The present invention relates to alkoxylated esteramines of Formula (I) and salts thereof. Esteramines according to the present invention may be used in cleaning composition, for example in liquid laundry detergents. They lead to improved cleaning performance of said compositions, for example when used in cold water washing conditions. They surprisingly boost grease cleaning performance of liquid laundry detergents, especially under cold water washing conditions. Whiteness is also improved. The esteramine according to the present invention show improved compatibility in liquid laundry detergent formulations.
Alkoxylated esteramines and salts thereof

Description

The invention relates to alkoxylated esteramines and salts thereof.

Due to the increasing popularity of easy-care fabrics made of synthetic fibers as well as the increasing energy costs and growing ecological concerns of detergent users, the once popular hot water wash has now taken a back seat to washing fabrics in cold water. Many commercially available laundry detergents are even advertised as being suitable for washing fabrics at 40°C or 30°C or even at room temperature. To achieve satisfactory washing result at such low temperatures, i.e. results comparable to those obtained with hot water washes, the demands on low temperature detergents are especially high.

It is known to include certain additives in detergent compositions to enhance the detergent power of conventional surfactants so as to improve the removal of grease stains at temperatures of 60°C and below.

US6346643 discloses a process for the preparation of esters of poly(ethylene glycol) with amino acid hydrochlorides.

DE 2025629 discloses esters of glutamic acid and C10 to C18 fatty alcohols and derivatives.

WO 2007/054226 describes the use of pyroglutamic acid esters as gas hydrate inhibitors. The pyroglutamic acid esters are obtained by esterification of pyroglutamic acid or glutamic acid with an alcohol comprising 1 to 100 hydroxyl groups.

JP2003064282 discloses ligands for semiconductor particles based on triethylene glycol C1 to C7 monoethers esterified with C2 to C21 aminoacids.

JP2005263890 discloses esters of C6 to C10 ζ- to ω-amino acids of ethoxylated glycerols.

WO2003059317 describes polyethylene glycol monomethyl or -ethyl ethers esterified with alpha-aminoacids as part of a medicinal aerosol composition.

There is a continuous need for cleaning compositions that remove grease stains from fabrics and other soiled materials, as grease stains are challenging stains to remove. Conventional cleaning compositions directed to grease removal frequently utilize various amine compounds which tend to show strong negative impacts on whiteness. As a consequence there is still a
continual need for amine compounds which provide grease removal abilities from fabrics and other soiled materials which at the same time do not negatively impact clay cleaning abilities or whiteness. There is a need for compounds having grease cleaning abilities at low temperatures.

It was an object of the present invention to provide compounds which comply with the above identifies objectives and needs.

This goal was achieved by the present invention as described herein below and as reflected in the claims.

Throughout this specification and the claims which follow, unless the context requires otherwise, the word "comprise", and variations such as "comprises" and "comprising", will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integer or step. When used herein the term "comprising" can be substituted with the term "containing" or "including" or sometimes when used herein with the term "having".

When used herein "consisting of excludes any element, step, or ingredient not specified in the claim element. When used herein, "consisting essentially of" does not exclude materials or steps that do not materially affect the basic and novel characteristics of the claim.

In each instance herein any of the terms "comprising", "consisting essentially of" and "consisting of" may be replaced with either of the other two terms.

Generally, as used herein, the term "obtainable by" means that corresponding products do not necessarily have to be produced (i.e. obtained) by the corresponding method or process described in the respective specific context, but also products are comprised which exhibit all features of a product produced (obtained) by said corresponding method or process, wherein said products were actually not produced (obtained) by such method or process. However, the term "obtainable by" also comprises the more limiting term "obtained by", i.e. products which were actually produced (obtained) by a method or process described in the respective specific context.

The present invention relates to alkoxylated esteramines of Formula (I) and salts thereof,
wherein independently from each other

n being an integer from 1 to 12,
m being an integer for each repetition unit n independently selected from 0 to 12;
p being an integer from 0 to 12,
o being an integer for each repetition unit p independently selected from 0 to 12;
r being an integer from 0 to 12,
q being an integer for each repetition unit r independently selected from 0 to 12;
s being an integer from 0 to 100;
t being an integer from 1 to 100;
u being an integer from 0 to 100;
v being an integer from 0 to 100;

with the sum of s, t, u, and v being equal to or greater than 1;

A1, A2, A3, and A4 are independently from each other and independently for each repetition unit
s, t, u, or v, selected from the list consisting of ethyleneoxy group, 1,2-propyleneoxy group, 1,2-
butyleneoxy group, 2,3-butylenoxy group, i-butylenoxy group, pentyleneoxy group, hexylene-
oxy group, styryloxy group, decenyloxy group, dodecenyloxy group, tetradeccenyloxy group, and
hexadecanyloxy group, wherein for s, t, u, or v equal to 1 the oxygen atom of the A1, A2, A3,
and A4 group is bound to the B group and the following A1, A2, A3, and A4 groups are always
bound via the oxygen atom to the previous A1, A2, A3, and A4 group.
B₁, B₂, B₃, and B₄ are independently from each other selected from the group consisting of a bond, linear C₁ to C₁₂ alkanediyl groups, and branched C₁ to C₁₂ alkanediyl groups;
R₄, R₆, and R₁₂ being selected from the group consisting of H, linear alkyl, branched alkyl, and cycloalkyl;
Rᵢ, R₂, and R₃ being independently for each repetition unit m of each repetition unit n being selected from the group consisting of H, linear alkyl, branched alkyl, and cycloalkyl;
R₅, R₆, and R₇ being independently for each repetition unit o of each repetition unit p being selected from the group consisting of H, linear alkyl, branched alkyl, and cycloalkyl;
R₉, R₁₀, and R₁₁ being independently for each repetition unit q of each repetition unit r being selected from the group consisting of H, linear alkyl, branched alkyl, and cycloalkyl;
i) with the proviso that when p and r are both equal to 0, and n being at least 1, Z₁ and Z₂, are independently selected from the group consisting of OH, alanine, arginine, asparagine, aspartic acid, cysteine, glutamine, glycine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine, valine, and a compound according to Formula (II), wherein said compound according to Formula (II) connects to the compound according to Formula (I) via the bond labeled with *, with the proviso that at least one substituent Z₁ and/or Z₂ is not OH, and with the proviso that R₃ contains equal to or more than 2 carbon atoms;

![Formula II](image)

with independently from each other
w being an integer from 0 to 12;
R₁₃ and R₁₄ independently for each repetition unit w being selected from the group consisting of H, linear alkyl, branched alkyl, and cycloalkyl;
R₁₅, R₁₆, R₁₇, and R₁₈ being selected from the group consisting of H, linear alkyl, branched alkyl, and cycloalkyl;
ii) with the proviso that when n and p are individually equal to or greater than 1 and r is equal to or greater than 0, Z₁, and/or Z₂, and/or Z₃, and/or Z₄, independently for each repetition unit n, p, and r, are selected from the group consisting of OH, alanine, arginine, asparagine, aspartic acid,
cysteine, glutamine, glycine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, pro-
line, serine, threonine, tryptophan, tyrosine, valine, and a compound according to Formula (II),
wherein said compound according to Formula (II) connects to the compound according to For-
formula (I) via the bond labeled with ˚, with the proviso that at least one substituent Z1, and/or Z2,
and/or Z3, and/or Z4, is not OH, and wherein for n and p equal to 1 and r equal to 0 at least one
unit A1, A2, or A3 is selected from the group consisting of 1,2-propyleneoxy group, 2-1,2-propl-
yleneoxy group, 1,2-butylenoxy group, 2,3-butylenoxy group, i-butylenoxy group, pentyleneoxy
group, hexyleneoxy group, styryloxy group, decenyloxy group, dodecyloxy group, tetrade-
cenyloxy group, and hexadecanyloxy group.

