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Description

This invention relates to a low irritant detergent composition, and more specifically to a detergent composition having low irritation to the skin and eyes as well as good washing and cleaning power and foaming power.

Detergents are of course required to have excellent detergency such as washing and cleaning power and foaming power and for those brought into direct contact with the skin and the like such as detergents for people (shampoos, body shampoos, etc.), kitchen detergents, mild detergents for wool, are also required in particular to have low irritation to the skin and eyes and also to have good stability as solutions.

As surfactants which are principal components of these detergents, anionic surfactants such as linear alkyl benzene sulfonates (LAS), alkyl sulfate esters (AS), polyoxyethylene alkyl ether sulfate ester salts (AES) and α -olefinsulfonates (AOS) are used. Although anionic surfactants have good detergency, they are all irritant to the skin and eyes, they cannot be considered ideal as surfactants for such detergents.

Incidentally, as a system capable of meeting these requirements to a certain satisfactory extent, it has been preferably practised in recent years to use in combination a polyoxyethylene alkyl ether sulfate and an ampholytic imidazoline surfactant, especially, in shampoos. A higher proportion of the polyoxyalkyl ether sulfate is however accompanied by a drawback that irritant property becomes relatively higher although the characteristics of the resultant composition as a shampoo, such as foaming properties and washing and cleaning power, are satisfied. On the other hand, a higher proportion of the amphoteric imidazoline surfactant is accompanied by a drawback that foaming properties and washing and cleaning power both become insufficient although irritant property is reduced.

With a view toward solving the problems described above, Japanese Patent Laid-Open No. 127396/1987 discloses to incorporate a surfactant of the sulfosuccinic acid type as a third essential component. The surfactant of the sulfosuccinic acid type itself is however a relatively low irritant anionic surfactant and as disclosed in Japanese Patent Laid-Open No. 38395/1981 by way of example, is effective in reducing the irritant property of AES when combined with AES. Such a surfactant of the sulfosuccinic acid type is however generally insufficient in foaming power and low-temperature stability, so that it is the current status that the surfactant is used only as an auxiliary active agent for AES.

In recent years, attention has been called to the byproduction of dioxane in AES, especially, in Europe. Elimination of dioxane has led to the avoidance of AES, so that there is an outstanding desire for the development of a low irritant detergent free of AES.

As a detergent which features total omission of AES, the detergent of JP-A-56 82 898 which contains both a surfactant of the sulfosuccinic acid type and a surfactant of the imidazoline type may be mentioned as a relatively close example. It however involves a problem in foaming property.

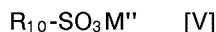
The present inventors have conducted an extensive investigation with a view toward solving such problems. As a result, it has been found that a detergent composition capable of reducing irritation and moreover having satisfactory stability as a solution without impairing its foaming power and washing and cleaning power can be obtained by combining (A) an α -olefinsulfonic acid salt and (B) a particular surfactant of the sulfosuccinic acid ester type with (C) an amphoteric imidazoline surfactant and (D) a nonionic alkanolamide surfactant, leading to completion of the present invention.

The present invention therefore provides a low irritant detergent composition as defined in claim 1 comprising (A) an α -olefinsulfonic acid salt, (B) a surfactant of the sulfosuccinic acid ester type, represented by the following formula [I]:



wherein R means $\text{R}_1\text{O}\{\text{CH}_2\text{CH}_2\text{O}\}_m$, R_1 being a linear or branched alkyl or alkenyl group having 8-22 carbon atoms and m standing for a number of 1-20 on average, and M denotes a hydrogen atom or a cationic ion capable of forming a water-soluble salt selected from the group consisting of alkali metal ions, ammonium ion and organoammonium ions, (C) an amphoteric imidazoline surfactant and (D) a nonionic alkanolamide surfactant, the weight ratio of (A)/(B) being 1/3-3/1, that of (C)/(A) being 1/10-1/1, that of (D)/(A) + (B) being 1/20-1/2, and the sum of (A) + (B) + (C) + (D) accounting for 10-40 wt.%.

As the α -olefinsulfonic acid salt (A) used in this invention, may be mentioned by way of example a sulfonated α -olefin derivative represented by the following formula [V]:



wherein R_{10} means a linear or branched alkenyl or hydroxyl-substituted alkylene group having 8-22 carbon atoms on average and M'' denotes a hydrogen atom or a cation capable of forming a water-soluble salt selected from the group consisting of alkali metal salts. The preferable average carbon number of R_{10} may range especially from 14 to 16 from the standpoint of the foaming property and stability of the composition.

