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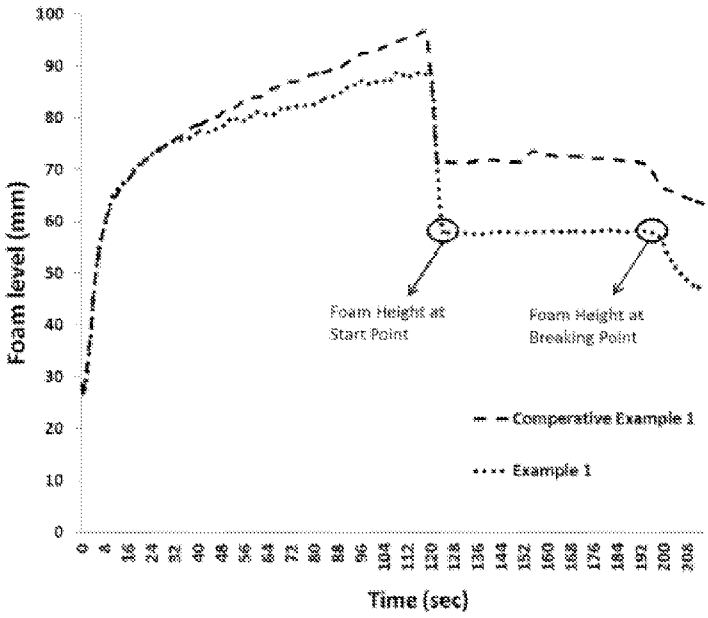

FIGURE 1

(57) Abstract: The present invention provides a transparent hand dishwashing cleaning composition comprising naturally derived ingredients exhibiting hypoallergenicity without sacrificing the efficient cleaning performance, high level of foam volume and foam durability. The composition comprises (a) fatty acid alkyl ester sulphonate, (b) alkyl polyglucoside, (c) N-methyl-N-alkyl acyl glucamine and (d) betaine.

WO 2017/209708 A1

[Continued on next page]

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A NON-IRRITANT HAND DISHWASHING COMPOSITION

FIELD OF THE INVENTION

The field of the present invention relates to hand dishwashing cleaning compositions.

The field of the present invention relates to transparent hand dishwashing cleaning compositions.

The field of the present invention relates to hand dishwashing compositions produced mainly from non-petrochemical resources.

The field of present invention relates to mild, hypoallergenic and non-irritating hand dishwashing cleaning compositions.

Particularly this application relates to the specific compositions in order to fulfill all the said requirements and the needs in this particular field.

BACKGROUND OF THE INVENTION

People are intertwined with cleaning compositions in their daily life whether the compositions are prepared as personal, laundry, dishwashing or surface cleaning compositions. Additionally, they have substantial functions which help us to stay healthy; care for us, our homes and our belongings; make our surrounding more pleasant and neat by safely and effectively removing soils, microorganisms and other contaminants. From above mentioned cleaners, cleaning compositions prepared for manual dishwashing applications are especially critical for the protection of our health since they are used for the removal of soils from our kitchen utensils. Unsuspended soil on kitchen appliances and tableware may lead to growth of microorganisms, germs etc. that may breakdown our health via diffusing to our body. Therefore, it is crucial to be aware of the safety and benefits of the dishwashing cleaning compositions. Due to the improved awareness of the consumers, their need and lifestyle changes, thus consumer products, manufacturing processes and marketing stamped out accordingly. Detergent industry responds the needs of consumers by manufacturing new products which are multifunctional in nature as being natural, safer and effective. The need beneath the demand of consumers to seek out a “natural” manual dishwashing cleaning composition stems from two primary reasons in which one is related with the health and safety of human body and the other is related with environment.

In some part of the world, economic reasons defines consumer demands especially in areas in which the mechanical machines are not prevalent and thus, kitchen appliances and tableware are washed manually. Unfortunately, this fact seems not to be changed in the near future. Because of that, hand dishwashing cleaning compositions can be prepared concerning the safety of the human body.

During hand washing and cleaning of kitchen appliances and tableware, as a matter of course, consumers’ hand come into substantial and prolonged contact with the dishwashing cleaning

compositions. Additionally, repeated and extensive exposure to cleaning solutions involving dishwashing detergents may lead to the development of skin irritation which may eventually grows into skin lesions and even skin damage. Although this is an undesirable and unacceptable situation, actually this is either partially arise from the nature of detergent itself or partially arise from the action of the detergent in weakening the skin resistance. As a matter of course, most of the synthetic detergents intrinsically cause irritation of the skin which may vary significantly with the detergents used and also person to person.

It is therefore an object of the present invention is to formulate a cleaning composition which is mild, hypoallergenic and less irritating to human skin.

Manufacturers have made many attempts for the development of mild hand dishwashing cleaning compositions in a way as to alleviate detrimental effects of the detergents on consumers' hand. However, this is not enough to convince the consumers to prefer the cleaning composition. Because, although hand dishwashing composition having mild, non-irritating and hypoallergenic properties is desirable, consumers do not claim to sacrifice the performance of the cleaning composition, instead they prefer for a detergent to maintain and improve its efficient cleaning performance. As a result, manufacturers have to take into consideration this indispensable desire of the consumers and incorporate high levels of anionic sulphonate or sulphate surfactant like linear alkyl benzene sulphonates (LAS) since they boost the performance of the cleaning composition whether cleaning operation is maintained in cold or hot water wash conditions. Anionic surfactants offer excellent cleaning of grease and oily soil and this performance can be empowered in conjunction with the use of nonionic surfactants as well. Although anionic and anionic/nonionic surfactant systems are robust and effective in the cleaning of wide range of soils under wide range of conditions like temperature and water hardness, they should not be designated for their mildness to consumers' skin.

Therefore, it is another object of the present invention is to formulate a hand dishwashing cleaning composition exhibiting mildness, non-irritancy and hypoallergenicity without scarifying the good and effective cleaning performance.

Additionally, the detergents empowered with the combinations of several surfactants mostly derived from petrochemicals may fulfill the expectations of consumers with respect to cleaning performance. But in recent years, improved awareness of the consumers about the safety brings about changes in their life styles and expectations. Although they seek out to search for a cleaning composition which is safer for their health, they are aware of the fact that safety and health of the people can only be fostered with the safety of the environment. So, consumers claim to seek out a natural manual dishwashing cleaning composition which is also safer for the environment. As a result, they prefer to

use cleaning compositions involving surfactants derived from naturally occurring resources representing the renewable materials which are readily available, inexpensive, synthetically versatile and environmentally friendly.

Thus, it is further another object of the present invention is to formulate a hand dishwashing cleaning composition derived from naturally occurring resources which exhibits mildness, non-irritancy and hypoallergenicity without sacrificing the good and effective cleaning performance.

