Office de la Propriété Intellectuelle du Canada
Un organisme d'Industrie Canada

Canadian Intellectual Property Office
An agency of Industry Canada

CA 2465360 A1 2003/05/15

(21) 2 465 360

(12) DEMANDE DE BREVET CANADIEN
CANADIAN PATENT APPLICATION

(13) A1

(86) Date de dépôt PCT/PCT Filing Date: 2002/08/15
(87) Date publication PCT/PCT Publication Date: 2003/05/15
(85) Entrée phase nationale/National Entry: 2004/04/29
(86) N° demande PCT/PCT Application No.: US 2002/026053
(87) N° publication PCT/PCT Publication No.: 2003/039401
(30) Priorité/Priority: 2001/11/02 (10/003,915) US

(51) Cl.Int.^{7}/Int.Cl.^{7} A61F 13/15

(71) Demandeur/Applicant:
PLAYTEX PRODUCTS, INC., US

(72) Inventeurs/Inventors:
MAURO, ANTHONY J., US;
ROSENGARTEN, MARK E., US;
BUTENSKY, IRWIN, US

(74) Agent: GIERCZAK, EUGENE J. A.

(54) Titre : DISPOSITIF CATAMENIAL
(54) Title: CATAMENIAL DEVICE

(57) Abrégé/Abstract:
There is provided a fibrous absorbent article for absorbing body fluids made up of a fibrous material defining a structure suitable for absorbing the body fluids, and disposed within the stucture an effective amount, so as to reduce Staphylococcus aureus bacterial growth and neutralize TSS toxin-1 within the vagina, of one or more antimicrobial agents and one or more finishing agents.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
15 May 2003 (15.05.2003)

PCT

(10) International Publication Number
WO 03/039401 A3

(51) International Patent Classification[7]: A61F 13/15

(21) International Application Number: PCT/US02/26053

(22) International Filing Date: 15 August 2002 (15.08.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/003,915 2 November 2001 (02.11.2001) US

(71) Applicant: **PLAYTEX PRODUCTS, INC.** [US/US]; 300 Nyala Farms Road, Westport, CT 06880 (US).

(72) Inventors: **MAURO, Anthony, J.**; 30 Spier Avenue, Allenhurst, NJ 07711 (US). **ROSENGARTEN, Mark, E.**; 2 Camberra Drive, Suffern, NY 10901 (US). **BUTENSKY, Irwin**; 533 Winthrop Road, Teaneck, NJ 07666 (US).

(74) Agents: **RUGGIERO, Charles, N., J.** et al.; Ohlandt, Greeley, Ruggiero & Perle, L.L.P., 10th Floor, One Landmark Square, Stamford, CT 06901 (US).

(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

(88) Date of publication of the international search report:
28 August 2003

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 03/039401 A3

(54) Title: CATAMENIAL DEVICE

(57) Abstract: There is provided a fibrous absorbent article for absorbing body fluids made up of a fibrous material defining a structure suitable for absorbing the body fluids, and disposed within the stucture an effective amount, so as to reduce Staphylococcus aureus bacterial growth and neutralize TSS toxin-1 within the vagina, of one or more antimicrobial agents and one or more finishing agents.

CATAMENIAL DEVICE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to absorbent products and, in particular, to absorbent products such as tampons and similar catamenial devices. More particularly, the present invention relates to tampons and other catamenial devices that reduce or inhibit the amount of bacteria within the vagina coming into contact with the catamenial device.

2. Description of the Prior Art

Menstrually occurring toxic shock syndrome (TSS), a multi-system disease associated with colonization by Staphylococcus aureus (S. aureus) bacteria, has been associated with the use of tampons during menstruation. It is believed that the disease is caused by toxic shock syndrome toxin-1 (TSST-1). This toxin has been found to have been produced by Staphylococcal strains isolated from menstrual TSS patients.

Staphylococci may be present in the vagina or in the nose or the throat or on the skin. The blood, desquamated tissue and other materials present in the vagina during menstruation are a culture medium for S. aureus and organisms symbiotic to Staphylococci. As the Staphylococci increase in number, toxins may be produced that are absorbed through the vaginal wall, potentially resulting in toxic shock syndrome.