As the surfactant of the sulfosuccinic acid ester type (B) in this invention, it is possible to use a higher alcohol ethoxylate or that derived from a higher fatty acid amide and containing an ethoxy group, which is represented by the formula [I]. The number m of polymerized ethoxy groups in the formula [I] may preferably be 2-10 since a greater m value gives less irritation but leads to reduced fundamental properties as a detergent. As the higher alcohol represented by R_1OH , not only a primary alcohol but also a secondary alcohol can be used suitably.

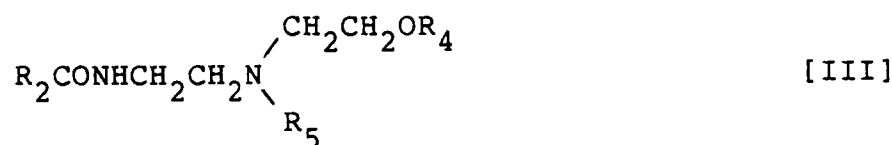
Illustrative examples of the amphoteric imidazoline surfactant (C) in this invention include the following compounds (amphoteric surfactants of the amideamine type) (1)-(3).

(1) ampholytic imidazoline surfactants of the tertiary amide type, represented by the following formula [II]:



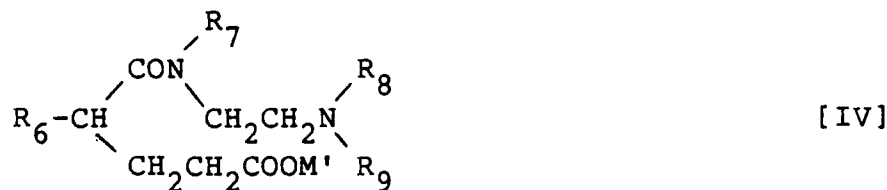
wherein R_2 means a linear or branched alkyl or alkenyl group having 7-21 carbon atoms, R_3 denotes $-\text{CH}_2\text{COOM}'$ or $-\text{CH}_2\text{CH}_2\text{COOM}'$, M' being a hydrogen atom or a cationic ion capable of forming a water-soluble salt selected from the group consisting of alkali metal ions, alkaline earth metal ions, ammonium ion and organoammonium ions, and R_4 is a hydrogen atom or $-\text{CH}_2\text{COOM}'$ or $-\text{CH}_2\text{CH}_2\text{COOM}'$, M' having the same meaning as defined above;

(2) amphoteric imidazoline surfactants of the secondary amide type, represented by the following formula [III]:



wherein R_5 means a hydrogen atom, $-\text{CH}_2\text{COOM}'$ or $-\text{CH}_2\text{CH}_2\text{COOM}'$, M' having the same meaning as defined above, and R_2 and R_4 have the same meanings as defined above; and

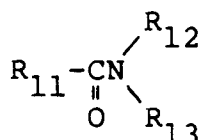
(3) imidazoline surfactants of the α -position addition type, represented by the following formula [IV]:



wherein R_6 means a linear or branched alkyl or alkenyl group having 6-20 carbon atoms, R_7 denotes a hydrogen atom or $-\text{C}_2\text{H}_4\text{OH}$, R_8 is $-\text{C}_2\text{H}_4\text{OH}$, $-\text{C}_2\text{H}_4\text{OC}_2\text{H}_4\text{COOM}'$ or $-\text{C}_2\text{H}_4\text{COOM}'$, M' having the same meaning as defined above, and R_9 means a hydrogen atom or $-\text{C}_2\text{H}_4\text{COOM}'$, M' having the same meaning as defined above.

These compounds may be used either singly or in combination. Further, as the R_2CO- group in the formula [II] or the R_6CHCO- group in the formula [IV], a group derived from lauric acid, oleic acid, coconut oil fatty acid or palm kernel oil fatty acid is preferred. A sodium ion, hydrogen atom or triethanolamine salt ion is most preferred as M' .

As the nonionic alkanolamide surfactant (D) in this invention, may be mentioned for example a compound represented by the following formula [VI]:



[VI]

wherein R_{11} means a linear or branched alkyl or alkenyl group having 7-21 carbon atoms on average and R_{12} and R_{13} denote individually a hydrogen atom, 2-hydroxyethyl group or 2-hydroxypropyl group.

In this invention, (A) and (B) are used to give an (A)/(B) weight ratio of 1/3-3/1. If (A)/(B) exceeds 3/1, it is impossible to provide a composition having sufficiently low irritation. It is necessary to incorporate a great deal of the component (C) in order to render this composition low irritant, whereby problems arise with respect to detergency and foaming property. Such an unduly large (A)/(B) ratio is therefore not preferred. If (A)/(B) becomes smaller than 1/3, it is impossible to obtain a composition having sufficient stability at low temperatures. Such an unduly small (A)/(B) ratio is hence not preferred either.