Esteramines according to the present invention may be used in cleaning composition, for exam-
ple in liquid laundry detergents. They lead to improved cleaning performance of said compo-
sitions, for example when used in cold water washing conditions. They surprisingly boost grease
cleaning performance of liquid laundry detergents, especially under cold water washing condi-
tions. The esteramine according to the present invention show improved compatibility in liquid
laundry detergent formulations.

In the following, the various embodiments of the present invention are described in more detail:

A1, A2, A3, and A4 are independently from each other and independently for each repetition unit
s, t, u, or v, selected from the list consisting of ethyleneoxy group, 1,2-propyleneoxy group, 1,2-
butylenoxy group, 2,3-butylenoxy group, i-butylenoxy group pentyleneoxy group, hexyleneoxy
group, styryloxy group, decenyloxy group, dodecyloxy group, tetradenemyloxy group and hexade-
cenyloxy group, wherein for s, t, u, and/or v equal to 1 the oxygen atom of the A1, A2, A3, and A4
group is bound to the B group and the following A1, A2, A3, and A4 groups are always bound via
the oxygen atom to the previous A1, A2, A3, and A4 group. When either of s, t, u, or v is equal to
or more than 2, the independently selected A1, A2, A3, and A4 for each repetition unit s, t, u, or v
either form a randomly distributed sidechain of various alkenyleneoxy units for each sidechain s, t,
u, or v, or the form a block structure with at least one alkenyleneoxy group repeating itself at least
two times, optionally followed by further blocks of different alkenyleneoxy group repeating them-
selves at least two times.

In one embodiment A1, A2, A3, and A4 are independently from each other and independently for
each repetition unit s, t, u, or v, selected from the list consisting of ethyleneoxy group, 1,2-propyl-
eneoxy group, 2-1,2-propyleneoxy group, and 1,2-butylenoxy group. In another embodiment, A1,
A2, A3, and A4 form each a block of at least two ethyleneoxy groups followed by a block of at least
two propyleneoxy groups, optionally followed by another block of at least two ethyleneoxy groups.
In another embodiment, A1, A2, A3, and A4 form each a block of at least two 1,2-propyleneoxy
groups followed by a block of at least two ethylenoxy groups, optionally followed by another block of at least two 1,2-propyleneoxy groups. In another embodiment, A1, A2, A3, and A4 are selected from the list consisting of ethylenoxy group, 1,2-propyleneoxy group, and 1,2-butyleneoxy group in such a way that at least one block of ethylenoxy groups, 1,2-propyleneoxy groups, or 1,2-butyleneoxy groups is formed, optionally followed by one or more blocks of ethylenoxy groups, 1,2-propyleneoxy groups, or 1,2-butyleneoxy groups. In another embodiment, A1, A2, A3, and A4 are ethylenoxy groups. In another embodiment, A1, A2, A3, and A4 are 1,2-propyleneoxy groups. In another embodiment, A1, A2, A3, and A4 are selected in such a way that at least for one of A1, A2, A3, and A4 a block of one to five ethylenoxy groups is followed by a block of one to three propyleneoxy groups followed by a block of one to five ethyleneoxy groups.

In one embodiment, s, u, or v are each individually in the range of from 0 to 50 and t in the range of from 1 to 50. In another embodiment, s, u, or v are each individually in the range of from 0 to 20 and t in the range of from 1 to 20.

It is recognized that the alkoxylated esteramines of the present disclosure may be asymetrically alkoxylated, meaning that the degree of alkoxylolation may not be the same in each portion of the compound. Put another way, when at least two of s, t, u, and v are at least 1, the at least two of s, t, u, and v may not be equal to each other in a given compound.

In one embodiment of the present invention, B1, B2, B3, and B4 are independently from each other selected from the group consisting of a bond, and linear C1 to C12 alkanediyl groups. In another embodiment, B1, B2, B3, and B4 are independently from each other selected from the group consisting of a bond, and linear C1 to C6 alkanediyl groups. In another embodiment, B1, B2, B3, and B4 are independently from each other selected from the group consisting of a bond, and linear C1 to C3 alkanediyl groups. In another embodiment, B1, B2, B3, and B4 are independently from each other selected from the group consisting of a bond, and a C1 alkanediyl group. In another embodiment B1, B2, B3, and B4 are all selected from the group consisting of a bond, and a C1 alkanediyl group. In another embodiment B1, B2, B3, and B4 are all a bond.

In one embodiment of the present invention, R1, R2, R3, R4, R5, R6, R7, Rs, R9, R10, R11, and R12 are all independently selected from the group consisting of H, linear alkyl, branched alkyl, and cycloalkyl. In one embodiment, R1, R2, R3, R4, R5, R6, R7, Rs, R9, R10, R11, and R12 are all independently selected from the group consisting of H, linear C1 to C12 alkyl, and C1 to C12 branched
alkyl. In another embodiment, R₁, R₂, R₃, R₄, R₅, R₆, R₇, R₈, R₉, R₁₀, R₁₁, and R₁₂ are all independently selected from the group consisting of H, linear C₁ to C₆ alkyl, and C₁ to C₉ branched alkyl.

For any one Z₁, Z₂, Z₃, and Z₄ being selected a compound according to Formula (II), said compound according to Formula (II) connects to the compound of Formula (I) via the bond labeled with 'w',

\[
\begin{align*}
\text{(Formula II)}
\end{align*}
\]

with independently from each other
w being an integer from 0 to 12;
R₁₃ and R₁₄ independently for each repetition unit w being selected from the group consisting of H, linear alkyl, branched alkyl, and cycloalkyl;
R₁₅, R₁₆, R₁₇, and R₁₈ being selected from the group consisting of H, linear alkyl, branched alkyl, and cycloalkyl. In one embodiment of the present invention, R₁₃, R₁₄, R₁₅, R₁₆, R₁₇, and R₁₈ are all independently selected from the group consisting of H, linear C₁ to C₁₂ alkyl, and C₁ to C₁₂ branched alkyl. In another embodiment, R₁₃, R₁₄, R₁₅, R₁₆, R₁₇, and R₁₈ are all independently selected from the group consisting of H, linear C₁ to C₆ alkyl, and C₁ to C₉ branched alkyl.