There have been numerous attempts to address toxic shock syndrome through modifications to catamenial devices, and specifically, catamenial tampons.

U.S. Patent No. 4,405,323 to Auerbach is directed to a tampon designed to eliminate the hazards of toxic shock syndrome and dysmenorrhea. The tampon has incorporated therein an antibacterial agent. The agent allegedly disperses on contact with body fluids and prevents development of the organisms that produce the toxins, which cause toxic shock syndrome. Among the antibacterial materials disclosed for use are povidone-iodine compound, mercury, zinc, penicillin, erythromycin and nitrofurazone.

Patent Cooperation Treaty Publication No. WO 86/05388 (published Sep. 25, 1986) to Kass provides that the inclusion of a salt of a nontoxic divalent cation in absorptive pads, e.g. catamenial tampons, inhibits production of toxic shock syndrome toxin-1 and other staphylococcal products during use of said absorptive pad. Suitable salts include those of magnesium, barium, calcium or strontium (preferred) or of other divalent cations such as zinc, manganese, copper, iron, nickel and the like.

In U.S. Patent No. 4,374,522 to Olevsky, it is stated that patterns of use of catamenial tampons seem to indicate that high absorptive capacity with the concomitant extended period of use of certain tampons are factors that contribute to the formation of toxic shock syndrome. The patent provides a tampon made of conventional cellulosic materials, such as rayon fibers, which have been compressed into a bullet-shape

with an open bottom surface sealed by a fluid impermeable sheet. The fluid impermeable bottom and the traditional bullet shaped pledget define a hollow core, central reservoir area, which serves as a reservoir for excess menstrual fluid.

U.S. Patent No. 4,431,427 to Lefren et al. discloses menstrual tampons comprising physiologically safe, water-soluble acids in their monomeric, oligomeric or polymeric forms. Citric, glycolic, malic, tartaric and lactic acids are disclosed as being useful in the practice of the invention. The presence of one or more of the above-noted acids in a tampon is said to inhibit the growth of bacteria responsible for toxic shock. Where an acid is used in its polymeric form, the tampon may additionally include an enzyme to hydrolyze the polymeric acid to its monomeric form.

Canadian Patent No. 1,123,155 to Sipos discloses a catamenial tampon for preventing toxic shock syndrome during menstrual flow. The body of the tampon, which is open at the insertion end and is closed at the withdrawal end, is snugly surrounded in its expanded condition by a fluid proof, thin and flexible membrane. This membrane, which can be made of polyethylene sheet, is biased against the vaginal wall during use of the tampon, is neutral to the vaginal mucosa and is completely impermeable to bacteria, viruses and toxic decomposition products of the menstrual flow.

Canadian Patent No. 1,192,701 to Bardhan discloses a tampon for the absorption of menstrual flow. The tampon comprises an inner layer of liquid-absorbent material and an outer layer, which surrounds and

encloses the inner layer. Menstrual discharge may flow inwardly to the inner layer, but the outer layer is impervious to the passage of menstrual fluid outwardly from the inner layer. A plurality of liquid absorbent wicks extending from the inner layer through apertures formed in the outer layer serve as conduits for the flow of menstrual discharge from outside the tampon to the inner layer thereof. The disclosed structure allegedly minimizes the availability of discharge outside the tampon with a resulting reduction in the likelihood of growth of S. aureus and consequently its production of toxin. This patent also discloses that an antimicrobial compound, which is bactericidal or bacteriostatic to S. aureus, may be included in the inner layer. The antimicrobial agent may take the form of an antibiotic (such as penicillin, erythromycin, tetracycline or neomycin), a chemotherapeutic agent (such as a sulfonamide) or a disinfectant (such as phenol).

U.S. Patent No. 4,585,792 to Jacob et al. discloses that L-ascorbic acid when topically applied to the vaginal area of a human female during manses will inactivate toxins known to contribute to Toxic Shock Syndrome. The ascorbic acid compound may be carried by a vaginal tampon. The disclosure of U.S. Patent No. 4,722,937 is to the same effect.