(C) and (A) are used to give a weight ratio of 1/10-1/1. If the (C)/(A) ratio is smaller than 1/10, it is impossible to obtain a low irritant composition although sufficient washing and cleaning power and foaming power are obtained. On the other hand, any (C)/(A) ratios greater than 1/1 are not preferred because problems arise with respect to the foaming power and stability.

Further, (D), (A) and (B) are used to give a (D)/(A) + (B) weight ratio of 1/20-1/2. If the ratio exceeds 1/2, the removal of foams is impaired. If the ratio becomes smaller than 1/20 on the other hand, the resulting detergent has poor foaming power and the quality of foams is lowered. Any (D)/(A) + (B) weight ratios outside the above range are hence not preferred.

In the composition of this invention, (A), (B), (C) and (D) are used in such amounts that their total weight accounts for 10-40 wt.% of the whole composition. Any total weights smaller than 10 wt.% cannot achieve sufficient foaming power, while any total weights greater than 40 wt.% cannot provide a uniform and stable composition. Total weights outside the above range are hence not preferred.

Besides these essential components (A), (B), (C) and (D), the detergent composition of this invention may additionally contain one or more conventional surfactants in a total proportion of 0-10 wt.%. In addition, it is also possible to use up to a total proportion of 0-20 wt.% a solubilizing adjuvant such as glycerin, propylene glycol, ethanol or urea, a thickener such as a water-soluble high molecular substance, polyethylene glycol fatty acid ester or sodium chloride, an antiseptic such as paraben, and/or an antioxidant such as BHT for shaping and/or stabilizing purposes. It is also feasible to use a color, a perfume base, an antidandruff agent, an antiphlogistic, vitamins, a plant extract, and/or a protein or its derivative or decomposition product in a total proportion of 0-5 wt.%. The remainder consists of water, whose proportion ranges from 30 wt.% to 90 wt.%.

The detergent composition of this invention can be formed into various preparation forms such as liquid (lotion-like) form, paste-like form and gel-like form as desired. Its pH may be adjusted to 4-10, more preferably, to 5.5-7.5 with an acid or base as needed.

Low irritant detergent compositions excellent in washing and cleaning power can be obtained in accordance with this invention. The compositions of this invention are beneficial, for example, as hair and skin detergents for infants, as kitchen detergents for housewives whose hands are sensitive and susceptible to roughening, as daily shampoos for those washing their hair everyday, and as low-irritant hair-dressing shampoos for those unavoidably exposed as a profession to shampoo for long time.

The invention will next be described by the following Examples, in which tests were conducted by the following methods respectively.

(1) Foaming power testing method:

(i) Artificial dirt and filth were added at a concentration of 0.5% to a 1% aqueous solution of each detergent composition. The resultant mixture was stirred by a flat propeller at 40 °C and 1,000 rpm for 5 minutes in a cylinder while reversing the stirring direction at every 10th seconds. Thirty seconds after completion of the stirring, the foaming power was evaluated in terms of the volume of foams.

(ii) Feeling evaluation by wool towel:

After soaking 25 g of a wool towel with warm water (40 °C), 0.5 g of each detergent composition was applied. The towel was then drawn and squeezed through a hand. The volume of foams was evaluated by feeling. Evaluation standard:

- 5 ⊙ : Good foaming
 O : Average foaming
 Δ : Slightly poor foaming
 X : Poor foaming

(2) Washing and cleaning power testing method:

10 (i) Deliberately-soiled fabric:

Oily artificial dirt and filth were dispersed evenly in a solvent. A wool muslin blanket was brought into contact with the dispersion, followed by drying to have the oily artificial dirt and filth adhered on the blanket. The blanket was cut into test pieces of 10 cm x 10 cm wide for use in testing.

(ii) Washing and cleaning conditions and method:

15 A detergent composition was dissolved in hard water of German hardness 15 °d to prepare 1 l of a 3% aqueous solution of the detergent composition. Five deliberately-soiled fabric sheets and the aqueous solution were placed, as they were, in a stainless steel beaker equipped with a targetometer, and were then whirled at 75 rpm, 40 °C for 3 minutes by the targetometer. After rinsing the fabric sheets under running water, they were ironed for measurement of their reflectance.