Consumer perception and habits determine the trends in consumer products. Consumers have been looking for cues to inform them about the performance of the cleaning composition in order to be convinced about the effectiveness, performance and reliability of the cleaning. Initially, consumers have judged the cues conveyed by products when they search for it through the shelves according to the visual appearance of it. They tend to prefer buying clear or transparent products which offers an aesthetic indication of purity. The cleaning power of a detergent is normally judged by the consumer according to a perception, the higher the clarity of the product, the better the cleaning performance of it since the transparent appearance of the composition reflects the actual “cleaning” action. Cleaning compositions with effective cleaning performance generally involve higher amount of surfactants and various ingredients which makes the appearance of the products cloudy or opaque. Beside the anesthetic appearance, cleaning compositions having higher amount of surfactants tend to increase cleansing and foaming properties. Allergies and irritations related with the use of these compositions make them undesirable for hand dishwashing applications. Although the cleaning compositions suitable for use as cleaners should have high clarity, it has been a challenge to produce clear and/or transparent cleaning products exhibiting mild, non-irritating and hypoallergenic properties without sacrificing the effective cleaning performance.

Therefore, it is another object of the present invention is to provide a clear and/or transparent hand dishwashing cleaning composition exhibiting effective cleaning performance which is mild, non-irritating and hypoallergenic.

Furthermore, consumers have demanded to choose a detergent composition according to the cleaning capability of the product. Additionally, consumers have judged the cleaning capability of a detergent composition according to the cues that they receive during the cleaning process. The amount of generated foam, the duration of it, the breeze of a perfume and the presence of suds are some of the marks that consumers have faith in that the product is working effectively and sustaining its cleaning performance. Therewithal, consumers dose the detergent according to those cues.

During hand dishwashing operation, consumers perceive high foam and foam durability is an indicator of cleaning efficiency. The cleaning composition offering high levels of foam volume and foam durability as an indication of an effective cleaning process has gained the trust and faith of the consumer whereas they start to feel safe during the usage and in turn, the use of this product becomes a custom. Therefore, manufacturers compose new formulations by combining the surfactants sufficient to achieve high levels of foam volume and foam duration with efficient cleaning performance. But used surfactants for this purpose are mostly of irritant nature. On the other hand, mild hand dishwashing cleaning compositions tend to suffer from relatively poor levels of foam volume, foam durability and effective cleaning performance.

It is therefore another object of the present invention is to provide a clear / transparent hand dishwashing cleaning composition exhibiting mildness, non-irritancy and hypoallergenicity without scarifying high levels of foam volume, foam duration and effective cleaning performance.

People take care of cleaning and hygiene of kitchen appliances and tableware mostly because of the health and safety of the people around us and especially for their children. Skin irritation or skin lesions are visual indications of unsafe detergent formulations. However, unfortunately the real threat for our health is caused by the chemical residues of cleaning compositions. The cleaning performance, high level of foam volume and foam durability are mostly attained by the excessive use of surfactants which makes the rinsing process difficult and leaves residues on kitchen appliances and tableware. As associated therewith, unremoved residues are absorbed by human body and may lead to the development of allergies and thus, severe diseases owing to prolonged exposure time. Consequently, consumers regret to use detergents leaving residues for the cleaning of kitchen appliances and especially for the cleaning of child utensils. Excessive use of surfactants makes the rinsing process complicated and results in the use of excessive water which increases the cost of the cleaning process. The rinsing of the detergent with less water is a critical parameter in places where the water shortages is high and this is also important in terms of cost saving and environmental care. Dishwashing cleaning compositions exhibiting effective cleaning performance with good foam volume and duration generally involves higher amount of surfactants compositions and they may tend to leave residues otherwise require higher amount of water for rinsing. Although this type of cleaning compositions provides effective cleaning performance with good foam volume and durability, they suffer from leaving residues and/or difficulty in rinsability. Therefore it has been a challenge for manufacturers to produce a cleaning composition which is easy to clean, leaving no trace and will not harm even to the child health.

It is further object of the present invention is to prepare a mild, less irritating and hypoallergenic hand dishwashing cleaning composition displaying high level of foam volume, foam durability and effective cleaning performance with lack of residue and ease of rinsability.

A liquid dishwashing detergent composition is known from EP1896558. This invention composition is comprised of anionic surfactant chosen from alkyl ether sulfate and/or an alkyl sulfate, non-ionic surfactants, betaine surfactant, alkyl polyglucosides and organic solvent. This invention is aimed to provide a viscous liquid, paste or gel type dishwashing detergent which has good foam height, foam durability and mildness to the skin. Although this invention seems to offer a cleaning composition having good cleaning performance, high foam height and duration without sacrificing the mildness, it has already been known that alkyl ether sulfate and/or alkyl sulfate type surfactants especially SLES and SLS cause skin irritations upon extended exposure time and concentration of the detergent. SLES ad SLS are not mild and non-irritating enough as anionic surfactants derived from natural plant, animal oil and fat which has biodegradable ability, less irritation and higher frothing ability even than LABSA and SLS. Beside, this invention does not provide a clear/transparent liquid cleaning composition which is a critical parameter for customers since the clarity of a cleaning composition is an aesthetic indication of purity. Additionally, this invention composition involves the use of an organic solvent which makes it not safer for the health and environment. It has been a challenge for formulators to produce a clear / transparent detergent both exhibiting efficient cleaning performance, high levels of foam height, foam duration as the products involving higher anionic surfactant and/or nonionic surfactant compositions and exhibiting hypoallergenicity, safety for health and environment.

A clear liquid dishwashing cleaning composition is known from US6429180. This invention composition is comprised of anionic surfactants like alkyl ether sulfate and alkyl benzene sulphonate, alkyl polyglucoside surfactant, amine oxide surfactant and silicone polymer. Although this composition offers a clear cleaning composition with good performance, it suffers from mildness due to the presence of ingredients such as SLS, SLES and LABSA which leads to the skin irritation upon extended exposure time and concentration of the detergent. Additionally, by the use of alkyl ether sulfate and alkyl benzene sulphonate type surfactants which are enabling good cleaning performance with high foam and foam duration, the rinsability constitutes to be difficult which requires higher amount of water and leaves residues on kitchen utensils and tableware . This is very critical issue in terms of health of the people and cost of application. This invention fulfills the most perceptional consumer needs like clarity and foam but it could not provide safe and inexpensive composition for people and environment due to the difficulty in rinsing, leaving residues and requiring high water

amounts. Besides, the use of amine oxide surfactants may form nitrosamines which can be carcinogenic so, therefore not safer for the health.

Actually, using several products in order to enhance desired cleaning performance of the dishwashing solution is not feasible, since the cost of the operation increases. The use of several products means several packages which need extra space for storage and also, consumers do not seem to give up above mentioned expectations concerning a hand dishwashing cleaning composition. Multifunctional products eliminate the need for separate packages, make the cleaning process easy, thus fulfill the consumer needs and expectations, reduce health and environmental risks. Because of that the present invention offers all these features as all-in-one product.

