esters are cationic, and therefore could potentially replace traditional cationic hair conditioning agents, such as behentrimonium chloride (BTAC) and cetrimonium chloride (CETAC), which traditionally have unfavorable environmental profiles.

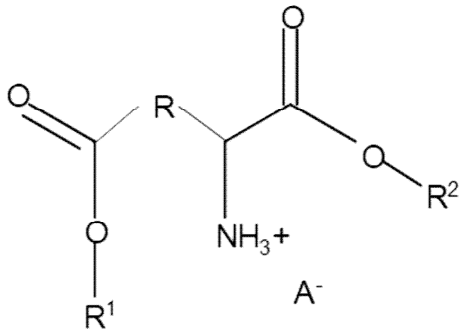
[0004] One drawback of the neutralized amino acid ester is that it is a more expensive cationic ingredient than other cationic components typically used in hair care compositions, such as quaternary ammonium compounds and amidoamines. In addition, a greater amount of the neutralized amino acid ester, compared to the traditional cationic active agents, is often required to achieve acceptable performance. Using more of an ingredient that is already more costly results in a more expensive product to manufacture. It would therefore be desirable to have composition actives that are derived from renewable sources, but that can also deliver acceptable performance at lower cost, and at use levels comparable to the use levels used for traditional cationic active agents.

SUMMARY OF THE DISCLOSURE

[0005] The present technology is directed to dialkyl amino acid ester salts that are the reaction product of a neutralized (protonated) amino acid and a fatty alcohol. The dialkyl amino acid ester salts can be used in compositions as a cationic component either alone or in combination with a glyceride component. The glyceride component comprises monoglycerides, diglycerides, or mixtures thereof, and optionally, from 0 to 50% by weight triglycerides, based on the total weight of the glycerides. In some examples, combining glycerides with the dialkyl amino acid ester salt can improve the wet combing properties of the dialkyl amino acid ester salt.

[0006] In one example, the present technology is directed to a composition comprising:

(a) 0.01% to about 50% by weight of a cationic active component comprising a dialkyl amino acid ester salt having the following chemical formula:



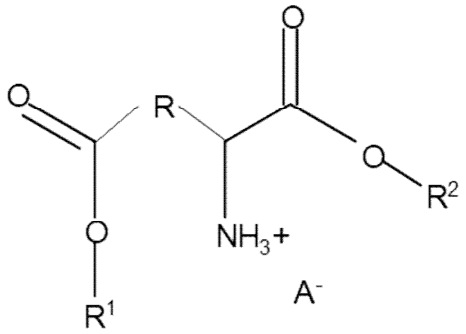
wherein R is a linear or branched carbon chain containing 1 to 10 carbon atoms, R^1 and R^2 are independently C8 to C22 linear or branched alkyl groups, and A^- is the anion of a proton-donating acid;

(b) optionally, one or more additional components; and

(c) diluent to balance the composition to 100%. In one example, the composition is a hair conditioning composition.

[0006a] In one aspect, the present technology is directed to a composition comprising:

(a) 0.01% to about 50% by weight of a cationic active component comprising a dialkyl amino acid ester salt having the following chemical formula:



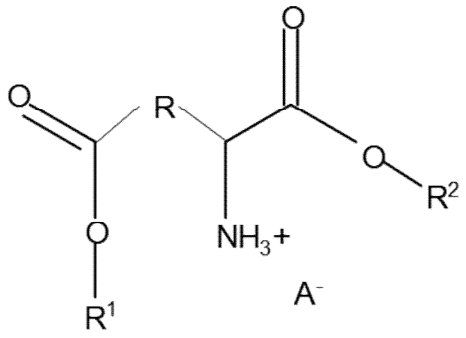
wherein R is a linear or branched carbon chain containing 1 to 10 carbon atoms, and R^1 and R^2 are independently C8 to C22, preferably C8 to C16, linear or branched alkyl groups, and A^- is an anion of a proton-donating acid;

(b) optionally, one or more additional components; and

(c) diluent to balance the formulation to 100%.

[0006b] In another aspect, the present technology is directed to a hair conditioning composition comprising:

(a) 0.01% to about 50% by weight of a cationic active component comprising a dialkyl amino acid ester salt having the following chemical formula:



wherein R is a linear or branched carbon chain containing 1 to 10 carbon atoms, and R^1 and R^2 are independently C8 to C22, preferably C8 to C16, linear or branched alkyl groups, and A^- is an anion of a proton-donating acid;

(b) 0.01% to about 40% of one or more linear or branched alcohols having between 14 and 22 carbon atoms;

(c) optionally, one or more additional components; and

(d) diluent to balance the formulation to 100%;

wherein the composition has a pH between 3 and 6.

