

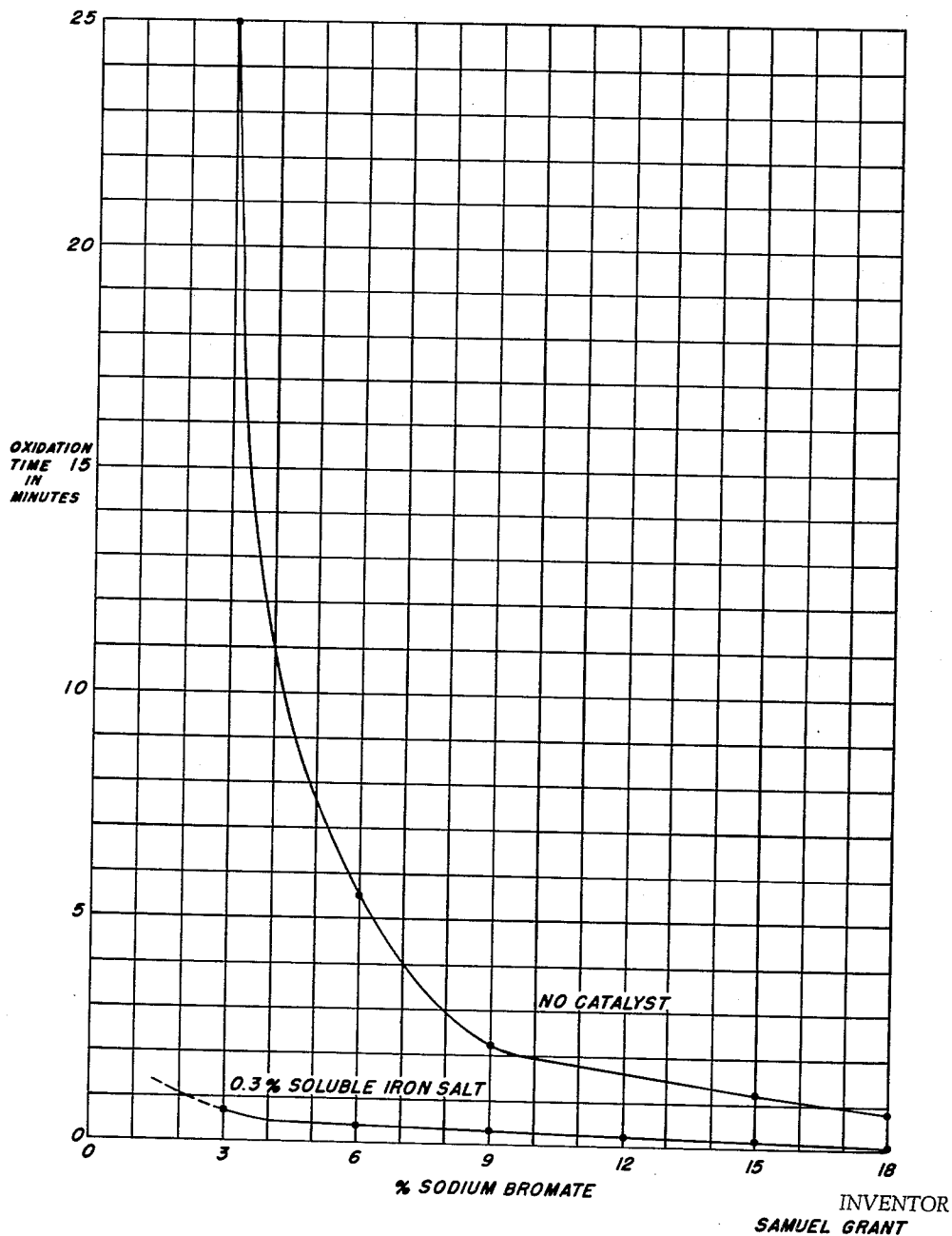
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COLD WAVE NEUTRALIZING COMPOSITION AND PROCESS

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COLD WAVE NEUTRALIZING COMPOSITION AND PROCESS

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This invention relates to a composition and process for neutralizing a keratin reducing cold wave lotion applied to the hair.

