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(71) Applicant: **GIVAUDAN SA** [CH/CH]; Chemin de la Parfumerie 5, 1214 Vernier (CH).

(72) Inventors: **BROOKS, Matthew Peter**; Kennington Road, Ashford TN24 0LT (GB). **AUSSANT, Emmanuel**; 19-23 Rue de la Voie des Bans, 95102 Argenteuil (FR).

(74) Agent: **GLOBAL PATENTS**; Givaudan SA Grafenaustrasse 7, 6300 Zug (CH).

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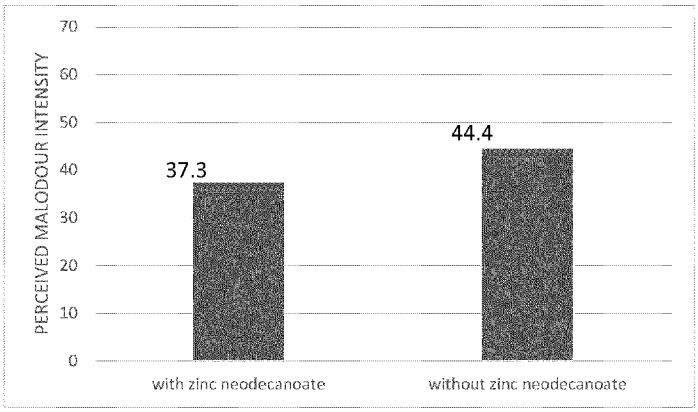
Figure 2: Perceived malodour intensity of post-dosed refresher spray formulation on worn T-shirt inserts – results illustrating example 6 C



(57) Abstract: The present invention relates to the stable incorporation of malodour-reducing composition containing zinc neodecanoate into a consumer product containing water, and the delivery of zinc neodecanoate from the consumer product onto a surface containing a source of malodour and to deliver a sensorially perceptible malodour reduction effect to the surface.

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IMPROVEMENTS IN OR RELATING TO ORGANIC COMPOUNDS

Field of the Invention

The present invention is concerned with consumer products containing a malodour-reducing composition comprising a zinc carboxylate, and the use of such products to suppress or eliminate malodours on a surface containing a source of malodour.

Background of the invention

Human olfaction is complex, and how malodours are perceived can be influenced by many factors. However, the most important factor in sensing, and indeed eliminating malodours is the vapour phase concentration of the malodorous molecules. Suppression or elimination of malodour can be achieved by the use of malodour-counteracting agents that chemically modify malodorous molecules to create non-odorous reaction products; or by using malodour-counteracting agents that have anti-microbial activity to exert an effect on microbes that may act as precursors in the development of malodour. In either case, successful intervention usually relies upon the delivery of sufficiently high dosages of malodour-counteracting agents to a surface containing the sources of malodour, and retaining them on the surface for a time period sufficient to enable them to exert a malodour counteracting effect.

Zinc salts, including certain zinc carboxylates, are known to reduce or inhibit malodour, both by chemical and anti-bacterial means. Zinc neodecanoate, in particular, has been described as being useful as a malodour reducing active agent in anhydrous deodorant compositions, see WO2018/087147 and WO2018/087148.

Although zinc neodecanoate has proven to be an effective malodour counteracting agent when delivered from the deodorant products referred to above, applicant found that it was difficult to incorporate it into products containing appreciable levels of water. Attempts to incorporate zinc neodecanoate into such products leads to the development of solid residues that can be problematic both in terms of the ease of manufacture of the products as well as their ease of use in application. More specifically, the formation of unwanted residues can cause fouling on production lines. It is also the case that during use residues can interfere with the proper dispensing of a product from its container, preventing the continuous and uniform delivery of effective amounts of zinc neodecanoate onto a surface in need of treatment.

The difficulty of formulating zinc carboxylates, and zinc neodecanoate in particular, in consumer products that contain appreciable amounts of water currently prevents the wider application of this effective technology to create sensorially perceivable malodour-reducing effects across a wide range of consumer product formats.

Summary of the invention

There remains a need to provide malodour-reducing compositions containing a zinc carboxylate, and in particular zinc neodecanoate, that can be stably incorporated into consumer products containing water, and which as a result can be delivered from a consumer product onto a surface containing a source of malodour thereby to deliver a perceivable malodour-reducing effect.

The invention provides in a first aspect a malodour-reducing composition comprising a zinc carboxylate and means for dissolving or dispersing the zinc carboxylate in a consumer product containing water, said means comprising at least one perfume ingredient, perfumery solvent, surfactant or mixtures thereof, and/or encapsulating media comprising a plurality of microparticles for encapsulating the zinc carboxylate.

In a second aspect, the invention provides a consumer product, comprising the malodour-reducing composition according to the first aspect of the invention.

In a third aspect, the invention provides a method of incorporating a zinc carboxylate into a consumer product comprising water, the method comprising the step of mixing the zinc carboxylate with at least one perfume ingredient, perfumery solvent or surfactant, and/ or encapsulating medium comprising a plurality of microparticles for encapsulating the zinc carboxylate.

In a fourth aspect, the invention provides a method of delivering a malodour counteracting effect to a surface containing a source of malodour, said method comprising the step of delivering a malodour-reducing composition according to the first aspect of the invention to the surface from a consumer product comprising water.

The details, examples and preferences provided in relation to any one or more of the stated aspects or embodiments of the present invention will be further described herein and apply equally to all aspects and embodiments of the present invention. Any combination of embodiments, examples and preferences described herein in all possible variations thereof are encompassed by the present invention unless otherwise indicated herein, or otherwise clearly contradicted by context.

Description of the Figures

Figure 1. Perceived malodour intensity – results illustrating example 6 A

Figure 2. Perceived malodour intensity of post-dosed refresher spray formulation on worn T-shirt inserts – results illustrating example 6 C

Figure 3. Perceived intensity of malodour or fragrance – results illustrating example 6 D

Detailed Description of the Invention

The applicant has discovered in a surprising manner that despite the poor solubility or dispersibility of zinc carboxylates, and in particular zinc neodecanoate, in consumer products containing appreciable levels of water, the combination of a zinc carboxylate with perfume ingredients, perfumery solvents, surfactants and/or encapsulation media as more fully described herein, enable the preparation of malodour-reducing compositions that can be stably incorporated into such consumer products.

In accordance with the invention, a zinc carboxylate, and in particular zinc neodecanoate, can be incorporated into such a consumer product whilst avoiding undesirable interactions that can result in the formation of solid residues. By ensuring the zinc carboxylate remains uniformly dissolved or dispersed it is possible to deliver a measured and effective concentration of zinc carboxylate uniformly over a surface containing a source of malodour deliver perceivable malodour-reducing performance.

Furthermore, the applicant also surprisingly found that by carefully selecting the carboxylate ligand as described more fully herein, the zinc carboxylate can exhibit excellent film-forming properties on a surface and resist rinse-off.

