemental iodine, alkali metal iodide and at least one detergent, the detergent content of said composition being a mixture of anionic organic non-soap synthetic detergent and water-soluble fatty acid soap in which the weight ratio of synthetic detergent to soap is at least 3 to 1 and the soap and synthetic detergent are inert to reaction with iodine, the amount of said detergent being between 3 and 20% of said composition by weight.

6. A disinfecting detergent composition, which comprises, a major proportion of solvent mixture of glycerin and at least one glycol in which the glycol is predominantly water-soluble polyalkylene glycol having at least two ether linkages per molecule and in which the weight ratio of glycerin to glycol is between approximately 1 to 3 and 3 to 1, said solvent mixture containing in solution therein minor proportions of elemental iodine, alkali metal iodide and at least one detergent, the detergent content of said composition being a mixture of anionic organic non-soap synthetic detergent and water-soluble fatty acid soap in which the weight ratio of synthetic detergent to soap is at least 3 to 1 and the soap and synthetic detergent are inert to reaction with iodine, the amount of said detergent being between 3 and 20% of said composition by weight.

7. A disinfecting detergent composition, which comprises, a major proportion of solvent mixture of glycerin and at least one glycol in which the glycol is predominantly water-soluble polyalkylene glycol having at least two ether linkages per molecule and in which the weight ratio of glycerin to glycol is between approximately 1 to 3 and 3 to 1, said solvent mixture containing in solution therein minor proportions of elemental iodine, alkali metal iodide and at least one detergent, the detergent content of said composition being a mixture of anionic organic non-soap synthetic detergent and water-soluble fatty acid soap in which the weight ratio of synthetic detergent to soap is at least 3 to 1 and the soap and synthetic detergent are inert to reaction with iodine, the amount of the solvent mixture in said composition being between approximately 55 and 97%, the amount of elemental iodine being between approximately 0.1% and 10%, the amount of alkali metal iodide being between approximately 0.05% and 15% and the amount of detergent being between approximately 3 and 20%, all percentages being based on the total weight of said composition.

8. A disinfecting detergent composition, which

comprises, a major proportion of solvent mixture of glycerin and triethylene glycol in which the weight ratio of glycerin to glycol is between approximately 1 to 3 and 3 to 1, said solvent mixture containing in solution therein minor proportions of elemental iodine, alkali metal iodide and at least one detergent, the detergent content of said composition being predominantly anionic organic non-soap synthetic detergent and being inert to reaction with iodine, the amount of said detergent being between 3 and 20% of said composition by weight.

9. A disinfecting detergent composition, which comprises, a major proportion of solvent mixture of glycerin and triethylene glycol in which the weight ratio of glycerin to glycol is between approximately 1 to 3 and 3 to 1, said solvent mixture containing in solution therein minor proportions of elemental iodine, alkali metal iodide and at least one detergent, the detergent content of said composition being predominantly anionic organic non-soap synthetic detergent and being inert to reaction with iodine, the amount of the solvent mixture in said composition being between approximately 55 and 97%, the amount of elemental iodine being between approximately 0.1% and 10%, the amount of alkali metal iodide being between approximately 0.05% and 15% and the amount of detergent being between approximately 3 and 20%, all percentages being based on the total weight of said composition.

10. A disinfecting detergent composition, which comprises, a major proportion of solvent mixture of glycerin and triethylene glycol in which the weight ratio of glycerin to glycol is between approximately 1 to 3 and 3 to 1, said solvent mixture containing in solution therein minor proportions of elemental iodine, alkali metal iodide and at least one detergent, the detergent content of said composition being a mixture of anionic organic non-soap synthetic detergent and water-soluble fatty acid soap in which the weight ratio of synthetic detergent to soap is at least 3 to 1 and the soap and synthetic detergent are inert to reaction with iodine, the amount of the solvent mixture in said composition being between approximately 55 and 97%, the amount of elemental iodine being between approximately 0.1% and 10%, the amount of alkali metal iodide being between approximately 0.05% and 15% and the amount of detergent being between approximately 3 and 20%, all percentages being based on the total weight of said composition.

11. A composition in accordance with claim 1 in which the glycol content is semi-solid to provide a semi-solid composition.

12. A composition in accordance with claim 1 in which the glycol content is liquid and between approximately 2 and 15% of a stiffening agent based on the weight of the composition defined in claim 1 is present to provide a semi-solid composition.

13. A composition in accordance with claim 1 in which an amount of water between approximately 2 and 25% based on the weight of the composition defined in claim 1 is also present in the composition.

14. A composition in accordance with claim 10 in which the glycol content is semi-solid to provide a semi-solid composition.

15. A composition in accordance with claim 10 in which the glycol content is liquid and between approximately 2 and 15% of a stiffening agent based on the weight of the composition defined

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in claim 10 is present to provide a semi-solid composition.

16. A composition in accordance with claim 10 in which an amount of water between approximately 2 and 25% based on the weight of the composition defined in claim 10 is also present in the composition.

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