In one embodiment of the present invention, p and r are both equal to 0, and n being at least 1, Z₁ and Z₂, are independently selected from the group consisting of OH, alanine, glycine, lysine, and a compound according to Formula (II), wherein w is an integer in the range of from 1 to 4, wherein said compound according to Formula (II) connects to the compound according to Formula (I) via the bond labeled with 'w', with the proviso that at least one substituent Z₁ and/or Z₂ is not H, and with the proviso that R₃ contains equal to or more than 2 carbon atoms. In one embodiment of the present invention, p and r are both equal to 0, and n being at least 1, Z₁ and Z₂, are independently selected from the group consisting of alanine, a compound according to Formula (II), wherein w = 0 and R₁₅ to R₁₈ are all H, a compound according to Formula (II), wherein w = 1 and R₁₃ to R₁₈ are all H, and a compound according to Formula (II), wherein w = 3 and R₁₃ to R₁₈ are all H, wherein said compound according to Formula (II) connects to the compound
according to Formula (I) via the bond labeled with *, with the proviso that at least one substituent $Z_1$ and/or $Z_2$ is not H, and with the proviso that $R_3$ contains equal to or more than 2 carbon atoms.

In one embodiment of the present invention, $p$ and $r$ are both equal to 0, and $n$ being 1, with $m$ being in the range of from 0 to 10, with $R_8$ and $R_{12}$ being H. In another embodiment of the present invention, $p$ and $r$ are both equal to 0, and $n$ being 1, with $m$ being in the range of from 0 to 5, with $R_8$ and $R_{12}$ being H. In one embodiment, $p$ and $r$ are both equal to 0, and $n$ being at least 1, wherein $m$ is equal to 1 and $R_1$ and $R_2$ are both linear C2 to C4 alkyl groups. In another embodiment of the present invention, $p$ and $r$ are both equal to 0, and $n$ being 1, with $m$ being in the range of from 0 to 1, with $R_8$ and $R_{12}$ being H and $B_1$ and $B_2$ being bonds. In another embodiment of the present invention, $p$ and $r$ are both equal to 0, and $n$ being 1, with $m$ being 1, $R_3$, $R_4$, $R_5$ and $R_{12}$ being H, $R_1$ and $R_2$ being methyl, and $B_1$ and $B_2$ being bonds. In another embodiment of the present invention, $p$ and $r$ are both equal to 0, and $n$ being 1, with $m$ being 1, $R_3$, $R_4$, $R_5$ and $R_{12}$ being H, $R_1$ being butyl, $R_2$ being ethyl, and $B_1$ and $B_2$ being bonds. In another embodiment of the present invention, $p$ and $r$ are both equal to 0, and $n$ being 1, with $m$ being 1, $R_3$, $R_4$, $R_5$ and $R_{12}$ being H, $R_1$ being methyl, $R_2$ being propyl, and $B_1$ and $B_2$ being bonds. In another embodiment of the present invention, $p$ and $r$ are both equal to 0, and $n$ being 1, with $m$ being 1, $R_4$ being propyl, $R_3$, $R_5$ and $R_{12}$ being H, $R_1$ being ethyl, and $B_1$ and $B_2$ being bonds.

In one embodiment of the present invention, $p$ and $r$ are both equal to 0, and $n$ being 1, with $m$ being in the range of from 0 to 10, with $R_8$ and $R_{12}$ being H, $t$ is of from 1 to 10, $A_1$ is for each repetition unit $t$ selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups, $u$ is of from 1 to 10, and $A_2$ is for each repetition unit $u$ selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups. In another embodiment of the present invention, $p$ and $r$ are both equal to 0, and $n$ being 1, with $m$ being in the range of from 0 to 5, with $R_8$ and $R_{12}$ being H, $t$ is of from 1 to 10, $A_1$ is for each repetition unit $t$ selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups, $u$ is of from 1 to 10, and $A_2$ is for each repetition unit $u$ selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups. In one embodiment, $p$ and $r$ are both equal to 0, and $n$ being at least 1, wherein $m$ is equal to 1 and $R_1$ and $R_2$ are both linear C2 to C4 alkyl groups, $t$ is of from 1 to 10, $A_1$ is for each repetition unit $t$ selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups, $u$ is of from 1 to 10, and $A_2$ is for each repetition unit $u$ selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups. In another embodiment of the present invention, $p$ and $r$ are both equal to 0, and $n$ being 1, with $m$ being in the range of from 0 to 1, with $R_8$ and $R_{12}$ being H, $t$ is of from 1 to 10, $A_1$ is for each repetition unit $t$
selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups, \( u \) is of from 1 to 10, and \( A_2 \) is for each repetition unit \( t \) selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups. In another embodiment of the present invention, \( p \) and \( r \) are both equal to 0, and \( n \) being 1, with \( m \) being 1, \( R_3, R_4, R_5 \) and \( R_{12} \) being \( H \), and \( R_1 \) and \( R_2 \) being methyl, \( t \) is of from 1 to 10, \( A_1 \) is for each repetition unit \( t \) selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups, \( u \) is of from 1 to 10, and \( A_2 \) is for each repetition unit \( u \) selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups, and \( B_1 \) and \( B_2 \) being bonds. In another embodiment of the present invention, \( p \) and \( r \) are both equal to 0, and \( n \) being 1, with \( m \) being 1, \( R_3, R_4, R_5 \) and \( R_{12} \) being \( H \), and \( R_1 \) being methyl and \( R_2 \) being propyl, \( t \) is of from 1 to 10, \( A_1 \) is for each repetition unit \( t \) selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups, \( u \) is of from 1 to 10, and \( A_2 \) is for each repetition unit \( u \) selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups, and \( B_1 \) and \( B_2 \) being bonds. In another embodiment of the present invention, \( p \) and \( r \) are both equal to 0, and \( n \) being 1, with \( m \) being 1, \( R_3, R_4, R_5 \) and \( R_{12} \) being \( H \), and \( R_1 \) being methyl and \( R_2 \) being propyl, \( t \) is of from 1 to 10, \( A_1 \) is for each repetition unit \( t \) selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups, \( u \) is of from 1 to 10, and \( A_2 \) is for each repetition unit \( u \) selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups, and \( B_1 \) and \( B_2 \) being bonds. In another embodiment of the present invention, \( p \) and \( r \) are both equal to 0, and \( n \) being 5, with \( m \) being 0, with \( R_3, R_4, R_5 \) and \( R_{12} \) being \( H \), \( t \) is of from 1 to 10, \( A_1 \) is for each repetition unit \( t \) selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups, \( u \) is of from 1 to 10, and \( A_2 \) is for each repetition unit \( u \) selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups, and \( B_1 \) and \( B_2 \) being bonds. In one embodiment of the present invention \( n \) and \( p \) are individually equal to or greater than 1 and \( r \) is equal to or greater than 0, \( Z_1 \), and/or \( Z_2 \), and/or \( Z_3 \), and/or \( Z_4 \), independently for each repetition unit \( n \), \( p \), and \( r \), are selected from the group consisting of \( \text{OH} \), alanine, glycine, lysine.
and Formula (II), wherein \( w \) is an integer in the range of from 1 to 4, wherein Formula (II) connects to Formula (I) via the bond labeled with ", with the proviso that at least one substituent \( Z_1 \), and/or \( Z_2 \), and/or \( Z_3 \), and/or \( Z_4 \), is not OH. In another embodiment of the present invention \( n \) and \( p \) are individually equal to or greater than 1 and \( r \) is equal to or greater than 0, \( Z \), and/or \( Z_2 \), and/or \( Z_3 \), and/or \( Z_4 \), independently for each repetition unit \( n \), \( p \), and \( r \), are selected from the group consisting of alanine, a compound according to Formula (II), wherein \( w = 0 \) and \( R_{15} \) to \( R_{18} \) are all H, a compound according to Formula (II), wherein \( w = 1 \) and \( R_{13} \) to \( R_{18} \) are all H, and a compound according to Formula (II), wherein \( w = 3 \) and \( R_{13} \) to \( R_{18} \) are all H, wherein said compound according to Formula (II) connects to the compound according to Formula (I) via the bond labeled with "", and wherein for \( n \) and \( p \) equal to 1 and \( r \) equal to 0 at least one unit \( A \), \( A_2 \), or \( A_3 \) is selected from the group consisting of 1,2-propyleneoxy group, 1,2-butylenoxy group, 2,3-butylenoxy group, i-butylenoxy group, pentylenoxy group, hexyleneoxy group, styryloxy group, decenyloxy group, do-decenyloxy group, tetradeényloxy group, and hexadecanyloxy group.