In the first aspect of the invention the zinc carboxylate useful in the malodour-reducing composition is selected on the basis of its ability to exert an effective malodour-reducing effect on a surface containing a source of a malodour, when delivered from a consumer product containing appreciable amounts of water. Relevant considerations in the selection include the solubility or dispersibility of the zinc carboxylate in an oil phase containing one or more of a perfumery solvent, a perfume ingredient, surfactants or mixtures thereof, and/or an encapsulating medium comprising a plurality of microparticles. The higher the solubility or dispersibility of the zinc carboxylate in an oil phase containing one or more of these ingredients, the higher can be its concentration in the malodour-reducing composition. Other considerations include the ability of the zinc carboxylate to disperse in a medium containing appreciable levels of water and deposit uniformly from it onto a surface to be treated; its ability to adhere to the surface once deposited; as well as its volatility. Zinc carboxylates that deposit well, which are adherent to a surface to be treated and which do not evaporate quickly from the surface once deposited will, self-evidently, be able to exert a longer and more effective malodour-reducing effect. Another important consideration is the odour of the zinc carboxylate. For obvious reasons, it is undesirable if a malodour-reducing compositions contains an active ingredient that is itself a source of malodour.

Zinc carboxylates having a carbon chain length of 1 to 3 carbon atoms are very water soluble and not compatible in perfumery solvents and perfume ingredients, and are not preferred as such. Those zinc carboxylates having a carbon chain length of 1 to 7 carbon atoms tend to have a pungent or even unpleasant odour and are likewise not preferred. However, zinc carboxylates, wherein the carboxylate group has between 8 and 12 carbon atoms are preferred as they have optimum malodour reduction performance, have a low volatility and also have low or no odour. Most preferred of the zinc carboxylates is zinc neodecanoate. Zinc neodecanoate and methods for its preparation, for example from zinc oxide and the corresponding carboxylic acid, are well known in the art.

A malodour-reducing composition is considered to be capable of being stably incorporated in a consumer product for the purpose of the present invention if the composition, by means of the inclusion therein of mixtures of perfumery ingredients, solvents, surfactants, and/or the use of an encapsulation medium, will readily disperse or dissolve in a consumer product, without causing undesirable changes in the physical characteristics of the consumer product, such as the development of residues, that could adversely affect the delivery of a zinc carboxylate consistently and uniformly to a surface in need of treatment.

Suitable perfumery solvents include, but are not limited to isopropyl myristate, ethanol, cyclomethicone, glycol ethers, such as dipropylene glycol methyl ether (e.g. Dowanol DPM) or tripropylene glycol methyl ether (Dowanol TPM), Medium Chain Triglycerides (MCTs), such as those sold under the trade names Miglyol, e.g Miglyol 812, methyl esters of hydrogenated wood rosin, such as Hercolyn DW, isoparaffins, such as the Isopar solvents, benzyl salicylates, and cyclohexyl salicylates.

Suitable perfumery ingredients can be selected from the palette of available ingredients, and may be selected on the basis of the particular hedonic effect that is desired or any functional effect that is required, such as a malodour-reducing effect. Perfumery ingredients include but are not limited to 3,7-dimethyloct-6-enal, e.g. Citronellal; 3,7-dimethyloct-6-en-1-ol, e.g. Citronellol; 2,4-dimethylcyclohex-3-enecarbaldehyde, e.g. Cyclal C; (E)-dec-4-enal; ethyl 2-methyl butyrate; 1-phenylethyl acetate, e.g. Gardenol; (Z)-hex-3-en-1-yl acetate; hexyl acetate; isoamyl acetate; Litsea cubeba oil; Nonanal; Orange oil; Orange terpenes; prenyl acetate; 4-methyl-2-(2-methylprop-1-en-1-yl)tetrahydro-2H-pyran, e.g.

Rose Oxide; 4-methylene-2-phenyltetrahydro-2H-pyran, e.g. Rosyrane super; 2,4-dimethylcyclohex-3-enecarbaldehyde; e.g. Tricyclal; 2,6,10-trimethylundec-9-enal, e.g. Adoxal; Armoise oil Morocco; 8-(sec-butyl)-5,6,7,8-tetrahydroquinoline, e.g. Bigaryl; (2E)-3-phenylprop-2-enal, e.g. Cinnamic aldehyde; (E)-3,7-dimethylocta-2,6-dienal, e.g. Citral; ethyl caproate; 1,3,3-trimethyl-2-oxabicyclo[2.2.2]octane, e.g. Eucalyptol; Eucalyptus, e.g. globulus oil China; 1-(1,2,8,8-tetramethyl-1,2,3,4,5,6,7,8-octahydronaphthalen-2-yl)ethanone, e.g. Georgywood; hexyl isobutyrate; (E)-4-(2,6,6-trimethylcyclohex-1-en-1-yl)but-3-en-2-one, e.g. Ionone beta; isobutyl isobutyrate; isobutyl quinolone; isopropyl methyl-2-butyrate; (2E,6Z)-3,7-dimethylnona-2,6-dienenitrile, e.g. Lemonile; 3,7-dimethylocta-1,6-dien-3-ol, e.g. Linalool; 2,6-dimethylhept-5-enal, e.g. Melonal; methyl amyl ketone; methyl benzoate; methyl heptenone; methyl hexyl ketone; phenyl ethyl acetate; tetrahydro myrcenol; Patchouli Oil; tridecen-2-nitrile; 6-methoxy-2,6-dimethyloctanal, e.g. Calypsone; 5-tert-butyl-2-methyl-5-propyl-2H-furan, e.g. Cassyrane; (4E)-9-hydroxy-5,9-dimethyl-4-decenal, e.g. Mahonial; 1-methyl-2-(5-methylhex-4-en-2-yl)cyclopropyl)methanol, e.g. Rosyfolia; 3-(4-isobutyl-2-methylphenyl)propanal, e.g. Nympheal; and mixtures thereof.

In particular embodiments of the invention the perfumery ingredients may comprise at least 2, at least 3, at least 4, at least 5 of the following ingredients: 3,7-dimethyloct-6-enal, e.g. Citronellal; , 3,7-dimethyloct-6-en-1-ol, e.g. Citronellol; 2,4-dimethylcyclohex-3-enecarbaldehyde, e.g. Cyclal C; (E)-dec-4-enal; Ethyl 2-methyl butyrate; 1-phenylethyl acetate, e.g. Gardenol; (Z)-hex-3-en-1-yl acetate; Hexyl acetate; isoamyl acetate; Litsea cubeba oil; Nonanal; Orange oil; Orange terpenes; prenyl acetate; 4-methyl-2-(2-methylprop-1-en-1-yl)tetrahydro-2H-pyran, e.g. Rose Oxide; 4-methylene-2-phenyltetrahydro-2H-pyran, e.g. Rosyrane super; 2,4-dimethylcyclohex-3-enecarbaldehyde; e.g. Tricyclal; and optionally at least 2, at least 3, at least 4, at least 5 of the following ingredients: 2,6,10-trimethylundec-9-enal, e.g. Adoxal; Armoise oil Morocco; 8-(sec-butyl)-5,6,7,8-tetrahydroquinoline, e.g. Bigaryl; (2E)-3-phenylprop-2-enal, e.g. Cinnamic aldehyde; (E)-3,7-dimethylocta-2,6-dienal, e.g. Citral; Ethyl caproate; 1,3,3-trimethyl-2-oxabicyclo[2.2.2]octane, e.g. Eucalyptol; Eucalyptus, e.g. globulus oil China; 1-(1,2,8,8-tetramethyl-1,2,3,4,5,6,7,8-octahydronaphthalen-2-yl)ethanone, e.g. Georgywood; Hexyl isobutyrate; (E)-4-(2,6,6-trimethylcyclohex-1-en-1-yl)but-3-en-2-one, e.g. Ionone beta; Isobutyl isobutyrate; Isobutyl quinolone; Isopropyl methyl-2-butyrate; (2E,6Z)-3,7-dimethylnona-2,6-dienenitrile, e.g. Lemonile; 3,7-dimethylocta-1,6-dien-3-ol, e.g. Linalool; 2,6-dimethylhept-5-enal, e.g. Melonal; Methyl amyl ketone; Methyl benzoate; Methyl heptenone; Methyl Hexyl Ketone; Phenyl ethyl acetate; Tetrahydro myrcenol; Patchouli Oil; Tridecen-2-nitrile; 6-methoxy-2,6-dimethyloctanal, e.g. Calypsone; 5-tert-butyl-2-methyl-5-propyl-2H-furan, e.g. Cassyrane; (4E)-9-hydroxy-5,9-dimethyl-4-decenal, e.g. Mahonial; 1-methyl-2-(5-methylhex-4-en-2-yl)cyclopropyl)methanol, e.g. Rosyfolia; and 3-(4-isobutyl-2-methylphenyl)propanal, e.g. Nympheal.