20 (iii) Evaluation of washing and cleaning power:

The washing and cleaning power of each detergent composition was evaluated by comparing it to the washing and cleaning power of a standard detergent of the following formulation:

- O : At least comparable with the standard detergent
 X : Inferior to the standard detergent

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Formulation of the standard detergent:	
Alkyl ether sulfate salt ("SAPANOL VS", trade name; product of KAO Corp. SA)	15.0%
Alkanol amide ("Amidet B-112", trade name; product of KAO Corp. SA)	3.0%
Water	Balance

30

(3) Eye coat irritation testing method:

35 (i) Primary eye coat irritation test was conducted in accordance with the standard method of France (Journal Officiel de la République Française 24-Oct-84). Described in brief, six rabbits were used. The right eye of each of the rabbits was brought into contact with 0.1 ml of an undiluted sample solution. Without washing the eye, it was observed 24 hours later, 48 hours later and 72 hours later respectively. Prior to each observation, the eye was however brought into contact with sodium fluorescein, followed by washing with physiological saline. Incidentally, the left eye was used as a control.

40

(ii) In order to achieve the evaluation in terms of numerical scores, the evaluation was effected in accordance with Code of Federal Regulations of the USA, Title 16, Section 1500.42. Described in brief, (A) the state of edema of the conjunctiva was ranked in 4 stages, (C) the state of redness in 3 stages, (D) the state of the iris in 2 stages, and (E) the state of opacity of the cornea in 4 stages. The eye coat irritation index (EII) was calculated in accordance with the following equation.

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$$EII = (A + C) \times 2 + D \times 5 + E \times 5$$

Accordingly, the maximum irritation index is 44.

50

(4) Stability test:

Each detergent composition was stored separately at 5 °C, room temperature, 40 °C and 50 °C for 1 month and its external appearance, pH, viscosity and fragrance were evaluated every week.

- Excellent: No changes.
 Good: Changed a little but still within an acceptable limit.
 Poor: Distinct change observed outside the acceptable limit.
 Bad: Substantial changes.

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Examples 1-6 & Comparative Examples a-c:

Liquid detergent compositions of compositions shown in Table 1 were prepared, and their foaming power, washing and cleaning power, stability and eye coat irritation were evaluated. Incidentally, each composition was adjusted to pH 7.0 with a small amount of citric acid.

Table 1

Unit: wt. %

Component added	Example						Comp. Ex.		
	1	2	3	4	5	6	a	b	c
α -Olefin sulfonic acid, AOS ¹⁾	8.0	8.0	8.0	5.0	11.0	8.0	16.0	-	8.0
Sulfosuccinic acid ester, NES ²⁾	8.0	8.0	8.0	5.0	8.0	10.0	-	10.0	8.0
Imidazoline surfactant, SC-2 ³⁾	2.0	3.0	4.0	8.0	2.0	2.0	2.0	8.0	2.0
Alkanolamide, B-112 ⁴⁾	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	-
Foaming power	⊙	⊙	⊙	⊙	⊙	⊙	⊙	x	x
Washing and cleaning power	○	○	○	○	○	○	○	○	○
Stability	○	○	○	○	○	○	○	Δ	○
Eye irritation	24 hours	15	-	14	15	16	-	20	-
	48 hours	8	-	6	3	9	-	14	-
	72 hours	4	-	0	0	2	-	10	-

1) AOS: "Alfanox 46", trade name; product of KAO CORPORATION S.A.; in the formula [V], $R_{10} = C_{14}, C_{16}$.

2) NES: "Succidet NES", trade name; product of KAO CORPORATION S.A.; in the formula [I], $R_1 = C_{12}, C_{14}, C_{16}$; $m = 2.8$.

3) SC-2: "Betadet SC-2", trade name; product of KAO CORPORATION S.A.; in the formula [III], $R_2CO =$ coconut fatty oil residual group; $R_4 = H$, $R_5 = -CH_2COONa$.

4) B-112: "Amidet B-112", trade name; product of KAO CORPORATION S.A.; (diethanol coconut acid amide produced from purified coconut oil and diethanolamine).

Examples 7-9 & Comparative Examples d-e:

Liquid detergent compositions of formulations shown in Table 2 were separately prepared, and their foaming power, stability, eye coat irritation and dioxane concentrations were evaluated.