In one embodiment, \( n \) and \( p \) are both equal to 1, \( r \) is equal to 0, \( m \) and \( o \) are both equal to 0, \( B_1 \), \( B_2 \), and \( B_3 \) are equal to a chemical bond, \( R_3 \), \( R_4 \), \( R_7 \), \( R_8 \), and \( R_{12} \) are all equal to H. In one embodiment, \( n \) and \( p \) are both equal to 1, \( r \) is equal to 0, \( m \) and \( o \) are both equal to 0, \( B_i \), \( B_2 \), and \( B_3 \) are equal to methanediyl, \( R_3 \), \( R_4 \), \( R_7 \), and \( R_8 \) are all equal to H, and \( R_{12} \) is equal to ethyl. In one embodiment, \( n \) and \( p \) are both equal to 1, \( r \) is equal to 0, \( m \) and \( o \) are equal to 0, \( R_4 \), \( R_8 \), and \( R_{12} \) are equal to H, and \( B_i \), \( B_2 \), and \( B_3 \) are all bonds. In another embodiment, \( n \) and \( p \) are both equal to 1, \( r \) is equal to 0, \( m \) and \( o \) are equal to 1, \( R_1 \), \( R_2 \), \( R_3 \), \( R_4 \), \( R_5 \), \( R_6 \), \( R_7 \), and \( R_8 \) are all H, \( R_{12} \) is ethyl, and \( B_i \), \( B_2 \), and \( B_3 \) are all bonds. In another embodiment, \( n, p \) and \( r \) are all equal to 1, \( m, o \), and \( q \) are 1, \( R_i \), \( R_2 \), \( R_3 \), \( R_4 \), \( R_5 \), \( R_6 \), \( R_7 \), \( R_8 \), \( R_9 \), \( R_{10} \), \( R_{11} \), \( R_{12} \) are all H, and \( B_1, B_2, B_3, \) and \( B_4 \) are all bonds.

In one embodiment, \( n \) and \( p \) are both equal to 1, \( r \) is equal to 0, \( m \) and \( o \) are both equal to 0, \( A_1 \) is for each repetition unit \( t \) selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups, \( u \) is of from 1 to 10, and \( A_2 \) is for each repetition unit \( u \) selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups, \( A_3 \) is for each repetition unit \( v \) selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups, \( B_1, B_2, \) and \( B_3 \) are equal to a chemical bond, \( R_3, R^*, R_7, R_8, \) and \( R_{12} \) are all equal to H. In one embodiment, \( n \) and \( p \) are both equal to 1, \( r \) is equal to 0, \( m \) and \( o \) are both equal to 0, \( A_1 \) is for each repetition unit \( t \) selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups, \( u \) is of from 1 to 10, and \( A_2 \) is for each repetition unit \( u \) selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups, \( A_3 \) is for each repetition unit \( v \) selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups, \( B_1 \) is
equal to methanediyl, \( B_2 \), and \( B_3 \) are equal to a chemical bond, \( R_3 \), \( R_4 \), \( R_7 \), and \( R_s \), are all equal to \( H \), and \( R_{12} \) is equal to ethyl. In one embodiment, \( n \) and \( p \) are both equal to 1, \( r \) is equal to 0, \( m \) and \( o \) are equal to 0, \( R_4 \), \( R_e \), and \( R_{12} \) are equal to \( H \). In one embodiment, \( n \) and \( p \) are both equal to 1, \( r \) is equal to 0, \( m \) and \( o \) are equal to 0, \( R_4 \), \( R_s \), and \( R_{12} \) are equal to \( H \). \( A_1 \) is for each repetition unit \( t \) selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups, \( u \) is of from 1 to 10, and \( A_2 \) is for each repetition unit \( u \) selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups, \( A_3 \) is for each repetition unit \( v \) selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups, and \( B_1 \), \( B_2 \), and \( B_3 \) are all bonds. In another embodiment, \( n \) and \( p \) are both equal to 1, \( r \) is equal to 0, \( m \) and \( o \) are equal to 1, \( R_1 \), \( R_2 \), \( R_3 \), \( R_4 \), \( R_5 \), \( R_6 \), \( R_7 \), and \( R_s \) are all \( H \), \( R_{12} \) is ethyl, and \( B_1 \), \( B_2 \), and \( B_3 \) are all bonds. In another embodiment, \( n \), \( p \), and \( r \) are all equal to 1, \( m \), \( o \), and \( q \) are 1, \( R_1 \), \( R_2 \), \( R_3 \), \( R_4 \), \( R_5 \), \( R_6 \), \( R_7 \), \( R_8 \), \( R_9 \), \( R_{10} \), \( R_{11} \), \( R_{12} \) are all \( H \), \( A_1 \) is for each repetition unit \( t \) selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups, \( u \) is of from 1 to 10, \( A_2 \) is for each repetition unit \( u \) selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups, \( A_3 \) is for each repetition unit \( v \) selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups, \( A_4 \) is for each repetition unit \( s \) selected from the group consisting of ethyleneoxy groups and 1,2-propyleneoxy groups, and \( B_1 \), \( B_2 \), \( B_3 \), and \( B_4 \) are all bonds.