Preferred perfumery ingredients include ambrofix (dodecahydro-3a,6,6,9a-tetramethyl naphtho[2,1-b]furan), radjanol (2-ethyl-4-(2,2,3-trimethyl-cyclopent-3-enyl)-but-2-en-1-ol), benzyl salicylate, cis-3-hexenyl salicylate, coumarin, cyclamen aldehyde, dihydrojasmonate, hedione (methyl dihydrojasmonate), lilial (3-(4-tert-butylphenyl)-2-methylpropanal), nympheal (3-(4-isobutyl-2-methylphenyl)propanal), methyl ionone, phenyl ethyl phenyl acetate, tetrahydrogeranyl acetate, trimofix (reaction products of acetic anhydride and 1,5,10-trimethyl-1,5,9-cyclodecatriene), and tropional (3-(1,3-benzodioxol-5-yl)-2-methylpropanal).

In particular embodiments of the invention the malodour-reducing composition comprises zinc neodecoate in a mixture with a perfumery solvent, or a perfumery ingredient or a mixture thereof. More particularly, the mixture may comprise greater than 50 wt %, greater than 60 wt %, greater than 70 wt %, greater than 80 wt % of zinc neodecanoate. More particularly still, the malodour-reducing composition comprises about 80 wt % zinc neodecanoate and about 20 wt % of at least one perfumery solvent or at least one perfumery ingredient or mixtures thereof.

In particular embodiments of the present invention, the malodour-reducing composition described herein above is in the form of a plurality of microparticles encapsulating zinc neodecanoate and optionally at least one perfumery solvent or perfumery ingredient, or mixtures thereof in any amounts referred to herein.

In more particular embodiments, the malodour-reducing composition is in the form of a powder comprising a plurality of microparticles encapsulating zinc neodecanoate and optionally at least one perfumery solvent or perfumery ingredient, or mixtures thereof in any amounts referred to herein.

In particular embodiments of the invention the microparticles contain at least 30 wt %, at least 40 wt %, at least 50 wt %, at least 60 wt %, at least 70 wt %, at least 80 wt % of zinc neodecanoate based on the total weight of the microparticles.

The malodour-reducing composition can be added to the aforementioned consumer products at levels such as to deliver an effective malodour-reducing effect onto a surface in need of treatment.

In particular embodiments of the invention, the malodour-reducing composition in the form of a powder comprising a plurality of microparticles described above can incorporated into an antiperspirant product in an amount ranging from about 1 wt % to about 50 wt %, more particularly about 1 wt % to about 20 wt %, more particularly about 1 wt % to about 10 wt %, based on the total weight of the antiperspirant product.

In particular embodiments of the invention, the zinc neodecanoate is present in an amount of 0.1 to 20 wt %, more particularly still about 0.5 to 10 wt %, more particularly still 0.5 to 5 wt %, e.g. about 4 wt %, based on the total weight of the product.

Microparticles are small particles, having diameters ranging generally from about 1 to 1000 microns. Microparticles may have variety of structures ranging from single-core (so-called core-shell microparticles) to multi-cores, and can comprise single or multilayer shells. The core material can comprise a zinc carboxylate and any other desired ingredient, such as one or more perfume ingredients or perfumery solvents, or surfactants.

Microparticles may be incorporated into a consumer product in the form of an aqueous slurry in which the microparticles are suspended. Alternatively, the microparticles may be incorporated into a consumer product in the form of a powder. Such powders can be formed by dehydrating a slurry for example by spray drying. Methods of forming microparticle slurries or dehydrated microparticles in powder format are well known in the art, and examples of such methods are disclosed in the references cited herein below, all of which are incorporated into the specification by reference.

Microparticles in powder format are particularly useful for incorporation into antiperspirant products, and particularly aerosol antiperspirant products.

Microparticles can be formed from thermosetting polymers, such as melamine formaldehyde, melamine urea formaldehyde, polyurea, polyurethane and polyacrylates. Such thermosetting polymers shells can be formed as shells by known polymerization methods, such as interfacial polymerization around droplets of core material. Examples of core shell microcapsules formed from thermosetting polymers that are useful in the preparation of encapsulated zinc carboxylates are disclosed in WO2004/016234; WO2006/056093; WO2007/137441; WO2008/098387; WO2009/100553; WO2017/001672; WO2018/197266; WO2016/207180; WO2018/149775; WO2011/161229; WO2013/092958; WO2016/071151; WO2016/071150; WO2016/071149; WO2017/085105;

WO2014/064252; WO2014/064255; and WO2014/032290, all of which documents are herein incorporated by reference.

Another commonplace method of forming microparticles useful in the present invention is coacervation. Coacervation is a well-known method of forming microparticles, whereby colloids are caused to form and harden around droplets of core material. So-called simple coacervation uses a single hydrocolloid, whereas complex coacervation uses two hydrocolloids. Coacervate microparticles useful in the present invention are disclosed in WO2015/150370; and WO2013/068581, which documents are herein incorporated by reference.

Still further, microparticles can be formed by spray drying an emulsion comprising a zinc carboxylate and other materials desired to be encapsulated, and shell forming polymers, such as starches, modified starches, celluloses and the like. Examples of such microparticles, and methods of preparing them, are disclosed in WO2020/149192; WO2015/189296; and WO2020/201258 all of which documents are herein incorporated by reference. In such starch microparticles the encapsulated material is dispersed in the form of a plurality of droplets or cores dispersed within an encapsulating polymer matrix.

In a preferred embodiment, the microparticles are core-shell microparticles. A malodour-reducing composition in the form of a plurality of core-shell microcapsules can provide superior malodour control performance compared, for example, with the aforementioned microparticles comprising a plurality of droplets or cores dispersed within an encapsulating polymer matrix.