[0006c] In another aspect, the present technology is directed to a method of conditioning hair comprising applying to the hair the composition as described above.

[0007] In a further example, the present technology is directed to a method of making a dialkyl amino acid ester salt comprising the steps of:

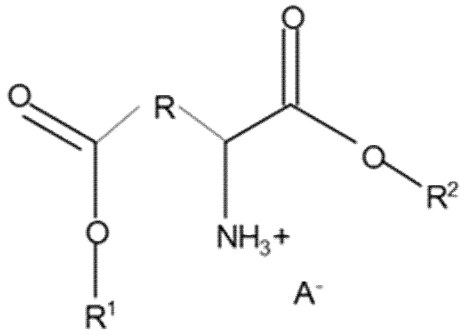
(a) providing an amino acid having at least two carboxylic acid groups;

(b) providing a fatty alcohol feedstock, wherein the fatty alcohol feedstock comprises one or more linear or branched, saturated or unsaturated fatty alcohols having from 8 to about 22 carbon atoms;

(c) providing a proton-donating acid to protonate the amine group of the amino acid; and

(d) in the absence of added solvent, reacting the protonated amino acid with the fatty alcohol feedstock to form the dialkyl amino acid ester salt.

[0008] In another aspect, the present technology is directed to a dialkyl amino acid ester salt having the following chemical formula:



wherein R is a carbon chain containing 1 or 2 carbon atoms, R1 and R2 are independently C8 to C22, preferably C8 to C16, linear or branched alkyl groups, and A- is ethane sulfonate or methane sulfonate.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0009] The compositions of the present technology comprise one or more dialkyl amino acid ester salts that are derived from biorenewable sources, and provide conditioning, softening, or cleaning performance.

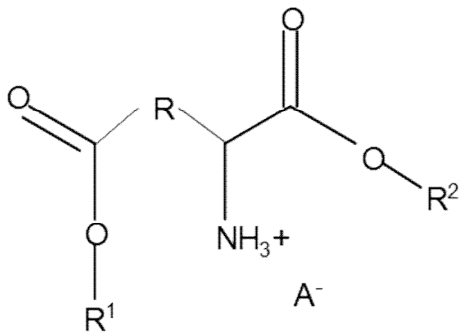
[0010] “Biorenewable Carbon Index” (BCI) refers to a calculation of the percent carbon derived from a biorenewable resource, and is calculated based on the number of biorenewable carbons divided by the total number of carbons in the entire molecule.

[0011] “Biorenewable” is defined herein as originating from animal, plant, or marine material.

CLAIMS

1. A composition comprising:

(a) 0.01% to about 50% by weight of a cationic active component comprising a dialkyl amino acid ester salt having the following chemical formula:



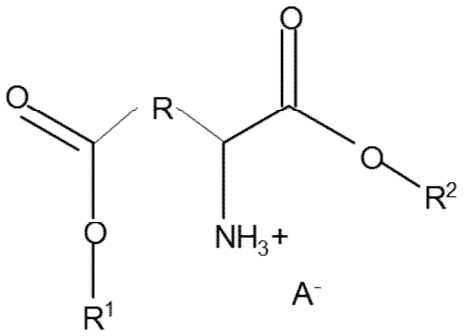
wherein R is a linear or branched carbon chain containing 1 to 10 carbon atoms, and R^1 and R^2 are independently C8 to C22, preferably C8 to C16, linear or branched alkyl groups, and A^- is an anion of a proton-donating acid;

(b) optionally, one or more additional components; and

(c) diluent to balance the formulation to 100%.

2. A hair conditioning composition comprising:

(a) 0.01% to about 50% by weight of a cationic active component comprising a dialkyl amino acid ester salt having the following chemical formula:



wherein R is a linear or branched carbon chain containing 1 to 10 carbon atoms, and R^1 and R^2 are independently C8 to C22, preferably C8 to C16, linear or branched alkyl groups, and A^- is an anion of a proton-donating acid;

(b) 0.01% to about 40% of one or more linear or branched alcohols having between 14 and 22 carbon atoms;

(c) optionally, one or more additional components; and

(d) diluent to balance the formulation to 100%;

wherein the composition has a pH between 3 and 6.