As heretofore practiced in the prior art, the cold waving of human hair involved several disadvantages. The procedure in the beauty salon has been both time consuming and tedious and has required an initial shampoo, the application of a keratin reducing cold wave lotion and winding of the hair on curlers, rinsing the wave lotion from the hair, the application of a neutralizer to oxidize and counteract the effect of the cold wave lotion, and then washing the hair again to remove the excess oxidizing agent of the neutralizer. The reducing and oxidizing steps involved considerable time since it was necessary to obviate the dangers of excessive reducing or inadequate neutralizing.

It is, therefore, a primary object of the present invention to provide a novel composition and process for neutralizing the keratin reducing cold wave lotion in less time than heretofore possible and also with greater assurance of complete neutralization.

Another object is to provide a composition and process of the character described which will be simpler and more effective in use and which will eliminate the necessity for more than one rinse.

The neutralizing agents generally employed to oxidize the cold wave lotion are sodium and potassium bromates. The essence of the present invention resides in the discovery that ferrous, ferric, and copper ions act as catalysts to increase the reaction rate of sodium and potassium bromate neutralizing agents. That is, the neutralizing composition of the present invention comprises soluble iron or copper salts in solution with the oxidizing agent to provide the desired catalytic ferrous, ferric or copper ions. Although copper ions showed some catalytic effect at higher concentrations, it has been discovered that ferrous and ferric ions are most effective even at low concentration. Furthermore, even when the ferrous and ferric ions are complexed with a powerful sequestering agent such as ethylene diamine tetra acetic acid, or its salts or derivatives, the catalytic action of the iron ions was not deleteriously affected. The catalytic effect of the iron salt is illustrated in the accompanying drawing illustrating a graph showing oxidation of approximately 0.8 M thioglycolic acid by sodium bromate solutions with and without catalyst using ten cubic centimeters of each.

Referring to the drawing, oxidation time in minutes is plotted against percent sodium bromate. The lower curve shows the action of sodium bromate solutions containing 0.3% soluble iron salt, and the upper curve shows the action of sodium bromate solutions without catalyst.

It has further been discovered that the presence of these catalysts not only eliminated the residual waving agent as a deterrent in the neutralization process, but accelerated the re-oxidation of the reduced keratin molecules as well. It was found that hair treated with waving lotion and then re-oxidized with a catalyzed neutralizing composition in accordance with the present invention exhibited a greater similarity to virgin hair than heretofore obtainable with any other known type of neutralization composition employed in cold waving. The catalyzed neutralizing composition of the present invention also provides a tighter curl and deeper waves to the hair than obtainable with prior art compositions.

The catalytic ferric and ferrous ions are provided in the neutralizing solution by dissolving therein almost any soluble ionizable iron salt compound, such as ferric chloride, ferrous ammonium sulfate, or "Sequestrene NaFe" which is the trademark designation for mono sodium ferric ethylene diamine tetra acetate. The latter forms an iron complex which remains dissolved in both alkaline and acidic solutions. However, it is to be understood that other iron compounds which dissolve to form ferric and ferrous ions may also be employed instead of the specific compounds enumerated above.

If it is desired to employ copper ions as the catalytic agent instead of ferric or ferrous ions, cupric chloride or other soluble copper salts may be employed.

The neutralizing composition of the present invention is preferably, although not necessary, provided with the usual clouding, emulsifying, wetting, and buffering agents, in addition to perfume and coloring matter. The clouding agent may be a butadiene styrene polymer. The clouding agent permits the beautician to observe when the neutralizing solution soaks into the hair. The wetting agent may be a sodium salt of lauryl alcohol sulfate or any other suitable wetting agent. Other agents which may be included in the neutralizing composition are sodium hexa meta phosphate, tetra sodium pyro phosphate, sodium hydroxide, and conventional sequestering compounds.

Several specific examples of a neutralizing composition in accordance with the present invention are given below. It is to be understood that these neutralizing compositions have proportions of their several active components suitable for use with the usual keratin reducing cold wave lotion having approximately seven percent by weight of thioglycolic acid as the reducing agent. If a different wave lotion is employed, it may be desirable to vary the proportions of the several active components of the specific examples of the present invention given below.