There is a need and desire to have hand dishwashing compositions as an all-in-one product for fulfilling the above mentioned requirements and all coming above mentioned problems.

BRIEF DESCRIPTION OF DRAWINGS

FIGURE 1: Foam Duration Tests Diagram of Example 1 and Comparative Example 1.

FIGURE 2: Foam Height in Presence of Oil Tests Diagram of Example 1 and Comparative Example 1.

DISCLOSURE OF THE INVENTION

The present invention overcomes above mentioned problems by formulating a clear and/or transparent hand dishwashing cleaning composition having not only mild, non-irritating and hypoallergenic properties but also improved cleaning performance with high level of foam volume and foam duration. The present invention cleaning composition allows the consumer to maintain using the product to its full extent by facilitating a safer, environmentally friendly, effective, and inexpensive cleaning.

The present invention composition provides a clear, less irritating hand dishwashing cleaning composition obtained from non-petrochemical resources exhibits effective cleaning performance wherein the features like good foam volume and foam duration, ease of rinsability and lack of residue provided as a vested extra advantage.

The present invention relates to clear and/or transparent and/or translucent hand dishwashing cleaning compositions which is superior as commercially available products containing high levels of

strong anionic surfactants with regard to effective cleaning performance, besides the same composition shows high level of foam volume and foam duration during hand dishwashing of kitchen appliances and tableware as well.

The present invention relates to clear and/or transparent and/or translucent hand dishwashing cleaning compositions displays high level of foam volume, foam durability and effective cleaning performance with lack of residue and excellent rinsability.

The present invention relates to clear hand dishwashing cleaning composition derived from naturally occurring resources which ensures effective cleaning performance, high level of foam volume and foam durability.

The present invention relates to clear hand dishwashing cleaning composition which ensures effective cleaning performance, high level of foam volume and foam duration without sacrificing the mildness, non-irritancy and hypoallergenicity.

The present invention relates to clear hand dishwashing cleaning compositions having above mentioned features which allows the consumer to maintain using the product to its full extent by facilitating an easy, effective, safe and inexpensive cleaning.

It is an object of the present invention is to provide a clear hand dishwashing cleaning composition comprising ingredients:

a) fatty acid alkyl ester sulphonate

b) alkylpoly glucoside

c) N-methyl-N-alkyl acyl glucamines

d) betaine

said ingredients are derived from naturally occurring resources exhibiting mildness, non-irritancy and hypoallergenicity without sacrificing effective cleaning performance, high level of foam volume, foam durability with lack of residue and excellent rinsability.

To the present invention related compositions is superior thus appealing customer more due to having effective cleaning performance and being safer not only for human health but also for environment.

Dishwashing cleaning composition as mentioned above is used for liquid and/or gel and/or pourable, rinse type cleaning compositions. The terms are used interchangeably.

Furthermore, dishwashing cleaning composition as mentioned above is used for clear and/or transparent and/or translucent cleaning compositions. The terms are used interchangeably. Additionally, cleaning composition and/or cleaning product and/or detergent composition cover the cleaning products for hand dishwashing applications.

The term dishwashing is used to refer to the cleaning of surfaces such as dishes, glasses, pots, pans, baking dishes and flatware made from ceramic, china, metal, glass, plastic (polyethylene, polypropylene, polystyrene, etc.) and wood.

The terms cleaning product and/or cleaning composition and/or detergent composition are used interchangeably.

Dishwashing cleaning composition as mentioned above is used for hand and/or manual dishwashing operations. The terms hand and/or manual are used interchangeably.

Dishwashing cleaning composition is derived from natural resources in which the term natural and/or ecofriendly is used to mean that most of the components are obtained by non-petrochemical but plant and mineral based resources. Dishwashing cleaning composition derived from natural resources does not involve non-plant ethoxylated surfactants, linear alkylbenzene sulphonate (LAS) surfactants, ether sulfate surfactants and it is ethyleneoxide (EO) free and thus, it is minimally and/or nontoxic to human health and environment.

Certain attempts for the production of mild and less irritating cleaning compositions have been made based on three approaches which are the utilization of specific particular surfactant mixtures in specific proportions, combining anionic surfactants with specific compounds like protein hydrolysate and the use of amphoteric and/or nonionic surfactants. The present invention brings about an improvement in the first approach since a clear cleaning composition exhibiting mildness without sacrificing the effective performance, high levels of foam volume, foam durability with lack of residue and excellent rinsability can be generated by the utilization of controlled proportions of specific surfactants. Second approach suffers from high cost of the ingredients whereas third approach suffers from the reduced foam volume and foam durability.

Commercially available liquid hand dishwashing products predominantly empowered with the inclusion of linear alkyl benzene sulphonate surfactants (LAS) with respect to its cleaning power efficiency and high levels of foam volume. However, the use of LAS as an only anionic surfactant could not provide good foam durability and besides, LAS containing hand dishwashing detergents suffer from skin compatibility and eco friendliness. The situation is almost same when alkyl ether sulfate surfactants are used. But with the present invention, the utilization of sodium alkyl α-sulfomethyl ester as anionic surfactant fulfills the needs in terms of cleaning efficiency, high level of foam volume, foam durability, eco friendliness, skin compatibility. Although this cleaning composition involves alkyl α-sulfomethyl ester as anionic surfactant, the transparency has been achieved without sacrificing the other indispensable properties. Besides, the cleaning composition contributes with the inclusion of cocoamido propyl betaine to the dermatological improvement which brings about a mildness, reduced irritancy and hypoallergenicity. Furthermore, high level of foam volume and foam durability is strengthened by the use of alkyl polyglucoside nonionic surfactants having chain lengths greater than C8 especially the chain lengths from C8 to C10, a C8 to C14 and glucamides and mixtures thereof.

This composition provides an improved hand dishwashing composition with regard to its transparency, mildness, efficiency, foaming and rinsability which are generated by the utilization of selected surfactants with specific proportions.

The present invention provides a mild and clear cleaning composition for hand dishwashing applications which overcomes the disadvantages of the prior art by utilizing the controlled proportions of three essential surfactants as anionic, nonionic and amphoteric wherein the cleaning composition involving (a) fatty acid alkyl ester sulphonate preferably from 0.5 to 5.0 wt.-% and more preferably from 1.0 to 4.5 wt.-% (b) alkyl polyglucoside preferably from 0.5 to 7.0 wt.-%, more preferably from 1.0 to 6.0 wt.-% (c) N-methyl-N-alkyl acyl glucamines preferably from 0.5 to 7.0 wt-%, more preferably from 1.0 to 6.0 wt-% and (d) betaine preferably from 0.5 to 20.0 wt.-%, more preferably from 1.25 to 18.0 wt.-% of the total composition.