The esteramines according to the present invention are obtained either as free amines, as salts thereof or as a mixture of free amines and salts. Salts are formed by at least partial protonation of the amine groups by an acid being a protic organic acid or a protic inorganic acid. In one embodiment, the acid for at least partial protonation of the amine groups is selected from the group consisting of methanesulfonic acid, hydrochloric acid, hydrobromic acid, sulfuric acid, phosphoric acid, citric acid, and lactic acid. In one embodiment, the acid is selected from the group of methanesulfonic acid, hydrochloric acid, and sulfuric acid. In another embodiment, the acid is methanesulfonic acid.

Partial protonation in one embodiment is protonation of the amine groups in the range of from 1 to 99 mol-% of all amine groups, in another embodiment in the range of from 10 to 90 mol-% of all amine groups, in another embodiment in the range of from 25 to 85 mol-%, in another embodiment in the range of from 40 to 75 mol-% of all amine groups.

The present invention also comprises combinations of at least two embodiments as presented herein.
The present invention also relates to a process for preparation of esteramine or salt thereof comprises the steps of

a) Alkoxylation of an alcohol of Formula (III)

wherein independently from each other

- n being an integer from 1 to 12,
- m being an integer for each repetition unit n independently selected from 0 to 12;
- p being an integer from 0 to 12,
- o being an integer for each repetition unit p independently selected from 0 to 12;
- r being an integer from 0 to 12,
- q being an integer for each repetition unit r independently selected from 0 to 12;
- B1, B2, B3, and B4 are independently from each other selected from the group consisting of a bond, linear C1 to C12 alkanediyl groups, and branched C1 to C12 alkanediyl groups;
- R4, Re, and R12 being selected from the group consisting of H, linear alkyl, branched alkyl, and cycloalkyl;
- Ri, R2, and R3 being independently for each repetition unit m of each repetition unit n being selected from the group consisting of H, linear alkyl, branched alkyl, and cycloalkyl;
- R5, R6, and R7 being independently for each repetition unit o of each repetition unit p being selected from the group consisting of H, linear alkyl, branched alkyl, and cycloalkyl;
- R9, R10, and R11 being independently for each repetition unit q of each repetition unit r being selected from the group consisting of H, linear alkyl, branched alkyl, and cycloalkyl;

with one or more C2 to C16 alkylen oxide, followed by

b) at least partial esterification of the alkoxylated alcohol with at least one acid selected from the group consisting of alanine, arginine, asparagine, aspartic acid, cysteine, glutamine, glycine,
histidine, isoleucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine, valine, and acids of Formula (IV)  

![Formula IV](image)

with w being an integer from 0 to 12,

Ri3 and Ri4 independently for each repetition unit w being selected from the group consisting of H, linear alkyi, branched alkyi, and cycloalkyl;

Ri5, Ri6, Ri7, and Ri8 being selected from the group consisting of H, linear alkyi, branched alkyi, and cycloalkyl.

In one embodiment of the present invention, Bi, B2, B3, and B4 are independently from each other selected from the group consisting of a bond, and linear Ci to C12 alkanediyl groups. In another embodiment, B1, B2, B3, and B4 are independently from each other selected from the group consisting of a bond, and linear C1 to C6 alkanediyl groups. In another embodiment, Bi, B2, B3, and B4 are independently from each other selected from the group consisting of a bond, and linear Ci to C6 alkanediyl groups. In another embodiment, Bi, B2, B3, and B4 are independently from each other selected from the group consisting of a bond, and a Ci alkanediyl group. In another embodiment Bi, B2, B3, and B4 are all selected from the group consisting of a bond, and a Ci alkanediyl group. In another embodiment Bi, B2, B3, and B4 are all a bond.

In one embodiment of the present invention, R1, R2, R3, R4, R5, R6, R7, Rs, R9, R10, R11, and R12 are all independently selected from the group consisting of H, linear alkyi, branched alkyi, and cycloalkyl. In one embodiment, R1, R2, R3, R4, R5, R6, R7, Rs, R9, R10, R11, and R12 are all independently selected from the group consisting of H, linear Ci to C12 alkyi, and Ci to C12 branched alkyi. In another embodiment, R1, R2, R3, R4, R5, R6, R7, Rs, R9, R10, R11, and R12 are all independently selected from the group consisting of H, linear Ci to C6 alkyi, and Ci to C9 branched alkyi.

Step a) Alkoxylaion of alcohol according to Formula (III) with at least one C2- to C16- alkyne oxide.
The alcohol of Formula (III) may be reacted with one single C2- to C16-alkylene oxide or combinations of two or more different C2- to C16-alkylene oxides. Using two or more different C2- to C16-alkylene oxides, the resulting polymer can be obtained as a block-wise structure or a random structure.

The molar ratio of alcohol of Formula (III) to total alkylene oxide may be in the range of from 1 : 1 to 1:400. In one embodiment, the molar ratio of the moles of hydroxyl groups of the alcohol of Formula (III) to the alkylene oxides with which the alkoxylation reaction is carried out may lie in the range of 1:1 to 1:100. In another embodiment the ratio of the moles of hydroxyl groups of the alcohol of Formula (III) to the alkylene oxides at which the alkoxylation reaction is carried out may lie in the range of from 1:2 to 1:50, in another embodiment in the range of 1:3 to 1:10.

This reaction may be undertaken generally in the presence of a catalyst at a reaction temperature from about 70 to about 200°C, in another embodiment from about 80 to about 160°C. This reaction may be affected at a pressure of up to about 10 bar, in another embodiment at a pressure of up to about 8 bar.

Examples of suitable catalysts comprise basic catalysts such as alkali metal and alkaline earth metal hydroxides such as sodium hydroxide, potassium hydroxide and calcium hydroxide, alkali metal alcohoxides, in particular sodium and potassium C1-C4-alkoxides, such as sodium methoxide, sodium ethoxide and potassium tert-butoxide, alkali metal and alkaline earth metal hydrides such as sodium hydride and calcium hydride, and alkali metal carbonates such as sodium carbonate and potassium carbonate. In one embodiment, alkali metal hydroxides are used. In another embodiment, potassium hydroxide and sodium hydroxide are used. Typical use amounts for the base are from 0.01 to 10% by weight, in particular from 0.05 to 2% by weight, based on the total amount of alcohol and C2- to C16-alkylene oxide.

Step b) Esterification

The esterification reaction may be performed as known in the art. An inorganic or organic protic acid may be added to the product of step a). The molar ratio of amino acid to hydroxyl groups of the alkoxyalted alcohol of step a) is 0.8 : 1 to 1 : 1.5. In one embodiment, the process is carried out with the molar ratio of the acid to the hydroxyl groups of the alkoxyalted alcohol of step a) is in the range of from 0.1 : 1 to 1: 1. Reaction temperatures may be from 50°C to 200°C, in another embodiment from 80°C to 160°C. The reaction may be affected by applying vacuum from 1000 mbar to 1 mbar, in another embodiment from 500 mbar to 5 mbar. Reaction times may be from 2 to 48 hours. Suitable solvents for the reaction may be water, toluene, xylene.