Table 2
Unit: wt. %

Component added	Example				Comp. Ex.	
	7	8	9		d	e
α -Olefin sulfonic acid, AOS ¹⁾	8.0	6.0	6.0		8.0	-
Alkyl ether sulfuric acid salt	-	-	-		-	18
Sulfosuccinic acid ester NES ²⁾ TS ⁵⁾ LS ⁶⁾ LSS ⁷⁾	-	-	6.0		-	-
	8.0	-	-		-	-
	-	6.0	-		-	-
	-	-	-		8.0	-
Imidazoline surfactant SC-2 ³⁾ TC-2 ⁸⁾	2.0	-	-		2.0	-
	-	2.0	2.0		-	-
Alkanolamide B-112 ⁴⁾	3.0	3.0	3.0		3.0	3.0
Foaming power	○	⊙	○		○	⊙
Washing and cleaning power	○	○	○		○	○
Stability	○	○	○		X	○
Eye irritation	-	16	14		-	19
	-	7	8		-	15
	-	3	2		-	14
Dioxane concentration	Not detected	Not detected	Not detected		Not detected	37 ppm

1)-4): As described above.

5) TS: "Succidet TS", trade name; product of KAO

CORPORATION S.A.; in the formula [I],

$R_1 = C_{12}, C_{14}$; $m = 2.3$.

6) LS: In the formula [I], C_{12}, C_{14} ; branched

alkyl groups = 50%; $m = 3.5$.

7) LSS: "Miranate LSS", trade name; product of Miranol

S.A.; fatty alcohol sulfosuccinate; in the

formula [I], $m = 0$; $R_1 = C_{12}-C_{14}$ alkyl

groups.

8) TC-2: "Betadet TC-2", trade name; product of KAO

CORPORATION S.A.; in the formula [II],

$R_3, R_4 = CH_2CO_2Na$ and $R_2CO =$ coconut fatty acid residual group.

Example 10: Pearlescent Shampoo

	wt. %
(1) α -Olefinsulfonic acid (AOS ¹⁾)	10.0
(2) Sulfosuccinic acid ester (NES ²⁾)	8.0
(3) Imidazoline surfactant (SC-2 ³⁾)	2.0
(4) Alkanolamide (A-111 ⁹⁾)	3.0
(5) Ethyleneglycol distearate	1.0
(6) Perfume base, color	Trace
(7) Water	Balance

When a shampoo was prepared in accordance with the above formulation, it was good in external appearance, feeling of use, foaming and detergency.

1), 2) and 3): As described above.

9) A-111: Product of KAO CORPORATION S.A. "Amidet A-111", trade name (monoethanol coconut acid amide produced from purified coconut oil and monoethanolamine)

Example 11: Conditioning Shampoo

5	(1) α -Olefin sulfonic acid (AOS ¹⁾)	10.0
	(2) Sulfosuccinic acid ester (NES ²⁾)	5.0
	(3) Imidazoline surfactant (SC-2 ³⁾)	5.0
	(4) Alkanolamide (B-112 ⁴⁾)	3.0
	(5) Cationized polymer "Morquat 550" (trade name, product of Merck & Co., Inc.)	0.05
10	(6) Sodium chloride	0.5
	(7) Perfume base, color	Trace
	(8) Water	Balance

1), 2), 3) and 4): As described above.

15 When a hair conditioning shampoo was prepared in accordance with the above formulation, it was excellent in detergency, foaming power and the feeling of use. Washed hair was moisturized and had excellent feeling to the touch.

Example 12: Conditioning Shampoo

25	(1) α -Olefin sulfonic acid (AOS ¹⁾)	8.0
	(2) Sulfosuccinic acid ester (NES ²⁾)	8.0
	(3) Imidazoline surfactant (SC-2 ³⁾)	4.0
	(4) Alkanolamide (B-112 ⁴⁾)	3.0
	(5) Cationized cellulose, (Polymer JF-400, trade name; product of Union Carbide Corporation)	0.20
	(7) Perfume base, color	Trace
30	(8) Water	Balance

1), 2), 3) and 4): As described above.

When a hair conditioning shampoo was prepared in accordance with the above formulation, it was excellent in detergency and foaming power. Washed hair was moisturized and was superb.

Claims

1. A low irritant detergent composition comprising (A) an α -olefin sulfonic acid salt, (B) a surfactant of the sulfosuccinic acid ester type, represented by the following formula [I]:



wherein R means $\text{R}_1\text{O}\{\text{CH}_2\text{CH}_2\text{O}\}_m$, R_1 being a linear or branched alkyl or alkenyl group having 8-22 carbon atoms and m standing for a number of 1-20 on average, and M denotes a hydrogen atom or a cationic ion capable of forming a water-soluble salt selected from the group consisting of alkali metal ions, ammonium ion and organoammonium ions, (C) an amphoteric imidazoline surfactant and (D) a nonionic alkanolamide surfactant, the weight ratio of (A)/(B) being 1/3-3/1, that of (C)/(A) being 1/10-1/1, that of (D)/(A) + (B) being 1/20-1/2, and the sum of (A) + (B) + (C) + (D) accounting for 10-40 wt.%; and further comprising from 30 to 90 wt. % water.