Anionic surfactants used in the dishwashing compositions of the present invention comprise the fatty acid methyl esters with chain length within 12 to 18 carbon atoms comprising lauric(C12), myristic (C14), palmitic (C16) and stearic (C18), arachidic (C20) acids as fatty acid parts. Preferred anionic surfactant of the present invention comprises alkyl α-sulfomethyl ester (MES). More preferably anionic surfactant of the present invention is selected from alkyl α-sulfomethyl esters having chain length of C12 to C20 preferably, C16 to C18. Alkyl α-sulfomethyl ester is a highly efficient surfactant which is produced from natural plant, animal oil and fat with subsequent sulfonation. The

compositions involving MES show mildness and reduced irritation for the skin thus, showing high skin compatibility, making the formulations suitable for hand washing applications. The compositions involving MES represents excellent water hardness stability which allows them to be used also in hard water regions.

Nonionic surfactants used in the present invention are ethoxylated alcohols like linear alcohol ethoxylates, alkyl phenol ethoxylate octyl phenol ethoxylates, nonyl phenol ethoxylates, alkyl amine ethoxylate, alkyl glycosides. Preferably, nonionic surfactants of the present invention composition comprise alkyl glycosides which are sugar-derived nonionic surface active agents with low irritant characteristic features. Moreover, alkyl polyglucosides reduce surface tension and provide more stable foam with respect to conventional nonionic surfactants. They can be prepared by using natural raw materials which makes them biologically safer and more preferred with respect to conventional nonionic surfactants. The use of alkyl polyglucoside provides environmentally friendly and ethylene oxide free compositions. The present invention composition comprises alkyl polyglucoside having alkyl group with the chain length of C6 to C18 preferably, C8 to C14 and mixtures thereof. The present invention composition comprises alkyl polyglucosides preferably from 0.5 to 7.0 wt.-%, more preferably from 1.0 to 6.0 wt.-% of the total composition. The present invention composition further comprises another sugar derived surfactants, glucamides which are obtained from glucose and natural oils. Glucamides are obtained from renewable resources. They are safer and less irritating and provide a good skin feeling after dishwashing. Besides, glucamides contributes to the development of cleaning performance and good foam which is not affected by water hardness. The present invention comprises N-methyl-N- alkyl acyl glucamine having alkyl group with the chain length of C8 to C18 preferably C12 to C14.The preferred glucamides of the present invention is derived from coco oil. The present invention composition comprises N-methyl-N-alkyl acyl glucamines preferably from 0.5 to 7.0 wt-%, more preferably from 1.0 to 6.0 wt-% of the total composition.

Amphoteric surfactants used in the liquid hand dishwashing compositions of the present invention comprises alkyl dimethyl betaine, alkyl carbo betaine, alkyl sulfo betaine, alkyl hydroxysulfobetaine, alkylamideamine-type betaine and alkylimidazoline-type betaine. Preferably amphoteric surfactant of the present invention is comprising alkyl amidopropylbetaine, N,N-dimethylacetic acid betaine, alkylamidopropyl-N,N-dimethyl-2-hydroxypropylsulfobetaine, alkylamidepropyl N, N-dimethylpropylsulfobetaine, lauramide propyl- N,N-dimethylacetic acid betaine, myristamidepropyl-N, N-dimethylacetic acid betaine, Cocamidepropyl-N,N-dimethylacetic acid betaine and the like. Most preferred amphoteric surfactant of the present invention is cocamideopropyl-N,N-dimethylacetic acid betaine.

Said betaines are particularly preferable in terms of detergency, foam producing ability and rinsing property. In the present invention, the above-mentioned amidobetaine-type amphoteric surfactants can be used singly or in combination of two or more. The composition is empowered with the addition of betaines in amounts from 1.0 % to 15.0 % of the total composition. The utilization of amidobetaines less than 1wt.-% leads to unsufficient detergency whereas the utilization higher than 20.0 % are not economical, since their performance cannot be enhanced any more. Therefore, compositions of the present invention comprise alkylamidopropyl betaine preferably from 0.5 to 20.0 wt.-%, more preferably from 1.25 to 18.0 wt.-% of the total composition.

Preservatives which can be optionally used in the present invention compositions at a concentration of 0 % to 3 % weight percentage comprise benzalkonium chloride, benzethonium chloride, sodium benzoate, 5-bromo-5-nitro-1,3 dioxane, 2-bromo-2- nitropropane-1, 3-diol, alkyl trimethyl ammonium bromide; N- (hydroxymethyl)-N- (1, 3- dihydroxy methyl-2, 5-dioxo-4-imidaxolidinyl-N'-(hydroxy methyl) urea; 1-3-dimethyol- 5, 5-dimethyl hydantoin; formaldehyde; iodopropynl butyl carbamate, butyl paraben; ethyl paraben; methyl paraben; propyl paraben, mixture of methyl isothiazolinone/methyl-chloroisothiazoline; mixture of phenoxythanol/butyl paraben/methyl paraben/propylparaben; 2-phenoxyethanol; tris- hydroxyethyl-hexahydrotriazine; benzisothiolinone; methylisothiazolinone; 5-chloro-2-methyl-4-isothiazol- 3-one; 2-methyl-4-isothiazol- 3-one ; 1,2-dibromo-2, 4-dicyanobutane and mixtures thereof. Preferred preservative of the present invention is mixture of benzisothiazolinone and methylisothiazolinone.

Furthermore, compositions of the present invention may involve builder which act as a complexation agent as well, such as glutamate diacetate and its salts. Preferred salts are alkali salts, most preferred tetrasodium salt of glutamate diacetate.

The present invention composition is formulated at a pH in the range 8.0 and 9.0. The pH adjusting agents of acidic nature, organic acids such as citric acid, fumaric acid, inorganic acids such as hydrochloric acid and sulfuric acid may be added to the present invention compositions. The preferred pH adjusting agent of the present invention composition is citric acid.

PREPERATION METHODS OF CLEANING COMPOSITIONS

Example 1: Preparation of the present invention hand dishwashing composition

- 3.0 g palmitic methyl ester sulphonate (90%) is dissolved in 24.25 mL water at 60 ^{o}C.
- The mixture is cooled to at 40 ^{o}C by adding 24.25 mL water.

- 5.0 g N-Coco-acyl-N-methyl-glucamine (40%) is added to the mixture and stirred until the mixture becomes clear.
- 2.0 g capryl glucoside (60%) is added.
- 3.0 g coco glucoside (50%) is added and stirred.
- 24.25 mL water is added.
- 12.0 g cocoamidopropyl betaine (35%) is added.
- Chelating agents and preservatives are added.
- The pH is adjusted 8.25 by using 0.1 g citric acid.
- 1.0 g NaCl is added.