More recently, the perfume industry has moved in the direction of biodegradable microparticles, and in particular biodegradable core-shell microparticles, that are free, or substantially free of microplastics, and such microparticles are useful to encapsulate zinc carboxylates, and more particularly zinc neodecanoate, in accordance with the present invention. Biodegradable microparticles can be formed by a process of coacervation or complex coacervation using various proteins and/or polysaccharides. Examples of biodegradable microparticles useful in the present invention are disclosed in WO2020/233887, which is herein incorporated by reference. Other examples of useful core-shell microcapsules wherein the shell comprises a hydrated polymer phase and a polymeric stabilizer comprising a thermosetting resin, and more particularly a thermosetting resin formed by the reaction of a polyfunctional isocyanate and an aminosilane are disclosed in WO 2023/020883, which core-shell microcapsules are likewise incorporated herein by reference.

An encapsulated form of zinc carboxylate can also be presented in the form of a plurality of pastilles or prills, which can be formed when the zinc carboxylate is dissolved or dispersed in a water-soluble matrix material and the resultant mixture is shaped, for example by extrudation and cutting. Alternatively, molten droplets of matrix material and zinc carboxylate can be dropped into a suitable liquid bath to harden the droplets and form prills, which can be collected by filtration. The water soluble matrix can contain a variety of materials useful in the preparation of scent booster compositions, as are generally well known in the art. An example of a suitable matrix material would be a mixture of polyethylene glycol, a filler material, and optionally a clay or a salt or mixtures thereof. Such compositions are described in US2017/226690, which is herein incorporated by reference. The zinc carboxylate, and optionally a perfume ingredient, perfumery solvent and a surfactant can be incorporated into the matrix material freely, or in an encapsulated form, as more fully described above.

Encapsulated forms of zinc carboxylate described hereinabove can also be incorporated into such water-soluble matrices.

In other embodiments of the present invention, a malodour-reducing composition may be formed by dissolving or dispersing a zinc carboxylate in an oil phase comprising a surfactant and optionally at least

one perfumery ingredient and or perfumery solvent, or mixtures thereof. Whereas the zinc carboxylates are to some extent soluble or miscible in perfumery ingredients or perfumery solvents, they are practically insoluble in water. Accordingly, in order to be able to disperse an effective concentration of a zinc carboxylate in a consumer product containing water, it is necessary to present the zinc carboxylate in admixture with a surfactant.

Preferred surfactants are non-ionic surfactants. Suitable non-ionic surfactants include any of those that are commonly employed in consumer products including but not limited to roll-on deodorants, hand dish wash, surface cleaners, deodorants, and fabric care products, including but not limited to liquid and powder laundry detergents, fabric conditioners, fabric refreshers, and scent boosters. Particularly preferred non-ionic surfactants include ethoxylated fatty acids and particular those having a chain length the same as or similar to that of the zinc carboxylate employed. Examples of particularly preferred non-ionic surfactants are Lutensol TO10 or Synperonic 13/9.

In accordance with the second aspect of the invention the consumer products into which a malodour-reducing composition can be stably dissolved or dispersed include, but are not limited to, carpet spray, fabric spray, all-purpose cleaners, bathroom cleaners, kitchen cleaners, floor cleaners, hand dish wash cleaners, diapers, feminine hygiene products, cat litter, roll-on deodorants, roll-on antiperspirants, liquid soap, bar soap, body wash, detergent bars, detergent pastes/creams, detergent powder tablets, liquid detergents, liquid detergent capsules, detergent powders, fabric fresheners, scent boosters, ironing water, and liquid softeners.

In particular embodiments of the invention, the consumer product is an antiperspirant product, and more particularly an antiperspirant product in aerosol format.

In more particular embodiments of the invention there is provided an antiperspirant product comprising an antiperspirant active ingredient and a malodour-reducing composition in the form of a plurality of microparticles, and more particularly core-shell microparticles,dispersed in the product and encapsulating zinc neodecanoate and optionally at least one perfumery solvent or perfumery ingredient, or mixtures thereof in any amounts referred to herein.

In still more particular embodiments of the invention the antiperspirant product comprises an antiperspirant active ingredient and a malodour-reducing composition in the form of a powder comprising a plurality of microparticles, and more particularly core-shell microparticles, dispersed in the product and encapsulating zinc neodecanoate and optionally at least one perfumery solvent or perfumery ingredient, or mixtures thereof in any amounts referred to herein.

In particular embodiments of the invention the antiperspirant product contains about 0.1 wt %, more particularly 0.5 wt % and more particularly still about 1 wt %, up to about 5 wt %, more particularly up to 4 wt %, more particularly up to 3 wt %, more particularly up to 2 wt % of water based on the total weight of the product.

Antiperspirant active ingredients include aluminium salts and complexes. Useful salts and complexes include but are not limited to aluminium chlorohydrate, aluminium chlorohydrate complexes such as aluminium sesquichlorohydrate and aluminium zirconium tetrachlorohydrate glycine complex, and aluminum zirconium complexes.

In particular embodiments of the invention the antiperspirant active ingredient is present in the antiperspirant product in an amount of about 0.5 to 50 wt %, more particularly still about 0.5 to 40 wt %, still more particularly about 0.5 to 30 wt %, and more particularly still from about 0.5 to 20 wt %, based on the total weight of the product.

Depending upon the particular format of an antiperspirant product, it may contain one or more additional ingredients such as an emollient, thickening or structuring agents, perfumes, propellants, pH buffering agents, humectants, additional malodour-controlling agents, skin-soothing agents, dyes or pigments, and anti-microbial agents. Examples of such additional ingredients and their inclusion level in such products are well known to the skilled person in the art. Further details of such products, their constituent ingredients and inclusion levels are disclosed, for example, in WO 2018/087148, which is hereby incorporated by reference for this purpose.

In accordance with the third aspect of the invention any of the malodour-reducing compositions described herein above can be used to stably incorporate zinc carboxylates, and in particular zinc neodecanoate, into any of the consumer product formats referred to in any of the embodiments described herein.

In a particular embodiment of the invention zinc neodecanoate can be incorporated into an antiperspirant product as defined herein in a method comprising the step of mixing zinc neodecanoate with at least one perfume ingredient or perfumery solvent and encapsulating the mixture in an encapsulating medium comprising a plurality of microparticles as described herein, and dispersing the microparticles in the antiperspirant product.

In accordance with the fourth aspect of the invention, any of the malodour-reducing compositions described in any of the embodiments referred to herein can be delivered from any of the aforementioned consumer product formats and onto a surface containing a source of malodour where it can deliver a malodour-reducing effect.

Surfaces include human or animal skin or hair, or inanimate surfaces including all manner of household surfaces such as hard surfaces, floors, bathroom and toilets, dishes, cutlery and other kitchen utensils, fabrics and the like. Malodours found on such surfaces include malodours from food, body odours, and odours from the waste of humans and animals.

Sources of malodour include, but are not limited to personal malodours such as axillary sweat, foot malodour, feminine (vaginal) malodour, scalp/hair malodour, urine malodour, food waste malodour, indoor air malodour, malodour from mould and mildew, and laundry malodour.

The invention will be further explained and illustrated with reference to the following non-limiting examples.