The effects for laundry as described and exemplified herein may be extrapolated to personal care applications.
The esteramines and salts thereof can be used in applications in personal care, as curing agent for epoxy resins, as reactant in the production of polymers, in polyurethanes, polyureas, and as thermoplastic polyamide adhesives. The can also be used in shampoo and body wash formulations. The esteramines and salts thereof may be included in personal care composition.

Methods

1H NMR measured in MeOD with Bruker Avance 400 MHz spectrometer. pH is measured in 10 % aqueous solution.

Hydroxyl values are measured according to DIN 53240-1.

Molecular weight of polyalkylene oxides (e.g. polyethylene glycol) is calculated from the measured hydroxyl values by following formula:

Molecular weight [g/mol] = 1000 / (hydroxyl value [mgKOH/g] / 56.11) x hydroxyl groups per molecule

Examples

Comparative example 1: Butyltriglycol ester with 6-amino hexane acid, methane sulfonic acid salt

In a 4-neck vessel with thermometer, reflux condenser, nitrogen inlet, dropping funnel, and stirrer, 64.39 g butyltriglycol and 39.35 g 6-amino hexane acid are placed and heated to 90°C. To the mixture 29.4 g methane sulfonic acid is added within 10 minutes. The reaction mixture is heated to 135°C and is stirred for 4 hours at 135°C. Vacuum (5 mbar) is applied and the reaction mixture is stirred for additional 13.5 hours at 130°C. 122.0 g of a light brown solid is obtained. 1H-NMR in MeOD indicates complete conversion to 6-amino hexane acid - butyltriglycol ester as methane sulfonic acid salt.

Comparative example 2: Polyethylene glycol, Mw approx.. 200 g/mol; ester with 6-amino hexane acid, methane sulfonic acid salt

In a 4-neck vessel with thermometer, reflux condenser, nitrogen inlet, dropping funnel, and stirrer, 30.0 g polyethylene glycol (Mw approx. 200 g/mol) and 39.35 g 6-amino hexane acid are placed and heated to 90°C. To the mixture 29.4 g methane sulfonic acid is added within 10 minutes. The reaction mixture is heated to 135°C and is stirred for 4 hours at 135°C. Vacuum (5 mbar) is applied and the reaction mixture is stirred for additional 22 hours at 135°C. 97.0 g of a light brown solid
is obtained. $^1$H-NMR in MeOD indicates complete conversion to 6-amino hexane acid - polyethylene glycol ester as methane sulfonic acid salt.

Example 1 Use as additives in detergents

Technical stain swatches of blue knitted cotton containing Bacon Grease were purchased from Warwick Equest Ltd. The stains were washed for 30 min in a launder-o-meter (manufactured by SDL Atlas) at room temperature using per canister 500 mL of washing solution, 20 metal balls and ballast fabrics. The washing solution contained 5000 ppm of detergent composition DC1 (table 1). Water hardness was 2.5 mM (Ca$^{2+}$ : Mg$^{2+}$ was 4:1). Additives were added to the washing solution of each canister separately and in the amount as detailed below. After addition the pH value was re-adjusted to the pH value of washing solution without additive. Standard colorimetric measurement was used to obtain $L^*$, $a^*$ and $b^*$ values for each stain before and after the washing. From $L^*$, $a^*$ and $b^*$ values the stain level were calculated as color difference $\Delta E$ (calculated according to DIN EN ISO 11664-4) between stain and untreated fabric.

Stain removal from the swatches was calculated as follows:

$$Stain\ Removal\ Index\ (SRI) = \frac{AE_{init} - AE_{washed} \times 100}{AE_{init}}$$

$AE_{init}$ = Stain level before washing

$AE_{washed}$ = Stain level after washing

Stain level corresponds to the amount of grease on the fabric. The stain level of the fabric before the washing ($\Delta E_{init}$) is high, in the washing process stains are removed and the stain level after washing is smaller ($AE_{washed}$). The better the stains have been removed the lower the value for $AE_{washed}$ will be and the higher the difference will be to $AE_{init}$. Therefore, the value of stain removal index increases with better washing performance.

The esteramines according to the present invention can be used in the detergent composition of Table 1.

Table 1: Detergent composition DC1
<table>
<thead>
<tr>
<th>Ingredients of liquid detergent composition DC1</th>
<th>percentage by weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>n-C10-C13 -alkylbenzene sulfonic acid</td>
<td>5.3</td>
</tr>
<tr>
<td>coconut C12-C18 fatty acid</td>
<td>2.4</td>
</tr>
<tr>
<td>sodium laureth sulfate + 2 EO</td>
<td>7.7</td>
</tr>
<tr>
<td>potassium hydroxide</td>
<td>2.2</td>
</tr>
<tr>
<td>C13C15- oxo alcohol + 7 EO</td>
<td>5.4</td>
</tr>
<tr>
<td>1,2 propylene glycol</td>
<td>6</td>
</tr>
<tr>
<td>ethanol</td>
<td>2</td>
</tr>
<tr>
<td>water</td>
<td>To Balance</td>
</tr>
<tr>
<td>pH of detergent composition DC1 = 8.0</td>
<td></td>
</tr>
</tbody>
</table>

Example 2: Sorbitol, propoxylated with 12 mole propylene oxide, ester with 2 mole 6-aminohexane acid, methane sulfonic acid salt

5 2a Sorbitol, propoxylated with 12 mole propylene oxide:

In a 2 l autoclave 278.85 g sorbitol and 2.65 g potassium tert- butylate are placed and the mixture is heated to 140°C. The vessel is purged three times with nitrogen and 1005.4 g propylene oxide is added in portions within 15 h. To complete the reaction, the mixture was allowed to post-react for additional 5 h at 140°C. The reaction mixture is stripped with nitrogen and volatile compounds are removed in vacuo at 80°C. After filtration 1325.0 g of a light yellowish oil is obtained (hydroxy value: 375 mgKOH/g).

2b Sorbitol, propoxylated with 12 mole propylene oxide, ester with 2 mole 6-aminohexane acid, methane sulfonic acid salt

In a 4-neck vessel with thermometer, nitrogen inlet, dropping funnel, and stirrer 88.14 g sorbitol propoxylated with 12 mole propylene oxide and 26.0 g 6-aminohexane acid are placed. The mixture is heated to 50°C, and 19.6 g methane sulfonic acid is added within 10 minutes under a constant stream of nitrogen. The temperature is allowed to rise to 60°C during the addition. The reaction mixture is heated to 135°C and is stirred for 4 hours at 135°C. Vacuum (5 mbar) is applied and the reaction mixture is stirred for additional 11.0 hours at 130°C. 121.0 g of a brown solid is obtained. 1H-NMR in MeOD indicates 33 % conversion of hydroxyl groups into esterified hydroxyl groups.