Comparative Example 1: Preparation of SLES and LABS-Na containing hand dishwashing composition

- 6.42 g SLES 2EO (70%) is dissolved in 79.0 mL water.
- 13.00 g LABS-Na paste is added to the mixture and stirred.
- 0.10 g EDTA, 0.05 g UV absorber, 0.15 g Parmetol A-28 S preservative are added. [Parmesotol A-28 is mixture of 5-Chloro-2-Methyl-2H-isothiazol-3-one (CIT) and 2-Methyl-2H-isothiazol-3-onemixture(MIT)]
- pH is adjusted to 8.50 by using 0.1 g citric acid.
- 1.0 g $MgSO_4$ is added.

Comparative Example 2: Preperation of the present invention composition without glucamine.

The same procedure with same amount of agents as in example 1 is applied except cocoglucoside (APG C12-C14) amount is changed to 8.0 g and N-Coco-acyl-N-methyl-glucamine is absent.

Table 1: Compositions of the example 1 and comparative examples 1-2.

	Example 1 (%)	**Comperative Example 1 (%)**	**Comperative Example 2 (%)**
Linear alkyl benzene sulfonic acid sodium salt	-	13,00	-
Sodium Lauryl Ether Sulphate	-	6,42	-
Methyl Ester Sulphonate	3,00	-	3,00
Cocoamine Oxide	-	-	-
Cocoamidopropyl betaine	12,00	-	12,00
N-Coco-acyl-N-methyl-glucamin	5,00	-	-

Coco glucoside (APG C12-C14)	3,00	-	8,00
Capryl/myristyl glucoside (APG C8-C10)	2,00	-	2,00
Tetrasodium Glutamate Diacetate	1,00	-	1,00
Citric Acid	0,10	0,10	0,10
NaCl	1,00	-	-
Benzisothiazolinone /Methylisothiazolinone	0,08	-	-
PARMETOL A - 28 S	-	0,15	0,15
EDTA	-	0,10	-
Ethyl Alcohol	-	-	-
$MgSO_4$	-	1,00	-
UV ABSORBER	-	0,05	-
Dye	-	0,0046	-
* Parfume	-	0,20	-
Water	completed to 100%	completed to 100%	completed to 100%

MEASUREMENTS and TEST METHODS

TRANSPARENCY

Clarity Test:

Example **1** and comparative example **2** were prepared according to the mentioned procedures and both compositions were kept in fridge at approximately +4 ^{o}C for one week.

Results of Clarity Test: According to the test result, example **1** is not blurred and keeps its transparency whereas comparative example **2** lost its transparency and becomes blurred. The reason for blurring of comparative example **2** can be attributed to the absence of N-Coco-acyl-N-methyl-glucamine.

IRRITANCY

Sensitizing Potential Study:

The sensitizing potential study of cleaning composition is determined according to Marzulli-Maibach Method on 100 subjects during 6 weeks. To evaluate the sensitizing potential of the compositions, 100 healthy subjects with sensitive skin is chosen and 1% of cleaning composition of the present invention diluted with water was applied. Frequency and contact time of the composition application is performed as induction phase and challenge phase. During the induction phase, product is applied three times in a week during 48 hours. During challenge phase, the product is applied once during 48

hours. Phase durations are as follows, induction phase lasts three weeks, rest phase takes 2 weeks and challenge phase lasts 1 week. Before any application of the composition, the skin was cleaned and dried. The cleaning composition of the present invention was applied like occlusive patch (filter paper) to the subject's back. The patch containing no product was applied under the same conditions to serve as a non-treated control.

Assessment was performed regarding irritating potential in induction phase and regarding the sensitizing potential in challenge phase. After each application, the patch is removed and the clinical examination is performed by the investigator 30 minutes later in order to eliminate the pressure and the occlusion effects. The result of examination is zero if the skin looks normal.

Table 2: The clinical examination is made on the back using the following criteria and scale.

Score	Cotation	CRITERIA: Description			
		ERYTHEMA	EDEMA	DRYNESS	VESICLES
0	Absent	Normal aspect	Normal aspect	Normal aspect	Normal aspect
1	Slight	Discreet pink coloration of the whole tested area or rather visible on part of the tested area	More palpable than visible edema	Discreet thin desquamation, tarnished aspect	More palpable than visible vesicles
2	Marked	Marked erythema covering the whole tested area	Visible edema	Visible desquamation, flaky aspect.	Visible vesicles
3	Important	Severe erythema covering the whole tested area or erythema diffusing beyond the tested area	Edema diffusing beyond the tested area	Important desquamation, cracking	Vesicles diffusing beyond the tested area or blisters.

Table 3: The allergic reactions are evaluated according to the following scale.

Criterion	Quotation ICDRG (*)	Score noted in all tables
No reaction	0	0
Doubtful reaction	?	*
Erythema and edema	+	1
Erythema, edema and vesicles	++	2
Severe reaction with blisters	+++	3

(*) –International Contact Dermatitis Research Group

Results of Sensitizing Potential Study:

Under these study conditions, the irritating potential of example 1 cleaning composition of the present invention in induction phase showed a score lower than 0.0080, so it can be considered non-irritating. Additionally, under these study conditions, no reaction ++ (2) nor +++ (3) were observed, so the cleaning composition of the present invention can be considered non-sensitizing.

The use of LABS-Na and SLES in detergent compositions as in comparative example can boost the cleaning performance and high foam levels but they cannot be designated for their mildness to users' skin. The irritating potential of these surfactants are known from patent US4256611 and EP0341071.

Conclusively, comparative example **1** has irritating potential due to the presence of strong anionic and irritating surfactants like LABS-Na and SLES. However, the present invention composition derived from non-petrochemical resources exhibiting mildness, non-irritancy and hypoallergenicity. So, example **1** represents concrete evidence that with the inclusion of surfactants derived from non-petrochemical resources, mildness, non-irritancy, hypoallergenicity can be achieved. Beside, with the incorporation of controlled proportions of specific surfactants, example **1** composition offer effective cleaning performance with high foam volume and foam durability as the compositions involving high amount of strong surfactants as comparative example **1**.

CLEANING PERFORMANCE

The present invention composition obtained from non-petrochemical resources provides a clear, less irritating hand dishwashing cleaning composition exhibits effective cleaning performance with high foam volume and foam durability.

Cleaning Performance Test:

The cleaning performance of the hand dishwashing composition is determined by two step procedure. In the first step, the soils are prepared and then, the plates are soiled with the prepared soils. In the second step, the soiled plates are washed with the hand dishwashing cleaning composition. In the dishwashing solution, soiled plates are washed by hand until the foam layer of the solutions collapses. Then, the number of washed plates is determined.

Preparation of the Test Soil: The components involving fat are melted carefully in a beaker in the microwave or in a hot water bath. Coloring agent, milk powder, flour and water are stirred and the

solution was transferred to the melted fat mixture (50-60 ^{0}C). The mixture is then stirred thoroughly such that 1.0 kg batch is stirred for 5min in order to obtain homogeneous test soil.