Example 1

(Synthesis of a melamine urea formaldehyde capsules containing a malodour-reducing composition)

A malodour reducing composition (1 wt % perfume, 19 wt % isopropyl myristate, and 80 wt % zinc neodecanoate) is encapsulated in melamine urea formaldehyde to form 1 Kg of slurry in accordance with the following method:

A reactor set to a temperature of 20°C and is charged with deionised water (600 g). Resorcinol as cross-linker (10 g); positively charged polymeric colloid stabilizer (2 g) and melamine formaldehyde pre-condensate (Luracoll SD) (5 g). The stirring speed is set to 400rpm. At this stage, 360 g of the malodour reducing composition (50 wt % in medium chain triglyceride) is added and dispersed in the water phase.

Polymerisation is undertaken in the following manner: Formic acid (10%) is added to the slurry until the pH reaches 4, and the slurry is stirred for 1 hour at 35°C. Thereafter, the reactor temperature is increased to 90°C over a period of 1 hour.

Finally, the slurry is cooled, and the pH is adjusted with the addition of ammonia (1g) until it falls into the range of 3-5. Deionised water is finally added to bring the volume of the slurry to 1L. The resultant slurry of encapsulated composition is discharged from the reactor.

The malodour reducing composition was successfully produced in the form of a slurry of microparticles.

Example 2

(Synthesis of a starch capsule containing a malodour-reducing composition)

Tap water (55.0 g) was weighed into a stainless steel beaker. Starch sodium octenyl succinate E1450 (18.7 g), starch modified Hi-Cap 100 (2.2 g) and maltodextrin Glucidex IT-19 (5.3 g) were subsequently weighed into the same beaker. The resulting mixture was first manually stirred with a stainless steel rod and then homogenized with an IKA T25 Ultra-Turrax Homogenizer at 13,500 rpm to obtain a homogeneous solution. To this resulting mixture was added the malodour reducing composition of Example 1 (17.8 g). High shear mixing was then carried out for 20-30 min at 22,000-24,000 rpm using the same Homogenizer to produce an emulsion. Dynamic light scattering was used to ensure the droplet size was between 0.5 and 2 microns.

The emulsion was subjected to spray drying using a LabPlant SD-06 Spray Dryer. The spray drying process parameters were as follows: Inlet Temperature: 190 °C; Outlet Temperature: 90 °C; peristaltic pump speed: 485 mL/h; and air flow rate: 3.7 m/s.

The resulting spray dried powder was mixed with silicon dioxide Aerosil 200 (0.5 g) in a closed mixing vessel.

A malodour-reducing composition was successfully produced in the form of a plurality of microparticles in dried powder form.

Example 3

(Synthesis of a scent booster product containing a malodour-reducing composition)

A scent booster product was prepared by blending fumed silica (Aerosil 200) @ 5 wt %, CMC (Blanose) @ 5 wt %, and sodium chloride @ 80wt. 10 wt % and the malodour reducing composition of Example 1 was added on top of the scent booster mixture and the whole was blended until a free-flowing powder is achieved.

(AEROSIL is a fumed silica (trade mark of Degussa); “Blanose” is carboxymethyl cellulose (trade mark of Hercules)).

Example 4

(Deposition of zinc neodecanoate from the scent booster product of Example 3 on to a fabric)

<u>Use of a Metallochromic Indicator to determine deposition on fabric</u>

Eriochrome Black T is a metallochromic indicator that can be used for complexometric titration with various metal ions. It is typically used with a pH10 buffer, whereupon the solution changes from a blue colour to red when forming a complex with a metal ion, such as zinc. The proportion of complexed Eriochrome Black T will determine the shade of the indicator solution. The presence of any uncomplexed indicator will remain blue, which can mask the red coloured complexed form. Therefore, it is important to use as little of the indicator as possible to make the test as sensitive as possible. However, this needs to be carefully balanced with using enough indicator to perceive any colour.
A series of solutions of zinc neodecanoate in ethanol were prepared (from 10% to 0.00001% in logarithmic steps). A further series of vials were prepared with 2mL of pH 9.41 buffer solution and 10µL of Eriochrome Black T solution (1% in ethanol). 10µL of the zinc neodecanoate solutions were added to the vials with the Eriochrome Black T solutions. The colours of the resulting solutions demonstrate that zinc neodecanoate can be detected at concentrations of 0.1% and higher, with 0.01% producing a weakly positive result.

Simulated Wash Cycle Test

10 wt % of a malodour reducing composition (zinc neodecanoate @ 10 wt % in Dowanol TPM) is added to the scent booster composition described in Example 3, and mixed thoroughly. A sample only using Dowanol TPM and the scent booster composition was also prepared. 150mg of each scent booster composition was added to 50mL of distilled water in a 60g glass bottle. Four small pieces of terry towelling (totalling 14cm^2) were added to each bottle and placed on a roller for one hour.

The indicator solution was prepared by adding buffer solution (1mL, pH 9.21) and Eriochrome Black T solution (1% in ethanol) into a clear glass vials (7.5mL). One of the pieces of terry towelling from each bottle was added to separate vials containing the indicator solution. The vials were agitated and the resulting colour was recorded.

Further indicator (10µL of 1% Eriochrome in ethanol) was added to each vial and the colours became more differentiated.

The remaining pieces of terry towelling were transferred to a fresh clear glass bottle (60mL) containing distilled water (50mL). The bottles were placed on a roller for a further hour. A piece of terry towelling was removed from each bottle and tested with the indicator solution as before (10µL of 1% Eriochrome in ethanol, in 1mL of pH9.21 buffer solution). It is still possible to differentiate the colours of the resulting solutions. This demonstrates that zinc neodecanoate is depositing onto the fabric and remaining there after rinsing.

The two remaining pieces of cloth were air dried overnight and tested using the same procedure as before. The cloth washed along with the scent booster containing zinc neodecanoate was still positive for the presence of zinc.

This experiment demonstrated that zinc neodecanoate can be deposited onto fabrics from a consumer product containing a malodour-reducing composition, and remain there after rinsing and drying.

Example 5

(Demonstration of malodour-reduction performance on fabric – trigger spray formulation)

A clear and colourless model trigger spray formulation was prepared using zinc neodecanoate (0.75 wt %), Dowanol TPM as solvent (0.25 wt %), lutensol TO 10 (9 wt %) and water (90 wt %).

A control was prepared by replacing Dowanol TPM and zinc neodecanoate with diethyl phthalate (1 wt %).

T-shirt inserts were pre-treated with the model formulation and the control. The inserts were allowed to dry and were placed into the underarm of t-shirts, which were then worn by a panel of volunteers for a whole day, without using fragranced products. Thereafter, the t-shirt inserts were olfactively assessed by a trained sensory panel for malodour intensity.

It was found that those inserts treated with the model trigger spray formulation exhibited significantly reduced malodour intensity compared with those inserts treated with the control formulation.

Example 6

(Demonstration of malodour reduction performance on fabric – Laundry tests)

A. Odour elimination on terry towelling

Preparation
Three different test compositions (1-3) were prepared according to the composition given in table 1. The samples NU67, MO48 and QC29 (1000µL) are applied to the centre of separate pieces of cloth (70mm x 70mm of terry towelling squares) together with 250µL of 0.006% 3-mercapto-3-methyl butan-1-ol (MMB) in Dowanol TPM as malodour. Samples ED71 and WC14 are applied to the centre of separate pieces of cloth (70mm x 70mm of terry towelling squares) without any malodour as control. Labels were attached to the top right of each piece of fabric.
Results:

The pieces of fabric were assessed by a trained panel of 15 assessors for malodour intensity using a 0-100 scale with the control set at 70, and 1-minute gap between assessments. The samples were assessed in a randomised order (randomisation was produced using DesignExpress). The average intensity rating for the hidden control (NU67) was 63. The panel reliability was very good (G=0.98, phi=0.98, inter-rater reliability=0.76).