3. The composition of claim 1 or 2, wherein the proton-donating acid is selected from the group consisting of lactic acid, citric acid, maleic acid, adipic acid, boric acid, glycolic acid, formic acid, acetic acid, ascorbic acid, uric acid, oxalic acid, butyric acid, oxalic acid, formic acid, methane sulfonic acid, ethane sulfonic acid, higher alkyl analogs of ethane sulfonic acid, hydrochloric acid, sulfuric acid, nitric acid, phosphoric acid, and combinations thereof.

4. The composition of any one of claims 1-3, wherein the R^1 and R^2 groups are derived from an alcohol source having an iodine value of less than 3.

5. The composition of any one of claims 1-4, wherein the dialkyl amino acid ester salt is dialkylaspartate ethanyl sulfonate or dialkylglutamate ethanyl sulfonate, wherein the combined R^1 and R^2 alkyl groups are between 65 wt% and 75 wt% C12, between 20 wt% and 30 wt% C14, and between 3 wt% and 8 wt% C16.

6. The composition of any one of claims 2-5, wherein the one or more linear or branched alcohols are saturated alcohols.

7. The composition of any one of claims 1-6, wherein the one or more additional components comprises a glyceride component.

8. The composition of claim 7, wherein the glyceride component comprises from about 5% to about 50% by weight, and the dialkyl amino acid ester salt comprises about 50% to about 95% by weight, based on the combined weight of the dialkyl amino acid ester salt and glyceride components.

9. The composition of claim 7 or 8, wherein the glyceride component comprises a combination of monoglycerides and diglycerides having a carbon chain length of 8-32 carbon atoms, preferably 16-22 carbon atoms.

10. The composition of claim 9, wherein at least 50% of the carbon chains in the monoglycerides and diglycerides in the glyceride component have at least one double bond.

11. The composition of any one of claims 7-10, wherein the glyceride component and the dialkyl amino acid ester salt together have a BCI of at least 90, preferably 100.

12. The composition of any one of claims 1-11, wherein the diluent comprises water, a solvent, or a combination thereof.

13. The composition of claim 2, wherein the composition, when applied to a hair tress, provides a wet combing Dia-Stron maximum peak load of about 55 gram mass force (gmf) or less.

14. The composition of any one of claims 1-13, wherein the dialkyl amino acid ester salt is present in the composition in an amount of 0.01% to about 12%, preferably about 0.1% to about 5% by weight of the composition.

15. The composition of any one of claims 7-13, wherein the dialkyl amino acid ester salt and glyceride component together comprise about 0.01% to about 17% by weight of the composition, preferably about 0.1% to about 7% by weight of the composition.

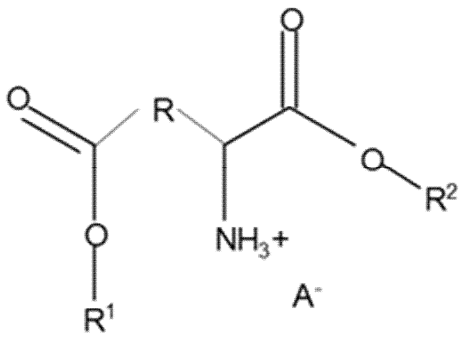
16. The composition of any one of claims 1-15, wherein the cationic active component comprises the dialkyl amino acid ester salt and a solvent.

17. The composition of claim 16, wherein the solvent is selected from the group consisting of propylene glycol, 1,3-propandiol, glycol ethers, glycerin, sorbitan esters, lactic acid, alkyl lactyl lactates, isopropyl alcohol, ethyl alcohol, dimethyl adipate, oleyl alcohol, 1,2-isopropylidine glycerol, benzyl alcohol, dimethyl lauramide myristamide, N-butyl lactate, citrate esters, dimethyl lactide, laureth-2 lactide, 1,2-butylene carbonate, conjugated linoleic acid, isosorbide dimethyl ether, propylene carbonate, C6-C18 methyl esters, C12-15 alkyl benzoate, glycerol monooleate, triglyceride oils, jojoba oil, sunflower oil/MDEA esteramine, and combinations thereof.

18. The composition of claim 16 or 17, wherein the dialkyl amino acid ester salt comprises from about 30% to about 99% by weight of the cationic active component, and the solvent comprises from about 1% to about 70% by weight of the cationic active component.

19. A method of conditioning hair comprising applying to the hair the composition of any one of claims 1-18.

20. A dialkyl amino acid ester salt having the following chemical formula:



wherein R is a carbon chain containing 1 or 2 carbon atoms, R^1 and R^2 are independently C8 to C22, preferably C8 to C16, linear or branched alkyl groups, and A^- is ethane sulfonate or methane sulfonate.