Table 4: Test Soil Components and Specifications

TEST SOIL		**3 g / PLATE (Normal Fat)**
Components	**Specifications**	**% weight**
Beef Tallow	Not specified	4,70
Vegetable Oil	Not specified	9,40(Corn oil)
Margarine	Not specified	4,70
Butter	Not specified	4,70
Whipped Cream	Not specified	4,70
Sunflower oil	Not specified	4,70
Olive oil	Not specified	4,70
Skim-milk Powder	Not specified	6,30
Flour	Not specified	18,80
Water	15 +/-2 °F	37,20
Coloring Agent	Rhodamin Dye	0,10
		Percent in the dry matter
	Fat	60
	Carbohydrates	30
	Proteins	10

Hand Dishwashing Process: The plates are soiled with 3.0 gram of prepared test soils. 3.0 g of hand dishwashing composition is weighed and mixed with water to facilitate the transfer of the composition to wash basin. Then, 5.0 liter of tap water of 20 FR of water hardness (whereby 1 FR is corresponding to 10mg Ca in 1 LT water) is run into wash basin involving cleaning composition from 1.0 meter height in order to generate foam. Temperature of water bath is adjusted to 25 ^{0}C. The soiled plates and hands are completely immersed in the washing soak. The front side of soiled plates is cleaned with 20 circular movements and the back side of the soiled plates is washed with 6 circular

movements until the foam layer of the solution collapses. When the foam layer of the washing solution has broken up permanently on the surface of the dishwashing soak, the dishwashing soak is deemed to be exhausted and the end point has been reached. Then, the number of washed plates per washing test is determined. For each test soil, washing process is repeated for 3 times and the number of washed plates is determined as an average.

Results of Cleaning Performance Test:

Table 5: Number of washed plates belonging to example1 and comparative example 1

	Example 1	Comperative Example 1
Number of washed plates	12,33	13,00

As can be seen from table 5, example 1 enables the cleaning of 12.33 numbers of plates so, it shows quite same cleaning performance with the comparative example 1. Number of washed plates is the indication of foaming strength of dishwashing compositions.

Conclusively, anionic surfactants like LABS-Na and SLES are generally used to boost the cleaning performance of the dishwashing compositions and by using comparative example 1 composition, 13 plates can be washed with sacrificing the irritancy, foam durability, safety of the health and environment. However, quite close number of plates are washed with the present invention composition with the inclusion of mild, non-irritating and naturally derived surfactants without sacrificing the non-irritancy, foam durability, safety of health and environment. So, example 1 represents concrete evidence that effective cleaning performance can also be achieved by using cleaning composition like example 1 involving mild, reduced amounts and naturally derived surfactants rather than by using compositions involving strong and irritating surfactants.

Foam Height Measurement at Starting Point:

Foam height measurement at starting point has been performed with KRUSS DFA 100 equipment. Holding cylinder has the dimensions of 250mm height and 40mm diameter with a propeller at the bottom of the cylinder. Thereby,

- 4.0 gram of cleaning composition is mixed with tap water to achieve total volume of 500.0 mL and 10.0 mL from this solution has been diluted to volume of 50.0 mL by using tap water of 45 FR of water hardness whereby 1 FR is corresponding to 10mg Ca in 1 LT water.
- This mixture is taken and placed into holding cylinder of KRUSS DFA 100 device.
- This test mixture is stirred 120 seconds with 4000 rpm,

- Stirring is stopped, waited 230 seconds whereby foam height is dropped and started to be stabilized significantly and foam height is measured.

Results of Foam Height Measurement at Start Point:

Table 6: Foam Heights at start point belonging to example **1** and comperative example **1**.

	Example 1	**Comperative Example 1**
Foam Height (mm)at Starting Point	58	72

See FIGURE 1 for respective diagrams.

Example 1 produces foam heights approximate to comparative example 1 although it contains methyl ester sulphonate surfactant which is milder and not harsh as strong anionic surfactants like LABS-Na and SLES. Additionally, the foamability of the composition is fostered with the inclusion of APG, glucamine and betaine surfactants.

Comparative example 1 produces high amount of foam due to the presence of strong anionic surfactants like LABS-Na and SLES.

Conclusively, high foam height is accepted as the indication of foaming strength and cleaning performance of dishwashing compositions and the present invention composition having controlled proportions of specific surfactants which are mild, non-irritating produces high foam height as compared to the cleaning products involving strong anionic surfactants like LABS-Na and SLES. Using mild, non-irritating, less amounts of MES contributes to the high foam height of the composition as other strong and irritating anionic surfactants. Example 1 represents a concrete evidence that high foam height can be obtained with dishwashing compositions involving mild, non-irritating compositions as with compositions involving strong and irritating surfactants.

Foam Height Measurement at Starting Point in the Presence of Oil Containing Soil:

Foam height measurement at starting point has been performed with KRUSS DFA 100 equipment. Holding cylinder has the dimensions of 250mm height and 40mm diameter with a propeller at the bottom of the cylinder. Thereby,

- 2.0 gram of cleaning composition is mixed with tap water to achieve total volume of 500.0 mL and 25.0 mL from this solution has been mixed with 0.5 mL sunflower oil and solution has

been diluted to volume of 50.0 mL by using tap water of 45 FR of water hardness whereby 1 FR is corresponding to 10mg Ca in 1 LT water.

- This mixture is taken and placed into holding cylinder of KRUSS DFA 100 device.
- This test mixture is stirred 120 seconds with 4000 rpm,
- Stirring is stopped, waited 60 seconds whereby foam height is dropped and started to be stabilized significantly and foam height is measured.

Results of Foam Height Measurement at Start Point in The Presence of Oil:

Table 7: Foam heights at start point in the presence of oil belonging to example 1 and comparative example 1.

	Example 1	**Comperative Example 1**
Foam Height (mm)at Starting Point in the Presence of Oil Containing Soil	48	54

See FIGURE 2 for respective diagrams.

As can be seen from table 7, Example 1 produces high foam height which is the indication of foaming strength of dishwashing compositions in the presence of oil.

Comparative example 1 containing strong and irritating surfactants produces very close foam heights as milder surfactants in the presence of oil.

Conclusively, although anionic surfactants like LABS-Na and SLES are used to boost the cleaning performance of the composition in the presence of oil and grease, they produces foam heights very close to the present invention composition which containing less amount of mild, non-irritating MES surfactant. With the present invention composition, high foam height in the presence of oil can be obtained by the inclusion of mild, non-irritating and naturally derived surfactants. So, example 1 represents concrete evidence that high foam height in the presence of oil can be obtained with dishwashing compositions involving mild, non-irritating compositions rather than compositions involving strong and irritating surfactants.