Table 1: Samples and results (also Fig. 1)

Sample	Test	Composition	Malodour Applied	Perceived Malodour intensity
NU67	1	1% Dowanol TPM, 9% Synperonic 13/9, 90% water	Yes	63
MO48	2	0.25% Dowanol TPM, 0.75% Zinc neodecanoate, 9% Synperonic 13/9, 90% water	Yes	35
QC29	3	0.25% Dowanol TPM,	Yes	

		0.75% TegoSorb Conc. 50, 9% Synperonic 13/9 90% water		
ED71	1	1% Dowanol TPM, 9% Synperonic 13/9, 90% water	No	10
WC14	2	0.25% Dowanol TPM, 0.75% Zinc neodecanoate, 9% Synperonic 13/9, 90% water	No	7

B. Odour elimination by application of refresher spray – pre-dosed on T-shirt inserts

Methodology – Test Formulations

Two refresher sprays were formulated, one with zinc neodecanoate, the other one without it. They were prepared by mixing each ingredient in the order presented in table 2, from top to bottom.

Table 2: Composition of fabric refresher spray formulations

Ingredient	Amount (%) in +TECH	Amount (%) in W/O
Zinc neodecanoate	0.75	–
Dowanol TPM	0.25	1.00
Synperonic 13/7	9.00	9.00
Water	90.00	90.00

Methodology – Insert Preparation

The fabric inserts are pre-washed, de-sized, labelled, had poppers sewn-in and hung on a laundry drying rail. The fabric refresher formulations are applied to each T-shirt insert: 2 sprays of the formulation followed by 2 further sprays 5 minutes later. The inserts are then allowed to dry before attaching to the T-shirts, randomising which side had the technology present (+TECH) and which not (W/O) as shown in table 3.

Table 3: Order used for location of each refresher spray formulation

T-Shirt No.	Left Insert	Right Insert	T-Shirt No.	Left Insert	Right Insert

1	+TECH	W/O	14	W/O	+TECH
2	W/O	+TECH	15	+TECH	W/O
3	+TECH	W/O	16	W/O	+TECH
4	W/O	+TECH	17	+TECH	W/O
5	+TECH	W/O	18	W/O	+TECH
6	W/O	+TECH	19	+TECH	W/O
7	+TECH	W/O	20	W/O	+TECH
8	W/O	+TECH	21	+TECH	W/O
9	+TECH	W/O	22	W/O	+TECH
10	W/O	+TECH	23	+TECH	W/O
11	+TECH	W/O	24	W/O	+TECH
12	W/O	+TECH	25	+TECH	W/O
13	+TECH	W/O			

The T-shirts are then supplied to volunteers, who wear them for a working day without use of any fragranced products or deodorant. The T-shirts are then returned for assessment the following day.

Methodology – Assessment of trained sensory panel

The inserts are removed from the T-shirts and arranged around two separate tables (one for left inserts, the other for the right inserts). The trained sensory panel (n=16) assess each insert individually for malodour intensity using a 0-100 free scoring scale in a randomised order defined by the assessment sheet.

Results

23 T-shirts were returned (1 of which had not been worn, but was included as a hidden control) and were assessed by the trained sensory panel. It was noted that several of the inserts smelled of fragrance and were later removed from the results.

The reliability of the panel assessments was checked using the Panel Reliability Program (v2-8) and no assessors needed to be excluded (G=0.93, phi=0.91, inter-rater reliability=0.47).
The malodour intensity of the pairs of T-shirt inserts with LS means below 20 were considered too low and removed. The remaining dataset was analysed by ANOVA.

The geometric mean malodour intensity was calculated for each insert, along with the standard error and difference between left and right. Perceived malodour intensity was measured and the overall

results are that, with a value of 42.5, the intensity of the pre-dosed T-shirt inserts with zinc neodecanoate was lower than the intensity of the T-shirt inserts without the zinc neodecanoate having a value of 45.2.

C. Odour elimination by application of refresher spray – Post-dosed on worn T-shirt inserts

Methodology – Test Formulations

Two refresher sprays were formulated, one with zinc neodecanoate, the other one without it. They were prepared by mixing each ingredient in the order presented in table 4, from top to bottom.

Table 4: Composition of fabric refresher spray formulations

Ingredient	Amount (%) in +TECH	Amount (%) in W/O
Zinc neodecanoate	0.75	–
Dowanol TPM	0.25	1.00
Synperonic 13/7	9.00	9.00
Water	90.00	90.00

Methodology – Insert Preparation (Before Wear)

The fabric inserts are pre-washed, de-sized, labelled, had poppers sewn-in and attached to the under-arm area of white T-shirts (also pre-washed and de-sized). The T-shirts are then supplied to volunteers who wear them for a working day without use of any fragranced products or deodorant. The T-shirts are then returned for further treatment and assessment.

Methodology – Insert Preparation (After Wear)

The fabric inserts were pre-screened by a trained panel of three internal sensory assessors to ensure that there is a perceivable amount of malodour but no fragrance present on the inserts. The fabric refresher formulations are applied to the remaining inserts: approximately 4 pumps of the selected fabric refresher. A different fabric refresher is applied to either the left or right insert. The inserts are then allowed to dry before attaching to the T-shirts, randomising which side had the technology present (+TECH) and which not (W/O) as shown in table 5.

Table 5: Order used for location of each refresher spray formulation

T-Shirt No.	Left Insert	Right Insert	T-Shirt No.	Left Insert	Right Insert
2	W/O	+TECH	14	W/O	+TECH
3	+TECH	W/O	15	W/O	+TECH

4	W/O	+TECH	16	+TECH	W/O
5	+TECH	W/O	17	+TECH	W/O
6	W/O	+TECH	18	W/O	+TECH
7	W/O	+TECH	22	W/O	+TECH
8	+TECH	W/O	24	W/O	+TECH
9	+TECH	W/O	25	+TECH	W/O
13	+TECH	W/O			

Methodology – Assessment of trained sensory panel
The inserts are allowed to dry and then arranged in pairs for olfactive assessment. The trained sensory panel assesses each insert for malodour intensity using a 0-100 free scoring scale in a randomised order defined by the assessment sheet.

Results
There were 17 pairs of T-shirt inserts assessed by the trained sensory panel (n=15).
The malodour intensity data provided by the trained internal sensory panel was checked using the Panel Reliability Program (v2-8). The results indicate that no assessors need to be excluded (G=0.93, phi=0.90, inter-rater reliability=0.48).
The malodour intensity of the pairs of T-shirt inserts with LS means below 20 were considered too low and removed. The remaining dataset was analysed by ANOVA.
The geometric mean malodour intensity was calculated for each insert, along with the standard error and difference between left and right. Perceived malodour intensity was measured and the overall results are that, with a value of 37.3, the intensity of the post-dosed T-shirt inserts with zinc neodecanoate was lower than the intensity of the T-shirt inserts without the zinc neodecanoate having a value of 44.4 (Fig. 2).