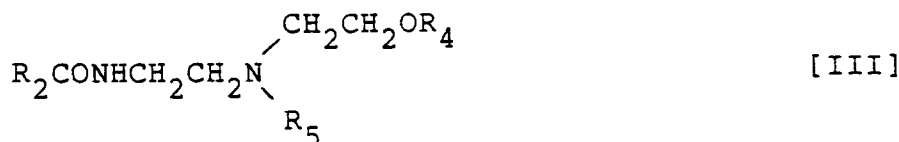
2. The composition as claimed in Claim 1, wherein the ampholytic imidazoline surfactant is composed of one or more compounds selected from the group consisting of compounds (1)-(3):

(1) amphoteric imidazoline surfactants of the tertiary amide type, represented by the following formula [II]:



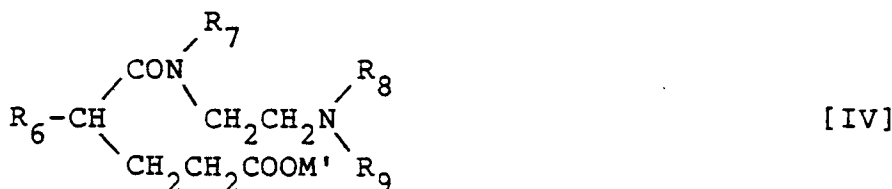
wherein R_2 means a linear or branched alkyl or alkenyl group having 7-21 carbon atoms, R_3 denotes $-\text{CH}_2\text{COOM}'$ or $-\text{CH}_2\text{CH}_2\text{COOM}'$, M' being a hydrogen atom or a cationic ion capable of forming a water-soluble salt selected from the group consisting of alkali metal ions, alkaline earth metal ions, ammonium ion and organoammonium ions, and R_4 is a hydrogen atom or $-\text{CH}_2\text{COOM}'$ or $-\text{CH}_2\text{CH}_2\text{COOM}'$, M' having the same meaning as defined above;

(2) amphoteric imidazoline surfactants of the secondary amide type, represented by the following formula [III]:



wherein R_5 means a hydrogen atom, $-\text{CH}_2\text{COOM}'$ or $-\text{CH}_2\text{CH}_2\text{COOM}'$, M' having the same meaning as defined above, and R_2 and R_4 have the same meanings as defined above; and

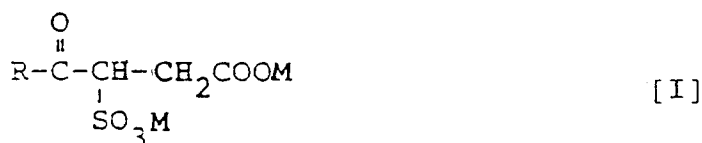
(3) imidazoline surfactants of the α -position addition type, represented by the following formula [IV]:



wherein R_6 means a linear or branched alkyl or alkenyl group having 6-20 carbon atoms, R_7 denotes a hydrogen atom or $-\text{C}_2\text{H}_4\text{OH}$, R_8 is $-\text{C}_2\text{H}_4\text{OH}$, $-\text{C}_2\text{H}_4\text{OC}_2\text{H}_4\text{COOM}'$ or $-\text{C}_2\text{H}_4\text{COOM}'$, M' having the same meaning as defined above, and R_9 means a hydrogen atom or $-\text{C}_2\text{H}_4\text{COOM}'$, M' having the same meaning as defined above.

Patentansprüche

1. Wenig reizende Detergens-Zusammensetzung, umfassend (A) ein α -Olefinsulfonsäuresalz, (B) ein Tensid vom Sulfobernsteinsäureester-Typ, das durch die folgende Formel [I] dargestellt wird:

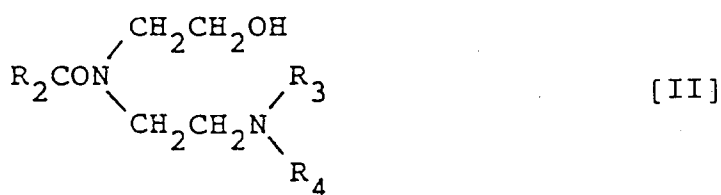


in der R $\text{R}_1\text{O}-(\text{CH}_2\text{CH}_2)_m-$ bedeutet, wobei R_1 eine lineare oder verzweigte Alkyl- oder Alkenylgruppe mit 8-22 Kohlenstoffatomen ist und m für eine Zahl von durchschnittlich 1-20 steht, und M ein Wasserstoffatom oder ein zur Bildung eines wasserlöslichen Salzes befähigtes Kation bedeutet, das

aus der aus Alkalimetallionen, dem Ammoniumion und Organoammoniumionen bestehenden Gruppe ausgewählt ist, (C) ein amphoterer Imidazolin-Tensid und (D) ein nicht-ionisches Alkanolamid-Tensid, wobei das Gewichtsverhältnis (A)/(B) 1/3-3/1 beträgt, dasjenige von (C)/(A) 1/10-1/1 beträgt, dasjenige von (D)/(A) + (B) 1/20-1/2 beträgt und die Summe aus (A) + (B) + (C) + (D) 10-40 Gew.-% ausmacht; und weiter 30 bis 90 Gew.-% Wasser umfassend.

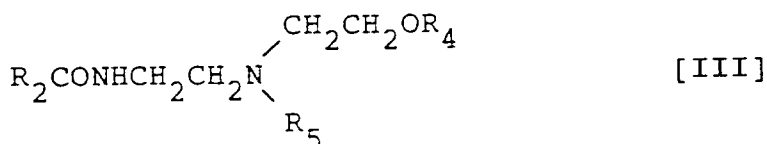
2. Zusammensetzung nach Anspruch 1, in der das ampholytische Imidazolin-Tensid aus einer oder mehreren Verbindungen zusammengesetzt ist, die aus der aus den Verbindungen (1)-(3) bestehenden Gruppe ausgewählt sind:

(1) amphotere Imidazolin-Tenside vom tertiären Amid-Typ, die durch die folgende Formel [II] dargestellt werden:



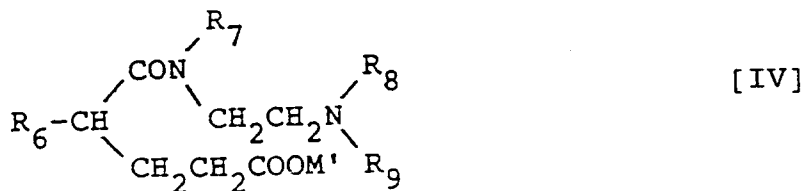
in der R_2 eine lineare oder verzweigte Alkyl- oder Alkenylgruppe mit 7-21 Kohlenstoffatomen bedeutet, R_3 $-\text{CH}_2\text{COOM}'$ oder $-\text{CH}_2\text{CH}_2\text{COOM}'$ bezeichnet, wobei M' ein Wasserstoffatom oder ein zur Bildung eines wasserlöslichen Salzes befähigtes Kation ist, das aus der aus Alkalimetallionen, Erdalkalimetallionen, dem Ammoniumion und Organoammoniumionen bestehenden Gruppe ausgewählt ist, und R_4 ein Wasserstoffatom oder $-\text{CH}_2\text{COOM}'$ oder $-\text{CH}_2\text{CH}_2\text{COOM}'$ ist, wobei M' dieselbe wie oben definierte Bedeutung aufweist;

(2) amphotere Imidazolin-Tenside vom sekundären Amid-Typ, die durch die folgende Formel [III] dargestellt werden:



in der R_5 ein Wasserstoffatom, $-\text{CH}_2\text{COOM}'$ oder $-\text{CH}_2\text{CH}_2\text{COOM}'$ bedeutet, wobei M' dieselbe wie oben definierte Bedeutung aufweist, und R_2 und R_4 dieselben wie oben definierten Bedeutungen aufweisen; und

(3) Imidazolin-Tenside-vom α -Stellungs-Addition-Typ, die durch die folgende Formel [IV] dargestellt werden:



in der R_6 eine lineare oder verzweigte Alkyl- oder Alkenylgruppe mit 6-20 Kohlenstoffatomen bedeutet, R_7 ein Wasserstoffatom oder $-\text{C}_2\text{H}_4\text{OH}$ bezeichnet, R_8 $-\text{C}_2\text{H}_4\text{OH}$, $-\text{C}_2\text{H}_4\text{OC}_2\text{H}_4\text{COOM}'$ oder $-\text{C}_2\text{H}_4\text{COOM}'$ ist, wobei M' dieselbe wie oben definierte Bedeutung aufweist, und R_9 ein Wasserstoffatom oder $-\text{C}_2\text{H}_4\text{COOM}'$ bedeutet, wobei M' dieselbe wie oben definierte Bedeutung aufweist.