Example 3 Sorbitol, alkoxylated with 18 mole ethylene oxide and 6 mole propylene oxide, ester with 2 mole 6-aminohexane acid, methane sulfonic acid salt

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3a Sorbitol, alkoxylated with 18 mole ethylene oxide and 6 mole propylene oxide
In a 2 l autoclave 148.7 g sorbitol and 2.1 g potassium tert.-butylate are placed and the mixture is heated to 130°C. The vessel is purged three times with nitrogen and 634.3 g ethylene oxide is added within 20 h. The mixture is stirred for additional 5 h, followed by the addition of 278.8 g propylene oxide in portions within 10 h. To complete the reaction, the mixture is allowed to post-react for additional 5 h at 130°C. The reaction mixture was stripped with nitrogen and volatile compounds were removed in vacuo at 80°C. After filtration 1060.0 g of a light yellowish oil was obtained (hydroxy value: 250 mgKOH/g).

3b Sorbitol, alkoxylated with 18 mole ethylene oxide and 6 mole propylene oxide, ester with 6 mole DL-alanine, methane sulfonic acid salt
In a 4-neck vessel with thermometer, nitrogen inlet, dropping funnel, and stirrer 105.8 g sorbitol, alkoxylated with 18 mole ethylene oxide and 6 mole propylene oxide and 42.8 g DL-alanine are placed. The mixture is heated to 50°C, and 47.1 g methane sulfonic acid is added within 10 minutes under a constant stream of nitrogen. The temperature is allowed to rise to 60 °C during the addition. The reaction mixture is heated to 135°C and is stirred for 13 hours at 135°C. 186.0 g of a brown solid is obtained. 1H-NMR in MeOD indicates 100 % conversion of hydroxyl groups into esterified hydroxyl groups.

Use as additives in detergents

Technical stain wfk20D (polyester/cotton 65/35, soil: pigment/sebum) from wfk Testgewebe GmbH, was used. Washing procedure and determination of stain removal index was followed as described above but with 1584 ppm of detergent composition 2 (table 2). The pH of the washing solution prior to washing with and without additives was adjusted in each case to pH= 8.0.
Table 2: Detergent composition DC2

<table>
<thead>
<tr>
<th>Ingredients of liquid detergent composition DC2</th>
<th>percentage by weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>linear C_{11,8}-alkylbenzene sulfonic acid</td>
<td>17.6</td>
</tr>
<tr>
<td>C12-C15 alkyl ethoxy (1.8) sulfate</td>
<td>4.4</td>
</tr>
<tr>
<td>C12-C14 alcohol + 9 ethylene oxide</td>
<td>0.9</td>
</tr>
<tr>
<td>C12-C18 fatty acid</td>
<td>1.1</td>
</tr>
<tr>
<td>C12-C14 amine oxide</td>
<td>0.8</td>
</tr>
<tr>
<td>chelant</td>
<td>2.8</td>
</tr>
<tr>
<td>solvent</td>
<td>14.8</td>
</tr>
<tr>
<td>brightener</td>
<td>0.2</td>
</tr>
<tr>
<td>sodium hydroxide</td>
<td>1.9</td>
</tr>
<tr>
<td>water</td>
<td>To Balance</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Experiment 1</th>
<th>SRI, wfk 20D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without additive</td>
<td></td>
</tr>
<tr>
<td>Example 3: Sorbitol ethoxylated and propoxylated, ester with alanine, methane sulfonic acid salt; 0.024 g per wash</td>
<td>40.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Experiment 2</th>
<th>SRI, wfk 20D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without additive</td>
<td></td>
</tr>
<tr>
<td>Example 2: Sorbitol propoxylated, ester with ester with 6-amino hexane acid, methane sulfonic acid salt; 0.024 g per wash</td>
<td>47.1</td>
</tr>
</tbody>
</table>
Claims:

1. Esteramine of Formula (I) and salt thereof,

(Formula I)

wherein independently from each other

- n being an integer from 1 to 12,
- m being an integer for each repetition unit n independently selected from 0 to 12;
- p being an integer from 0 to 12,
- o being an integer for each repetition unit p independently selected from 0 to 12;
- r being an integer from 0 to 12,
- q being an integer for each repetition unit r independently selected from 0 to 12;
- s being an integer from 0 to 100;
- t being an integer from 1 to 100;
- u being an integer from 0 to 100;
- v being an integer from 0 to 100;

with the sum of s, t, u, and v being equal to or greater than 1;

A₁, A₂, A₃, and A₄ are independently from each other and independently for each repetition unit

s, t, u, or v, selected from the list consisting of ethyleneoxy group, 1,2-propyleneoxy group, 1,2-butyleneoxy group, 2,3-butyleneoxy group, i-butyleneoxy group, pentyleneoxy group, hexyleneoxy group, styryloxy group, decenyloxy group, dodecenyloxy group, tetradecenyloxy group, and
hexadecanyloxy group, wherein for s, t, u, and/or v equal to 1 the oxygen atom of the A₁, A₂, A₃, and A₄ group is bound to the B group and the following A₁, A₂, A₃, and A₄ groups are always bound via the oxygen atom to the previous A₁, A₂, A₃, and A₄ group;

B₁, B₂, B₃, and B₄ are independently selected from the group consisting of bond, linear C₁ to C₁₂ alkanediyl groups, and branched C₁ to C₁₂ alkanediyl groups;

R₁₁, R₁₂, and R₁₂ being selected from the group consisting of H, linear alkyl, branched alkyl, and cycloalkyl;

R₁, R₂, and R₃ being independently for each repetition unit m of each repetition unit n being selected from the group consisting of H, linear alkyl, branched alkyl, and cycloalkyl;

R₅, R₆, and R₇ being independently for each repetition unit o of each repetition unit p being selected from the group consisting of H, linear alkyl, branched alkyl, and cycloalkyl;

R₉, R₁₀, and R₁₁ being independently for each repetition unit q of each repetition unit r being selected from the group consisting of H, linear alkyl, branched alkyl, and cycloalkyl;

i) with the proviso that when p and r are both equal to 0, and n being at least 1, Z₁ and Z₂, are independently selected from the group consisting of OH, alanine, arginine, asparagine, aspartic acid, cysteine, glutamine, glycine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine, valine, and a compound according to Formula (II), wherein said compound according to Formula (II) connects to the compound according to Formula (I) via the bond labeled with *, with the proviso that at least one substituent Z₁ and/or Z₂ is not OH, and with the proviso that R₃ contains equal to or more than 2 carbon atoms;

![Formula II]

with independently from each other

w being an integer from 0 to 12;

R₁₃ and R₁₄ independently for each repetition unit w being selected from the group consisting of H, linear alkyl, branched alkyl, and cycloalkyl;

