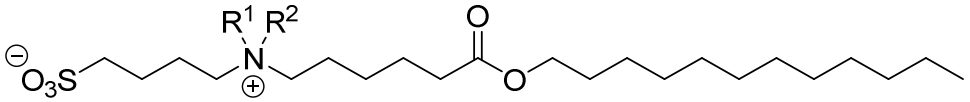
CLAIMS

1. A method of synthesizing an amino acid surfactant, comprising the steps of: (1) opening a lactam to yield an amino acid having an N-terminus;

(2) reacting the N-terminus of the amino acid with an alkylating agent to yield a tertiary amine;

(3) reacting the tertiary amine with an alcohol under acidic conditions to yield an amino acid ester having an N-terminus; and

(4) reacting the N-terminus of the amino acid ester with a sulfonating agent to yield an amino acid surfactant of the following formula:



wherein R^1 and R^2 are independently chosen from C_1-C_6 alkyl, wherein in step 1, the lactam is caprolactam.

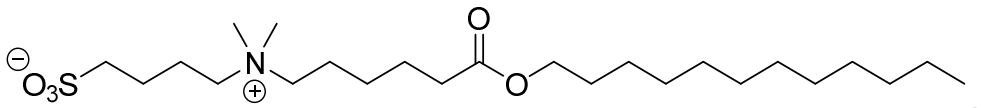
2. The method of Claim 1, wherein in step 2, the alkylating agent is formaldehyde or paraformaldehyde.

3. The method of Claim 1 or Claim 2, wherein in step 3, the alcohol is dodecanol.

4. The method of any one of Claims 1-3, wherein in step 3, the acid is *p*-toluene sulfonic acid.

5. The method of Claim 1, wherein in step 4, the sulfonating agent is 1,4-butanesultone.

6. The method of any one of Claims 1-5, wherein the amino acid surfactant is 4-((6-(dodecyloxy)-6-oxohexyl)dimethylammonio)butane-1-sulfonate, having the following formula:



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7. The method of Claim 6, wherein the amino acid surfactant has a critical micelle concentration (CMC) of about 0.1 mmol in water.

8. The method of Claim 6 or Claim 7, wherein the amino acid surfactant has a plateau value of a minimum surface tension in water of about 36 mN/m.

9. The method of any one of Claims 6-8, wherein the amino acid surfactant has a surface tension in water equal to or less than 37 mN/m at a concentration of 1 mmol or greater.

10. The method of any one of Claims 6 to 9, wherein the amino acid surfactant has a surface tension in water equal to or less than 40.5 mN/m at a surface age of 4000 ms or greater.