D. Fabric Conditioner with Socks

Test Formulations
Two sets of fabric conditioners were formulated, one with zinc neodecanoate and the other one without it. The fragrance selected is a 'typical' fabric conditioner type fragrance.

Table 6: Composition of liquid fabric conditioner formulations

Ingredient	**Amount (%) With**	**Amount (%) Without**
Zinc neodecanoate	5	–
distilled water	-	5

Fragrance	1	1
Fab Con Base	94	94

Methodology – Washing Socks

Sixty pairs of socks (30 male, 30 female) were separated and washed such that either the left or right were treated either with (+TECH) or without the technology (W/O) as shown in table 7. A standard wash cycle was used with un-fragranced detergent. The fabric conditioner (35g) was placed directly into the drum at the appropriate part of the wash cycle.

Table 7: Sequence used to sort socks treated with different fabric conditioner sample

	Left	**Right**
Male Socks – Odd	+TECH	W/O
Male Socks – Even	W/O	+TECH
Female Socks – Odd	W/O	+TECH
Female Socks - Even	+TECH	W/O

Methodology – Wear and Self-Assessment
The socks were provided to volunteers (naive panellists) to be worn for a working day, then assessed for fragrance and malodour (0-10 fixed scale), and the preferred socks were selected.

Results
30 pairs of male socks and 29 pairs of female socks were returned along with the assessment sheets. There was no clear difference in preference between the socks washed using the fabric conditioner with zinc neodecanoate, compared to without (16 men with, 13 men without, 15 women with, 13 women without).

Several of the socks were self-assessed as not having any malodour and were removed from the data set. The resulting dataset was used to compare the fragrance intensity and malodour intensity of the samples with and without zinc neodecanoate present. It was found that there is an indicative benefit in malodour intensity, which however is not statistically significant. There is no difference in perceived fragrance intensity (Fig. 3).

Example 7

(Demonstration of the incorporation of encapsulated zinc neodecanoate in a model aerosol base).

A model aerosol base is selected based on its transparency that enables the development of any residues to be observed. The base selected is 96 % ethanol, which allows easily observance of any precipitates that are formed.

Two glass jars containing aerosol formulations (50ml) are prepared by dispersing 1 and 4 wt% of core shell capsules according to Example 1 in ethanol 96° before addition of propellant.

Another two glass jars containing aerosol formulations are prepared by dispersing 0.5 wt% and 2 wt% of the malodour-reducing composition (this time in unencapsulated form), in ethanol before addition of propellant.

The glass jars are stored at 4°C for 24h.

Upon visual inspection, the samples containing the encapsulated malodour-reducing composition remain clear, whereas a cloudy precipitate is visible in both samples containing unencapsulated malodour reducing composition. The cloudy precipitate sediments after a few hours.

The results indicate that the encapsulated composition are dispensible from a nozzle of an aerosol container to be delivered uniformly onto a surface to exert a malodour-reducing effect.

Example 8

(Demonstration of malodor control benefit of encapsulated zinc neodecanoate in an aerosol base)

A malodour-reducing composition comprising core-shell microparticles encapsulating a mixture comprising zinc neodecanoate (1 wt % perfume, 19 wt % isopropyl myristate, and 80 wt % zinc neodecanoate) was added to an aerosol base comprising a carrier, an aluminium salt antiperspirant active and residual water to produce an aerosol base (hereafter referred to as "Base 01"). The microparticle shell material comprised a thermosetting resin, formed from the reaction of an aminosilane and a polyfunctional isocyanate as described in WO2023020883. The malodour-reducing composition was incorporated in Base 01 such that zinc neodecanoate was dosed at at 1.4 wt%. The aerosol base without the malodour-reducing composition was used as a control (hereafter "Control")

The testing was performed on underarm through a self-assessment study in which the Control was applied on one side of a participant's underarm while Base 01 was applied on the other underarm. A group of participants were recruited and instructed to take aerosol test products (i.e. Base 01 and Control) home for use. A test study was rolled out over a period of 1 to 2 weeks. The objective of this test was to allow self-assessment of long lasting malodour protection on underarm contributed by the test products.

This study involved 21 participants where each participant was asked to use each of the coded test products over a consecutive 2-day period. Application of test products by means of aerosol spray was made on the same underarm position (left/right side) for each product. Assessment time intervals were made at before product application, 2 hours, 4 hours post-application.

The overall perceived odour intensity was self-assessed using a 0 to 5 rating scale. Participants were instructed to smell directly the treated skin rather than through clothing worn over the treated skin in order to make an odour rating. For the evaluation stages conducted, each test product was assessed twice by each of the 21 participants, thus giving 42 assessments per test product. The participants used the following scaling:

0 – no odour, 1 – slightly weak odour, 2 – noticeable odour, 3 – quite strong odour, 4 – strong odour, 5 – very intense/strong odour.

The data were analysed using an analysis of variance and multiple comparison test. The confidence level was at 95%. The results are provided in table 8, in terms of perceived malodour intensity.

Table 8: malodor control benefit of encapsulated zinc neodecanoate

	Before Application		2 hours		4 hours	
	Score	Group	Score	Group	Score	Group
Control	0.48	A	0.22	B	0.53	B
Base 01	0.50	A	0.12	A	0.37	A

**Where the same letter is shown under "Group" there was no statistically-significant difference between the indicated figures.*

As evidenced above, there was significantly lower malodour intensity perceived on underarms treated with Base 01 as compared to Control, up to 4 hours duration.

1. An antiperspirant product comprising an antiperspirant active ingredient, water and a malodour-reducing composition in the form of a plurality of microparticles dispersed in the product, the microparticles encapsulating zinc neodecanoate and optionally at least one perfumery solvent or perfumery ingredient.

2. An antiperspirant product according to claim 1, comprising water in an amount of about 0.1 to about 5 wt %, and more particularly about 0.5 to about 5 wt % based on the total weight of the product

3. An antiperspirant product according to claim 1 or claim 2, wherein the antiperspirant active ingredient is an aluminium-containing salt or complex.

4. An antiperspirant product according to any of the preceding claims, wherein the antiperspirant active ingredient is selected from the group consisting of aluminium chlorohydrate, aluminium chlorohydrate complexes aluminium sesquichlorohydrate and aluminium zirconium tetrachlorohydrate glycine complex, and aluminum zirconium complexes.

5. An antiperspirant product according to any of the preceding claims wherein the antiperspirant active ingredient is present in an amount of 0.5 to 50 wt % based on the total weight of the product.

6. An antiperspirant product according to any of the preceding claims wherein the malodour-reducing composition is in the form of a powder comprising a plurality of microparticles dispersed in the product and encapsulating zinc neodecanoate and optionally at least one perfumery solvent or perfumery ingredient, or mixtures thereof.

7. An antiperspirant product according to any of the preceding claims wherein the microparticles contain at least 30 wt % of zinc neodecanoate based on the total weight of the microparticles.

