United States Patent Office 2,834,737 Patented May 13, 1958

2,834,737

FOAMING BLEACH

Roland Z. Farkas, Greenville, S. C., assignor to Texize Chemicals, Inc., Greenville, S. C., a corporation of South Carolina

No Drawing. Application January 15, 1957
Serial No. 634,170

4 Claims. (Cl. 252—187)

This invention relates to liquid bleaching and germicidal compositions and more particularly to aqueous sodium hypochlorite solutions containing an organic agent having foaming and penetrating properties.

This application is a continuation-in-part of Serial No. 412,378, filed February 24, 1954, now abandoned.

Various organic surface active agents have been mixed with weak hypochlorite solutions but due to the tendency of the chlorine in the solution to attack the organic substance the use of these organic materials is limited to very dilute solutions. In most instances, such as for use in bleacheries, surface active agents are employed and such mixtures are not allowed to stand for very long periods of time, even in the case of weak solutions, because of the tendency of the organic materials to decompose in the presence of the bleaching agent.

Dry hypochlorite mixtures with anionic surface active agents have been successfully employed and at least one instance has been mentioned in which dry hypochlorite compositions have been employed with a cationic surface active agent. In each instance it is necessary that the surface active agent be low in hygroscopic properties because of the recognized tendency of these substances to decompose in the presence of moisture and a strong oxidizing agent.

It was hitherto thought impossible to mix a wetting agent or a surface active agent in a relatively concentrated aqueous hypochlorite solution without decomposing the organic material and destroying the bleach even though it has long been desired to produce a household bleach in combination with organic surface active agents to give the bleach, a penetrating and foaming action. In the past, very little has been accomplished in the way of checking the undesirable odor of household bleaches and it is well known that this odor lingers on the hands of the user as well as the materials to which the bleach has been applied.

Accordingly, it is an object of this invention to provide a more pleasing household bleach containing organic surface active agents which lend a penetrating and foaming action to the bleach.

It is another object of this invention to provide a household bleach in which the characteristic bleach odor is checked so that within a short period of time after use the disagreeable odor will no longer be present on the hands of the user or the materials treated by the bleach.

It is a further object of this invention to provide a bleach having the above mentioned desirable qualities brought about by the use of a surface active agent which remains stable upon storage over extended periods of time.

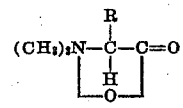
My invention generally comprises a concentrated aqueous sodium hypochlorite solution and an amphoteric betaine to provide a foaming and penetrating action and to arrest the objectionable odor of the bleach. Most commercial bleaches contain about 5.25% available chlorine by weight and experiments have shown that the

betaines may be effectively employed in solutions containing as high as 16.5% available chlorine. About .05% to 1% by weight of the betaine has been effectively employed, the quantity being limited in the lower range by the effectiveness of the betaine and in the upper range by the cost thereof. About .1% of the surface active agent in about a 5.25% sodium hypochlorite solution is preferred.

Experiments have shown that anionic and non-ionic surface active agents will salt out or decompose the bleach within two or three days, more or less. All cationic agents were thought to be incompatible with relatively concentrated sodium hypochlorite solutions.

However, it has now been found that the amphoteric betaines are compatible with sodium hypochlorite and will not salt out or destroy the bleach even after months of standing in concentrated sodium hypochlorite solutions of the type that are sold in grocery stores to the household trade.

The betaines compatible with sodium hypochlorite solutions to yield a foaming, penetrating bleach having low odor have the following structure:



where R is a long chain alkyl group containing 10 to 16 carbon atoms. The betaines may thus be termed C-higher alkyl-N-trimethyl-α-betaines. Examples of C-higher alkyl-substituted betaines useful in the present invention are decyl, dodecyl (lauryl), tetradecyl (myristyl), hexadecyl (cetyl) and octadecyl (stearyl) betaines.