Foam Duration Measurement:

Foam duration measurement is the time period measure between the starting point (as above) and breaking point of stable foam period. Foam duration is the time period lapsed between starting point of foam height measurement at starting point (as above) and the breaking point of the foam,

whereas breaking point is defined as the time point where significant decrease of foam height occurs.

Result of Foam Duration Measurement:

Table 8: Foam Durations belonging to example 1 and comperative examples 1.

	Example 1	**Comperative Example 1**
Foam Duration (sec)	76	80
Decrease of Foam Height (%)	1.8	8.3

See FIGURE 1 for respective diagrams.

As can be seen from table 8, Example 1 has the most persistent foam height which is an indicator of foam strength. With %1.8 foam height decrease it is by far the best composition with respect of foam duration which is indicative for better cleaning performance as well.

Comparative example 1 is empowered with the inclusion of strong anionic surfactants which creates big bubbles and high foam height at the beginning of the cleaning process but they perish after short period of time. Therefore, the percent decrease of foam height in comparative example 1 is 8.3 which way higher than example 1.

Conclusively, present invention composition has better foam duration properties in comparison with comparative example 1. Present invention composition produces high foam durability with low foam decrease with the inclusion of controlled proportions of specific surfactants which are mild, non-irritating. As a result, example 1 represents a concrete evidence that high foam duration with low foam decrease can be obtained with dishwashing compositions involving mild, non-irritating surfactants rather than compositions involving strong and irritating surfactants.

Foam Height Measurement at Breaking Point:

Foam height is measured at the breaking point of stable foams. Breaking point of stable foam is determined at the start of rapid fall of stable foam and foam height at that point is measured.

Results of Foam Height Measurement at Breaking Point:

Table 9: Foam heights at breaking points belonging to example 1 and comparative example 1.

	Example 1	Comparative Example 1
Foam Height (mm) at Breaking Point	57	66

See FIGURE 1 for breaking point observations.

As can be seen from table 9 and 8, Example 1 the preferred composition of present invention, has high foam height as comparative example 1 at breaking point with low (1.8%) foam height decrease which is indicative for foaming strength.

Comparative example 1 has high foam height at breaking point but with high (8.3%) foam height decrease.

Conclusively, although composition involving LABS-Na, SLES seems to provide better cleaning performance by creating big bubbles and high foam height at the beginning of the cleaning process, the bubbles and foam height are perished after a short period of time. However, with the present invention composition, high foam height at breaking point with low (1.8%) foam height decrease can be obtained by the inclusion of mild, non-irritating and naturally derived surfactants. So, example 1 represents concrete evidence that high foam height at breaking point with low decrease of foam height can be obtained with dishwashing compositions involving mild, non-irritating compositions rather than compositions involving strong and irritating surfactants.

TOC (Total Organic Carbon) Test:

This test was performed in order to determine whether residue was left after rinsing or not. TOC sample procedure was performed as follows: 11 pieces detergent solution have been dissolved according to IKW Standart Test Method with 3.03 gr detergent in 5 lt water. Foaming has been achieved with pouring water from 1 m height according to standard. 10 pieces white porcalein dishes have been put in the prepared solution and each one have been holded for one minute. Rinsing have been performed for each dishes 5 times front part, 5 times back part and 5 times front part again during 7 seconds with 550 gr water, under 4500 g/min flowrate. Dishes have been put on a flat surface to be dried. Rinsed dishes have been holded in 10 L water for 1 hour. Water samples have been taken from the rinsing solution (1 L water) for each washed and rinsed plate samples. (For each detergent 1 sample has been taken).

Results of TOC Test: According to test results, total organic carbon amount of the present invention composition is determined <1 mg/L so, the cleaning composition of the present invention can be considered that it is lack of residue.

CLAIMS

1. A non-irritant transparent liquid hand dishwashing composition comprising,

a) fatty acid alkyl ester sulphonate from 0.5 to 5.0 wt.-%,

b) alkyl polyglucoside from 0.5 to 7.0 wt.-%,

c) N-methyl-N-alkyl acyl glucamines 0.5 to 7.0 wt-% and

d) betaine from 0.5 to 20.0 wt.-%

by weight of the total composition.

2. A non-irritant transparent liquid hand dishwashing composition according to claim 1 comprising,

a) fatty acid alkyl ester sulphonate from 1.0 to 4.5 wt.-%,

b) alkyl polyglucoside from 1.0 to 6.0 wt.-%,

c) N-methyl-N-alkyl acyl glucamines 1.0 to 6.0 wt-% and

d) betaine from 1.25 to 18.0 wt.-%

by weight of the total composition.

3. A non-irritant transparent liquid hand dishwashing composition according claim 1 and 2, wherein said fatty acid alkyl ester is selected from sodium salt of alkyl α-sulfomethyl ester wherein alkyl group has the chain length of C12 to C20 preferably, C16 to C18.

4. A non-irritant transparent liquid hand dishwashing composition according claim 1 wherein said alkyl polyglucoside comprises alkyl group with the chain length of C6 to C18 preferably, C8 to C14.

5. A non-irritant transparent liquid hand dishwashing composition according claim 1 wherein said N-methyl-N- alkyl acyl glucamine comprises alkyl group with the chain length of C8 to C18 preferably C12 to C14.

6. A non-irritant transparent liquid hand dishwashing composition according claim 1, wherein said betaine compound is selected from alkylamidepropyl-N,N-dimethyl-2-hydroxypropylsulfobetaine; alkylamidepropyl N, N-dimethylpropylsulfobetaine; lauramidepropyl-N,N-dimethylacetic acid betaine; myristamidepropyl-N, N-dimethylacetic

acid betaine; alkylhydroxy sulfobetaine; alkylamideamine-type betaine; alkylimidazoline-type betaine; cocamidepropyl-N,N-dimethylacetic acid betaine.

7. A non-irritant transparent liquid hand dishwashing composition according claim 5, wherein the preferred betaine is cocoamidopropyl-N,N-dimethylacetic acid betaine.

8. A non-irritant transparent liquid hand dishwashing composition according to preceding claims, further comprising preservatives, chelating agent, salt.

9. A process for the preparation of a non-irritant transparent liquid hand dishwashing composition according to preceding claims wherein said composition is prepared with the steps comprising,

a) Adding methyl ester sulphonate into water at 60°C and stirring for homogeneous suspension,
b) Adding N-alkyl-acyl-N-methyl-glucamine at 40°C and stirring until mixture becomes clear,
c) Adding alkyl glucoside sucessively and stirring,
d) Adding alkylamidopropyl betaine and stirring,
e) Adding chelating agents and preservatives under stirring and,
f) Adjusting pH between 8.0 and 9.0 by using acid.