8. An antiperspirant product according to any of the preceding claims wherein the malodour-reducing composition, in the form of a powder comprising a plurality of microparticles dispersed in the product and encapsulating zinc neodecanoate and optionally at least one perfumery solvent or perfumery ingredient or mixtures thereof, is incorporated into the antiperspirant product in an amount ranging from range of about 1 wt % to about 50 wt %.

9. An antiperspirant product according to any of the preceding claims wherein zinc neodecanoate is present in an amount of 0.1 to 20 wt % based on the total weight of the product.

10. An antiperspirant product according to any of the preceding claims wherein the microparticles are in the form of core-shell microparticles.

11. An antiperspirant product according to claim 11, wherein the shell is formed of a hydrated polymer phase and a polymeric stabilizer comprising a thermosetting resin, wherein the thermosetting resin is the reaction product of a polyfunctional isocyanate and an aminosilane.

12. A method of incorporating zinc neodecanoate into an antiperspirant product as defined in any of the preceding claims, the method comprising the step of mixing zinc neodecanoate with at least one perfume ingredient or perfumery solvent; encapsulating the mixture in an encapsulating medium comprising a plurality of microparticles; and dispersing the microparticles in the antiperspirant product.

13. A method of delivering a malodour counteracting effect to a surface containing a source of malodour, said method comprising the step of applying the antiperspirant product according to the any of the claims 1 through 11 onto human skin or hair.

14. A method according to claim 13 wherein the malodour is a body odour or a scalp malodour.

Figure 1: Perceived malodour intensity – results illustrating example 6 A

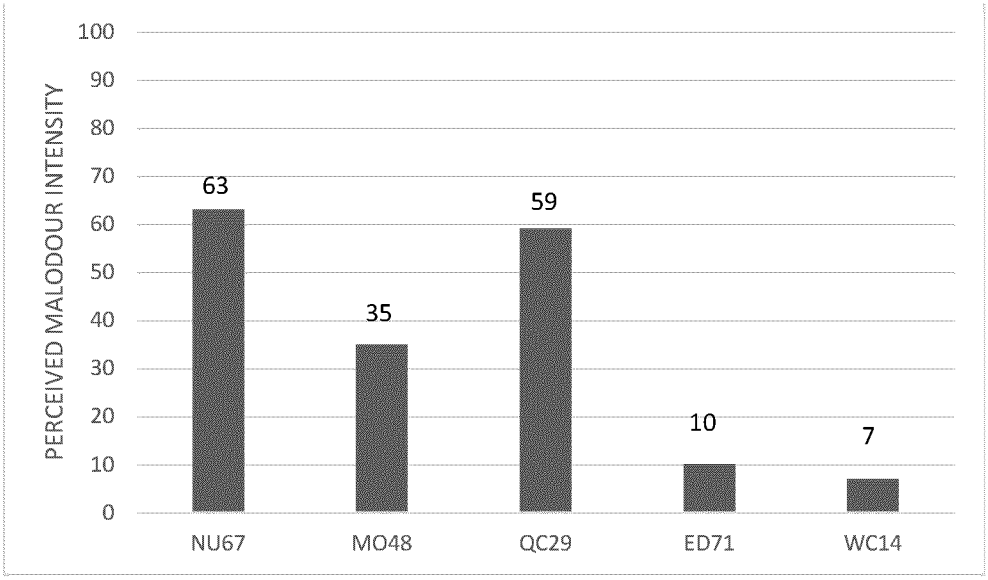


Figure 2: Perceived malodour intensity of post-dosed refresher spray formulation on worn T-shirt inserts – results illustrating example 6 C

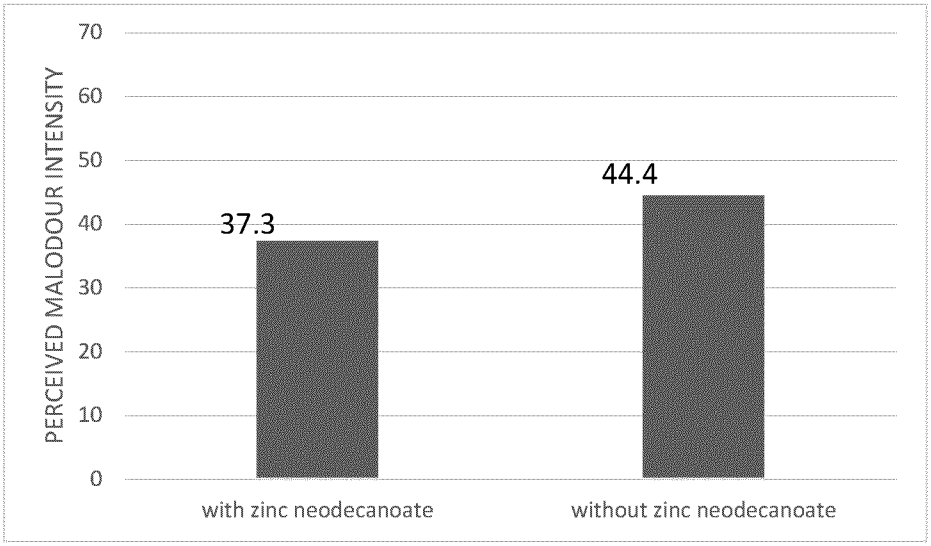
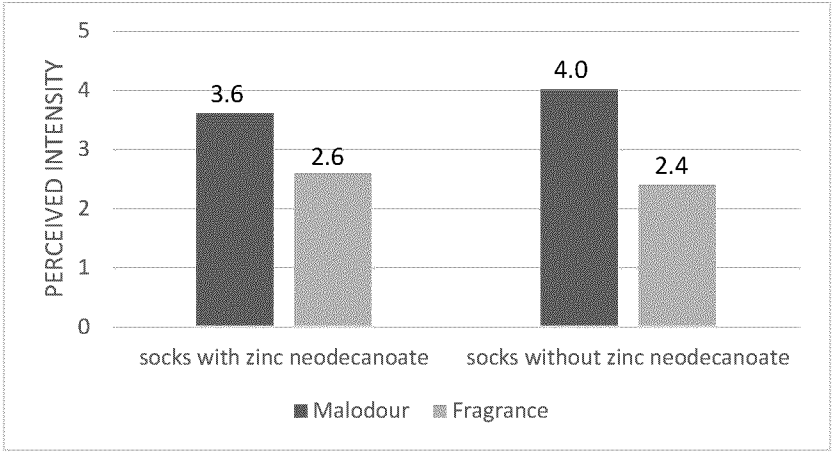


Figure 3: Perceived intensity of malodour or fragrance – results illustrating example 6 D



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2024/066361

A. CLASSIFICATION OF SUBJECT MATTER

INV. A61K8/11 A61K8/26 A61K8/27 A61Q15/00
ADD.

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)
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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2018/087147 A1 (GIVAUDAN SA [CH]) 17 May 2018 (2018-05-17) cited in the application page 11, line 16 - line 19; claims 1,10 page 12, line 3 - line 4	1-14
A	WO 2018/087148 A1 (GIVAUDAN SA [CH]) 17 May 2018 (2018-05-17) cited in the application the whole document	1-14

☐ Further documents are listed in the continuation of Box C.

☒ 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

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

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"P" document published prior to the international filing date but later than the priority date claimed

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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

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
9 October 2024	30/10/2024

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Yon, Jean-Michel

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2024/066361

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