Revendications

1. Composition détergente peu irritante, comprenant (A) un sel d'un acide α -oléfinesulfonique, (B) un tensioactif du type ester de l'acide sulfosuccinique, ayant la formule (I) ci-après :



dans laquelle R est un radical $\text{R}_1\text{O}\{\text{CH}_2\text{CH}_2\text{O}\}_m$, R_1 étant un groupe alkyle ou alcényle à chaîne droite ou ramifiée ayant de 8 à 22 atomes de carbone, et m étant un nombre de 1 à 20 en moyenne, et M est un atome d'hydrogène ou un ion cationique capable de former un sel soluble dans l'eau, choisi parmi l'ensemble constitué par les ions de métaux alcalins, l'ion ammonium et les ions organoammonium, (C) un tensioactif amphotère de type imidazoline, et (D) un tensioactif non ionique de type alcanolamide, le rapport pondéral (A)/(B) étant de 1/3-3/1, le rapport pondéral (C)/(A) étant de 1/10-1/1, le rapport pondéral (D)/(A) + (B) étant de 1/20-1/2, et la somme (A) + (B) + (C) + (D) représentant 10 à 40 % en poids ; et comprenant en outre de 30 à 90 % en poids d'eau.

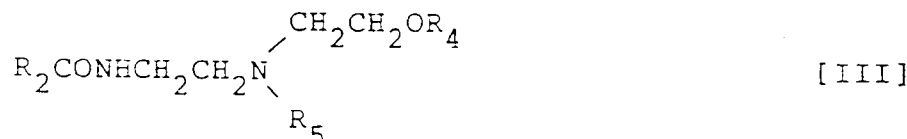
2. Composition selon la revendication 1, dans laquelle le tensioactif ampholytique de type imidazoline est constitué d'un ou plusieurs composés choisis dans le groupe constitué par les composés (1)-(3) :

(1) les tensioactifs amphotères de type imidazoline, du type amide tertiaire, ayant la formule (II) ci-après :



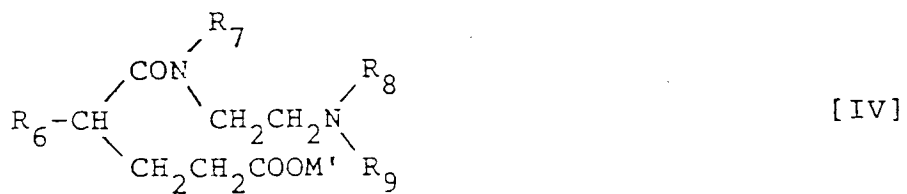
dans laquelle R_2 est un groupe alkyle ou alcényle à chaîne droite ou ramifiée ayant de 7 à 21 atomes de carbone, R_3 est un radical $-\text{CH}_2\text{COOM}'$ ou $-\text{CH}_2\text{CH}_2\text{COOM}'$, M' étant un atome d'hydrogène ou un ion cationique pouvant former un sel soluble dans l'eau et choisi parmi l'ensemble constitué par les ions de métaux alcalins, les ions de métaux alcalino-terreux, l'ion ammonium et les ions organoammonium, et R_4 est un atome d'hydrogène ou $-\text{CH}_2\text{COOM}'$ ou $-\text{CH}_2\text{CH}_2\text{COOM}'$, M' ayant la même signification que ci-dessus ;

(2) les tensioactifs amphotères de type imidazoline, du type amide secondaire, ayant la formule (III) ci-après :



dans laquelle R_5 est un atome d'hydrogène, $-\text{CH}_2\text{COOM}'$ ou $-\text{CH}_2\text{CH}_2\text{COOM}'$, M' ayant la même signification que ci-dessus, et R_2 et R_4 ont les mêmes significations que ci-dessus ; et

(3) les tensioactifs de type imidazoline, du type addition en position α , ayant la formule (IV) ci-après :



dans laquelle R_6 est un groupe alkyle ou alcényle à chaîne droite ou ramifiée ayant de 6 à 20 atomes de carbone, R_7 est un atome d'hydrogène ou $-\text{C}_2\text{H}_4\text{OH}$, R_8 est $-\text{C}_2\text{H}_4\text{OH}$, $-\text{C}_2\text{H}_4\text{OC}_2\text{H}_4\text{COO}-\text{M}'$ ou $-\text{C}_2\text{H}_4\text{COOM}'$, M' ayant la même signification que ci-dessus, et R_9 est un atome d'hydrogène ou $-\text{C}_2\text{H}_4\text{COOM}'$, M' ayant la même signification que ci-dessus.