U.S. Patent No. 4,413,986 to Jacobs discloses a sterilely-packaged tampon assembly for sterile insertion of a tampon into the vagina and having a guide tube telescoped around an insertion tube and a flexible sheath attached to the inner end of the guide

tube and tucked into the inner end of the insertion tube. In use, as the insertion tube is pushed through the guide tube and into the vagina, the flexible sheath is pulled over the inner end of the insertion tube and extends along the exterior thereof. The portion of the insertion tube, which is inserted into the vagina, is at all times fully sheathed by the flexible sheath.

U.S. Patents Nos. 5,389,374, 5,547,985, 5,641,503, 5,679,369, 5,705,503, and 5,753,252, all to Brown-Skrobot et al., each disclose an absorbent product having a compound for inhibiting toxins produced by Staphylococcus aureus bacteria. The compound is selected from the group consisting of (1) monoesters of a polyhydric aliphatic alcohol and a fatty acid containing from eight to eighteen carbon atoms, in which the monoester has at least one hydroxyl group associated with its aliphatic alcohol residue, (2) diesters of a polyhydric aliphatic alcohol and a fatty acid containing from eight to eighteen carbon atoms, in which the diester has at least one hydroxyl group associated with its aliphatic alcohol residue, and (3) mixtures of the monoesters and diesters.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide an absorbent catamenial device or product, such as a tampon, that reduces or inhibits bacterial growth and toxin formation within the vagina.

It is another object of the present invention to provide a tampon that maximizes the effect of a desired

amount of antibacterial agent in a tampon to reduce or inhibit bacterial growth in the vagina.

It is a further object of the present invention to provide a tampon that maximizes the effect of a desired amount of one or more finishing agents in a tampon to neutralize toxin formed in the vagina.

It is still a further object of the present invention to provide a method of incorporating the one or more antibacterial agents and the one or more finishing agents into a tampon.

The above and other objects and advantages of the present invention are fulfilled by a tampon or other similar catamenial device or product in which there is disposed an effective amount of antibacterial agent and finishing agent, capable of significantly reducing or inhibiting bacterial growth and neutralizing toxin within the vagina. Briefly stated, a broad feature of the present invention can be defined as a fibrous absorbent article for absorbing body fluids made up of a fibrous material defining a structure suitable for absorbing the body fluids, and disposed within the structure an effective amount, so as to reduce Staphylococcus aureus bacterial growth and neutralize TSS toxin-1 within the vagina, of one or more antimicrobial agents and one or more finishing agents.

DETAILED DESCRIPTION OF THE INVENTION

As used herein, the term "absorbent material" includes natural or synthetic fibers, nonwovens, films, foams, wood pulp, peat moss, superabsorbent polymers

and the like, which are capable, either inherently or by virtue of the manner in which they have been assembled, of absorbing liquids such as water, urine, menstrual fluids, blood, and wound exudates.

As used herein, the term "absorbent products" includes catamenial tampons, wound dressings, disposable diapers, sanitary napkins, other kinds of tampons, such as those intended for medical, surgical, dental and/or nasal use, and any other article or device for absorbing body fluids therein.

In accordance with the invention, the absorbent product contains an amount of one or more antibacterial agents effective to reduce or inhibit the growth of S. aureus bacteria, when exposed to the absorbent product. In addition, the absorbent product has an amount of one or more finishing agents effective to neutralize TSST-1, which may have formed within the vagina when exposed to the Staphylococci.