The following examples illustrate the invention:

Example I

	Gms.
Aqueous sodium hypochlorite containing 5.25% available chlorine by weight	100
C-decyl-N-trimethyl-α-betaine (Du Pont Product BD)	1

were mixed at room temperature. The resultant clear solution had very good foaming and penetrating power, was a potent bleach, as determined by using the bleach with various white fabrics during the rinsing thereof in laundering, and the characteristic hypochlorite odor was almost unnoticeable. The solution was stored for a period of nine months at room temperature in brown bottles and after that period of time the available chlorine was 5.25% by weight. The bleaching and foaming action was unchanged.

Example II

	Gms.
Aqueous sodium hypochlorite containing 16.5% available chlorine by weight	1,000
C-cetyl-N-trimethyl-α-betaine (Du Pont product BC)	10

were mixed at room temperature. This clear solution exhibited good foaming and penetrating power, was a potent bleach, and the hypochlorite odor was not noticeably present. The solution was stored for a period of nine months at room temperature in brown bottles and after that period of time the available chlorine was 16.5% by weight and the bleaching and foaming action was unchanged.

Similarly, sodium hypochlorite solutions containing from 3% to 16.5% available chlorine and from 0.05% to 1% by weight of C-cetyl-N-trimethyl-α-betaine or C-decyl-N-trimethyl-α-betaine showed excellent storage characteristics, low hypochlorite odor and foaming ability.

The sodium hypochlorite useful in the preparation of solution of the present invention may be the conventional bleaching solution of the prior art. Such solutions, prepared, for example, by chlorination of aqueous caustic soda or by causticization of bleaching powder, contain other salts, such as sodium chloride and calcium chloride, respectively. The presence of these inactive salts does not affect the usefulness of the foaming bleach of the invention.

The bleaches of the present invention are clear, stable solutions. They retain their clarity and strength after storage for extended periods. The high clarity of the products is desirable as an added sales appeal.

It is observed therefore that the hypochlorite itself is more stable in storage because of the addition of the betaine. It is well known that a common problem with regard to hypochlorite solutions is their instability and loss of strength on storage and any of the hypochlorite solutions referred to in the above examples without the addition of the quaternary would have shown an appreciable loss of available chlorine after storage under such conditions.

A bleach which is almost odorless offers a great advantage in that the bottling thereof is greatly facilitated. A great deal of breakage normally occurs during the high speed bottling processes employed in most plants producing bleach. The penetrating odor of the bleach on the operators make it almost impossible for them to work under such conditions. This problem is minimized when bottling the above described bleach.

While the invention has been described in terms of

certain examples, such examples are to be construed as illustrative rather than limiting, and it is intended to cover all modifications and embodiments which fall within the spirit and scope of the appended claims.

I claim:

1. A bleach comprising an aqueous solution of sodium hypochlorite containing from about 3% to about 16.5% available chlorine by weight and from about 0.05% to about 1% by weight of a C-higher alkyl-N-trimethyl-α-betaine, said higher alkyl group containing 10 to 18 carbon atoms.

2. A bleach set forth in claim 1 wherein said betaine is C-decyl-N-trimethyl-α-betaine.

3. A bleach set forth in claim 1 wherein said betaine is C-cetyl-N-trimethyl-α-betaine.

4. A bleach set forth in claim 1 wherein said sodium hypochlorite solution contains about 5.25% available chlorine by weight.

References Cited in the file of this patent

UNITED STATES PATENTS

2,129,264	Downing et al.	Sept. 6, 1938
2,255,057	Holt	Sept. 9, 1941
2,320,280	Kalusdial	May 25, 1943
2,415,657	Riggs et al.	Feb. 11, 1947
2,576,205	Apperson	Nov. 27, 1951
2,702,279	Funderburk et al.	Feb. 15, 1955

OTHER REFERENCES

"Surface Active Agents," by Schwartz et al. (1949), pages 219–223, Interscience Publishers, Inc., New York.