R₁₅, R₁₆, R₁₇, and R₁₈ being selected from the group consisting of H, linear alkyl, branched alkyl, and cycloalkyl;
ii) with the proviso that when n and p are individually equal to or greater than 1 and r is equal to or greater than 0, Z₁, and/or Z₂, and/or Z₃, and/or Z₄, independently for each repetition unit n, p, and r, are selected from the group consisting of OH, alanine, arginine, asparagine, aspartic acid, cysteine, glutamine, glycine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine, valine, and a compound according to Formula (II), wherein said compound according to Formula (II) connects to the compound according to Formula (I) via the bond labeled with °, with the proviso that at least one substituent Z₁, and/or Z₂, and/or Z₃, and/or Z₄, is not OH, and wherein for n and p equal to 1 and r equal to 0 at least one unit A₁, A₂, or A₃ is selected from the group consisting of 1,2-propyleneoxy group, 1,2-butyleneoxy group, 2,3-butyleneoxy group, i-butylenoxy group, pentylenoxy group, hexylnoxy group, styrylxy group, decylnoxy group, dodecylnoxy group, tetradecylnoxy group, and hexadecylnoxy group.

2. Salt of esteramine according to claim 1, wherein the salt is formed by at least partial protonation of the amine group by an acid being a protic organic or inorganic acid.

3. Salt of esteramine according to any of claims 1 or 2, wherein the salt is formed by at least partial protonation of the amine group by an acid being selected from the group consisting of methanesulfonic acid, hydrochloric acid, hydrobromic acid, sulfuric acid, phosphoric acid, citric acid and lactic acid.

4. Esteramine or salt thereof according to any of the preceding claims, wherein A₁, A₂, A₃, and A₄ are independently from each other and independently for each repetition unit s, t, u, or v, selected from the list consisting of ethyleneoxy group, 1,2-propyleneoxy group, and 1,2-butyleneoxy group.

5. Esteramine or salt thereof according to any of the preceding claims 1 to 4, wherein p and r are both equal to 0, and n being at least 1, Z₁ and Z₂, are independently selected from the group consisting of OH, alanine, glycine, lysine, and a compound according to Formula (II), wherein w is an integer in the range of from 1 to 4, wherein the compound according to Formula (II) connects to the compound according to Formula (I) via the bond labeled with °, with the proviso that at least one substituent Z₁ and/or Z₂ is not OH, and with the proviso that 1 contains equal to or more than 2 carbon atoms.

6. Esteramine or salt thereof according to any of the preceding claims 1 to 4, wherein p and r are both equal to 0, and n being at least 1, wherein m is equal to 1 and R₁ and R2 are both linear C₂ to C₄ alkyl groups.
7. Esteramine or salt thereof according to any of the preceding claims 1 to 4, wherein when n and p are individually equal to or greater than 1 and r is equal to or greater than 0, Z₁, and/or Z₂, and/or Z₃, and/or Z₄, independently for each repetition unit n, p, and r, are selected from the group consisting of OH, alanine, glycine, lysine, and a compound according to Formula (II), wherein w is an integer in the range of from 1 to 4, wherein the compound according to Formula (II) connects to the compound according to Formula (I) via the bond labeled with *, with the proviso that at least one substituent Z₁, and/or Z₂, and/or Z₃, and/or Z₄, is not OH.

8. Esteramine or salt thereof according to any of the preceding claims 1 to 4, wherein n and p are both equal to 1, r is equal to 0, m and o are both equal to 0, B₁ is equal to a chemical bond, R₃, R₄, R₇, and/or R₁₂ are all equal to H.

9. Esteramine or salt thereof according to any of the preceding claims 1 to 4, wherein n and p are both equal to 1, r is equal to 0, m and o are both equal to 0, B₁ is equal to a methylene, R₃, R₄, R₇, and/or R₁₂ are all equal to H, and R₁₂ is equal to ethyl.

10. Process for preparation of esteramine or salt thereof according to claim 1, comprising the steps of

a) Reacting an alcohol according to Formula (III)

wherein independently from each other
n being an integer from 1 to 12,
m being an integer for each repetition unit n independently selected from 0 to 12;
p being an integer from 0 to 12,
o being an integer for each repetition unit p independently selected from 0 to 12;
r being an integer from 0 to 12,
q being an integer for each repetition unit r independently selected from 0 to 12;
B₁, B₂, B₃, and B₄ are independently selected from each other selected from the group consisting of a bond, linear C₁ to C₁₂ alkanediyl groups, and branched C₁ to C₁₂ alkanediyl groups;
R₄, R₆, and R₁₂ being selected from the group consisting of H, linear alkyl, branched alkyl, and cycloalkyl;
R₁, R₂, and R₃ being independently selected for each repetition unit m of each repetition unit n being selected from the group consisting of H, linear alkyl, branched alkyl, and cycloalkyl;
R₅, R₆, and R₇ being independently selected for each repetition unit o of each repetition unit p being selected from the group consisting of H, linear alkyl, branched alkyl, and cycloalkyl;
R₉, R₁₀, and Rₙ being independently selected for each repetition unit q of each repetition unit r being selected from the group consisting of H, linear alkyl, branched alkyl, and cycloalkyl;

with one or more C₂ to C₁₆ alkylene oxide, followed by

b) at least partial esterification of the alkoxylated alcohol with at least one compound selected from the group consisting of alanine, arginine, asparagine, aspartic acid, cysteine, glutamine, glycine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine, valine, acids according to Formula (IV), and salts thereof;

(Formula IV)

with w being an integer from 0 to 12,
R₁₃ and R₁₄ independently selected for each repetition unit w being selected from the group consisting of H, linear alkyl, branched alkyl, and cycloalkyl;
R₁₅, R₁₆, R₁₇, and R₁₈ being selected from the group consisting of H, linear alkyl, branched alkyl, and cycloalkyl.

11. The process according to claim 10, wherein the molar ratio of alcohol according to Formula (III) to total C₂ to C₁₂ alkylene oxide is in the range of from 1 : 1 to 1 : 400.

12. The process according to claims 10 or 11, wherein the molar ratio of the acid to the hydroxyl groups of the alkoxylated alcohol is in the range of from 0.1 : 1 to 1 : 1.
13. Use of the esteramine and salt thereof according to claims 1 to 9 in personal care, as curing agent for epoxy resins, as reactant in the production of polymers, in polyurethanes, polyureas, or as thermoplastic polyamide adhesives.

14. Use of the esteramine and salt thereof according to claim 13 in shampoo or body wash formulations.

15. A personal care composition comprising the esteramine and salt thereof according to any of claims 1 to 9.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

INV. C08G59/52 C08G65/26 C08G65/333 C11D3/37 A61K8/90
A61Q5/02 A61Q19/10 C1IDI/46

ADD.

According to International Patent Classification (IPC) or both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

C08G C11D A61K A61Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal , WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of Box C. See patent family annex.

Date of the actual completion of the international search 21 September 2018

Date of mailing of the international search report 01/10/2018

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