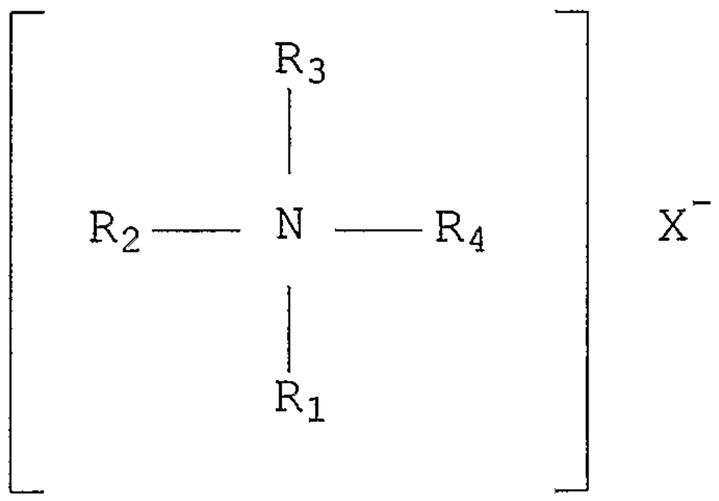
In a preferred embodiment of the present invention, an amount of antibacterial agent and finishing agent is disposed in an absorbent product. It has been found that by disposing both the one or more antibacterial agents and the one or more finishing agents in an absorbent product, S. aureus bacteria growth and TSST-1 are significantly reduced as a result of the synergy between the neutralization effect of the one or more finishing agents and the bactericidal or bacteriostatic effect of the one or more antibacterial agents.

Preferably, the absorbent product is a tampon. The tampon may be made of any material known in the art to be suitable for insertion into the body and/or the absorption of body fluids. Typically, the tampon may be made of a fibrous material, such as cotton or rayon, a superabsorbent, or mixtures thereof.

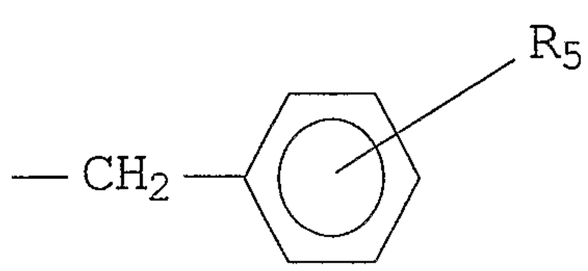
Suitable antibacterial agents that may be included in the tampon, which effectively reduce S. aureus bacteria growth, include, without limitation, one or more quaternary ammonium compounds, glyceryl monolaurate, 5-chloro-2-(2,4-dichlorophenoxy)-2,4,4'-trichloro-2'-hydroxy diphenyl ether (triclosan), p-chloro-m-xylenol, N-(4-chlorophenyl)-N'-(3,4-dichlorophenyl) urea (triclocarban), 2-N-octyl-4-isothiazolin-3-one, iodine-based compounds, such as, for example, PVP-iodine, iodopropynyl butyl carbamate (glycacil), or diiodomethyltolylsulfone (amical), and any mixtures thereof.

It has been found that an absorbent product, such as a tampon, having one or more antibacterial agents present in an amount from about 0.01 percentage by weight (wt.%) to about 5 wt.%, based on the total weight of the tampon, is effective at significantly reducing the growth of S. aureus bacteria that comes into contact with the tampon.

Preferably, the one or more antibacterial agents are quaternary ammonium compounds conforming to the chemical structure:



where X is selected from the group consisting of: a halogen and a saccharinate; R_1 and R_3 is a straight or branched C_1-C_4 alkyl; R_2 is a straight or branched C_6-C_{22} alkyl; and R_4 is of the chemical structure:



where R_5 is selected from the group consisting of: H, a straight or branched C_1-C_4 alkyl, and a halogen.

Preferably, the quaternary ammonium compound is, for example, alkyl dimethyl benzylammonium chloride, alkyl dimethyl ethylbenzylammonium chloride, myristyl dimethyl benzylammonium chloride, lauryl dimethyl ethylbenzylammonium chloride, alkyl dimethyl benzylammonium bromide, alkyl dimethyl benzylammonium cetyl phosphate, alkyl dimethyl benzylammonium saccharinate, or any mixtures thereof.