If desired, the neutralizing composition of the present invention may be marketed in the form of two separate components in individually packaged containers, the components being mixed just prior to use. A typical production batch for this form is exemplified by the following:

Example 1

First component:

Sodium bromate	110 lbs.
Buffering agent	15 oz.
Wetting agent	15 oz.
Clouding agent	18 lbs.
Water	94.5 gals.

Second component:

Mono sodium ferric ethylene diamine tetra acetate	52 lbs., 7 oz.
Wetting agent	175 lbs.
Perfume	2 lbs., 3 oz.
Coloring matter	50 cc.
Water	77.5 gals.

For use with the conventional keratin reducing wave lotion containing approximately seven percent thioglycolic acid by weight, it has been found that the neutralizing composition of the present invention requires approximately not less than three percent by weight of sodium bromate or approximately two and one-half percent by weight of bromate ions. Instead of this amount of sodium bromate, other alkali or alkaline earth metal bromates may be employed in the proper proportion to give this minimum bromate concentration below which the rate of reaction of the composition becomes too slow. It has also been found that increasing the concentration above approximately fifteen percent of bromate ions by weight produces no significant increase in the effectiveness of the composition.

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The minimum concentration of ferrous or ferric ions has been found to be approximately 0.001% by weight. This corresponds to a concentration of approximately 0.01% of mono sodium ferric ethylene diamine tetra acetate when the latter is employed as the soluble iron salt. It will be understood that when other iron salts are employed to provide the catalytic ferrous or ferric ions that concentration of salt is selected which will provide at least the minimum concentration of ferrous or ferric ions noted above.

When copper ions are employed as the catalytic agent instead of iron ions, a greater minimum concentration has been found necessary. In the case of cupric chloride, this minimum concentration is approximately 0.1% by weight. Other soluble copper salts may be employed to provide the equivalent copper ion concentration.

Another specific example illustrative of compositions in accordance with the present invention is as follows, the indicated percentages being by weight:

Example 2

	Percent
NaBrO ₃ -----	12
Wetting agent -----	1.0
Sequestering agent -----	0.5
FeCl ₃ -----	0.25
H ₂ O -----	84.25
Clouding agent -----	2.0

The composition of Example 2 is stable in storage over long periods, and the catalytic activity is maintained. The catalyzed neutralizing composition in accordance with the present invention is utilized in a manner similar to that employed with conventional cold wave neutralizing compositions and is applied to the hair while the latter is rolled on curlers. However, the time required for neutralization is considerably reduced by the present invention.

It is to be understood that the specific embodiments of the invention described above are merely illustrative of several of the many forms which the invention may take in practice without departing from the scope thereof as delineated in the appended claims.

What I claim and desire to secure by Letters Patent of the United States is:

1. A process for neutralizing a keratin reducing cold wave solution on the hair, said process comprising applying to the hair a neutralizing solution including by weight between 3% and 18% bromate salts selected from the group consisting of alkali and alkali earth metal bromates, at least 0.001% of iron, and a sequestering agent.

2. A process for neutralizing a keratin reducing cold

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wave solution on the hair, said process comprising applying to the hair a solution including a bromate salt selected from the group consisting of alkali and alkali earth metal bromates and monosodium ferric ethylene diamine tetra acetate.

3. A composition for neutralizing a keratin reducing cold wave solution on the hair, said composition comprising an aqueous solution of a water soluble bromate salt selected from the group consisting of alkali and alkali earth metals, a water soluble salt of a metal selected from the group consisting of iron and copper as a catalyst to increase the reaction rate of the bromate salt, and a sequestering agent.

4. A composition for neutralizing a keratin reducing cold wave solution on the hair, said composition comprising an aqueous solution of a water soluble bromate salt selected from the group consisting of alkali and alkali earth metals, a water soluble salt of iron in the concentration of at least .001 percent iron as a catalyst to increase the reaction rate of the bromate salt, and a sequestering agent.

5. A composition for neutralizing a keratin reducing cold wave solution on the hair, comprising an aqueous neutralizing solution of a water soluble bromate salt selected from the group consisting of alkali and alkali earth metal bromates, and monosodiumferricethylenediamine tetraacetate, the amount of iron being at least 0.001 percent by weight of the composition.

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