10. A process for the preparation of a non-irritant transparent liquid hand dishwashing composition according to claim 9 comprises the steps of,

g) Dissolving 3.0 wt.-% sodium salt of plamitic α-methyl ester sulphonate in water at 60°C and stirring for 20 min,
h) Adding 5.0 wt.-% N-Coco-acyl-N-methyl-glucamine at 40°C and stirring for 10 min,
i) Adding 2.0 wt.-% capryl glucoside and 3.0 wt.-% coco glucoside subsequently and stirring for 5 min,
j) Adding 12.0 wt.-% cocoamidopropyl-N,N-dimethylacetic acid betaine and stirring for 5 min,
k) Dissolving 1.0 wt.-% tetrasodium glutamate diacetate and 0.08 wt.-% benzisothiazolinone/methylisothiazolinone mixture subsequently under continuous stirring and
l) Adjusting of pH to 8.25 by using citric acid.

11. A non-irritant transparent liquid hand dishwashing composition according to preceding claims, wherein said composition has consistent foam duration as determined according to the test method described in the specification.

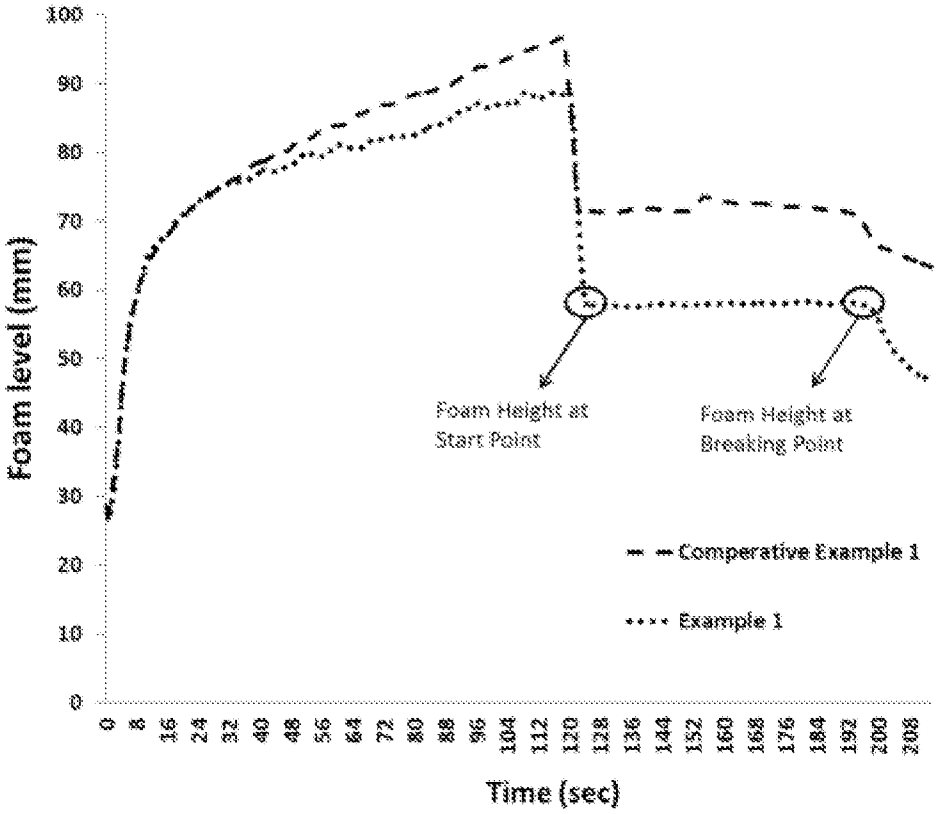
Foam level (mm)
100
90
80
70
60
50
40
30
20
10
0
0 8 16 24 32 40 48 56 64 72 80 88 96 104 112 120 128 136 144 152 160 168 176 184 192 200 208
Time (sec)
Foam Height at Start Point
Foam Height at Breaking Point
Comperative Example 1
Example 1

FIGURE 1

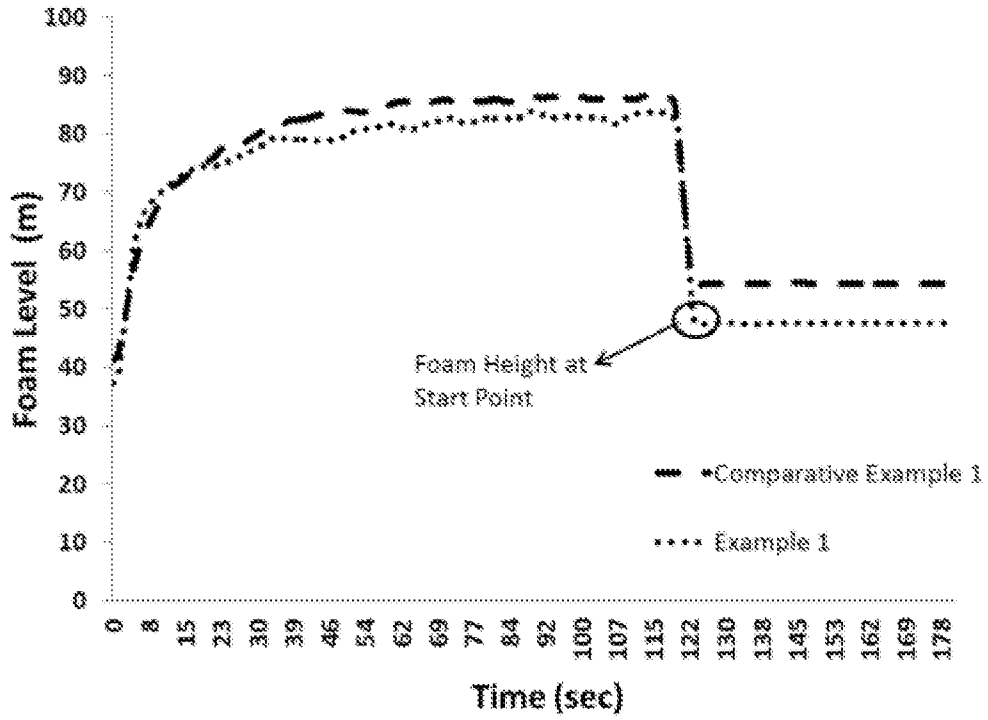
Foam Level (m)
100
90
80
70
60
50
40
30
20
10
0
0 8 15 23 30 39 46 54 62 69 77 84 92 100 107 115 122 130 138 145 153 162 169 178
Time (sec)
Foam Height at Start Point
Comparative Example 1
Example 1

FIGURE 2

INTERNATIONAL SEARCH REPORT

International application No
PCT/TR2016/050159

A. CLASSIFICATION OF SUBJECT MATTER
INV. C11D1/94
ADD. C11D1/28 C11D1/66 C11D1/52 C11D1/90

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
C11D

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

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
11 November 2016	23/11/2016

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Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No
PCT/TR2016/050159

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Information on patent family members

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