In a preferred embodiment of the present invention, a mixture of alkyl dimethyl benzylammonium chloride and alkyl dimethyl ethylbenzylammonium chloride, sold under the trade name BTC 2125®M by Stepan

Company, is used. It is present in the tampon in an amount from about 0.01 wt.% to about 5 wt.%. More preferably, the BTC 2125®M is present in an amount from about 0.10 wt.% to about 2.5 wt.%. In the most preferred embodiment, BTC 2125®M is present in an amount from about 1.0 wt.% based on the total weight of the tampon.

Suitable finishing agents that may be included in the tampon that neutralize toxins, such as TSST-1, include, for example, one or more surfactants. Suitable surfactants that may be included in the tampon to neutralize TSST-1, may include, without limitation, one or more nonionic, anionic, cationic, amphoteric, or any mixtures thereof.

Preferably, the one or more surfactants are nonionic surfactants. Suitable nonionic surfactants may include, for example, one or more alcohol ethoxylates, alkylphenol ethoxylates, amine oxides, carboxylic acid esters, ethoxylated anhydrosorbital esters, glycerol esters, poly(oxyethylene-co-oxypropylene) based surfactants, polyoxyethylene fatty acid amines, polyoxyethylene fatty acid esters, polyethylene glycol, polyethylene glycol esters, or any mixtures thereof.

Suitable cationic surfactants for use in the tampon include, for example, cocamidopropyl PG dimonium chloride.

Suitable amphoteric surfactants for use in the tampon include, for example, cocamidopropyl betaine, oleamidopropyl betaines, coco-betaine, disodium cocoamphodiacetate, or any mixtures thereof.

It has been found that an absorbent product, such as a tampon, having one or more finishing agents present in an amount from about 0.01 wt.% to about 10 wt.%, based on the total weight of the tampon, is effective at significantly neutralizing toxins that come into contact with the tampon.

The preferred surfactants are a polyoxyethylene fatty acid ester, such as, for example, polysorbate-20 and an amine oxide, such as, for example, cocamidopropyl amine oxide. Most preferably, the surfactant is polysorbate-20 sold under the trade name Tween®-20. Preferably, Tween-20 is present in the tampon in an amount from about 0.01 wt.% to about 10 wt.%. More preferably, Tween®-20 is present in an amount from about 1 wt.% and about 5 wt.%. In the most preferred embodiment of the present invention, Tween®-20 is present at about 2.5 wt.% based on the total weight of the tampon.

The absorbent products of the present invention may also include one or more additional components. These components may be one or more preservatives, deodorants, lubricants, fragrances, malodor counteractant odor absorbing and neutralizing materials, humectants (moisturizers), or any combinations thereof.

Tampons were prepared with varying concentrations of BTC 2125®M and Tween®-20. S. aureus MN8 was incubated with these tampons, and also on tampons without antibacterial agent and surfactant. After a predetermined incubation time, the concentration of both S. aureus and TSST-1 on the tampons was measured.

The results of this study are summarized in Table 1 below.

Table 1. Growth of S. Aureus MN8 and Production of TSST-1 When Incubated with Tampons having BTC 2125®M and Tween®-20.

APPLICATOR DESCRIPTION	AIR VOLUME (cc)	INOCULUM (cc)	FINAL pH	CFU/ml	AVERAGE	TSST-1 (ng/ml)	AVERAGE TSST-1 (ng/ml)
Tampon with 0.25% BTC and 0.25% Tween 20	5.7	8.7	6.65	3.6×10^4	7.7×10^3	200.5	332.28 Std.= 206.29
	5.9	7.7	6.71	2.0×10^2		159.1	
	5.6	8.0	6.86	< 100		227.8	
	5.5	6.9	6.79	< 100		725.0	
	5.4	8.3	6.80	2.3×10^3		349.0	
Tampon with 0.25% BTC and 2.5% Tween 20	4.8	10.7	6.81	2.3×10^5	3.2×10^5	43.1	47.1 Std. = 10.76
	5.4	12.5	6.82	5.5×10^5		52.7	
	5.3	10.5	6.82	1.7×10^4		65.8	
	5.0	10.4	6.81	6.5×10^5		40.6	
	5.4	10.4	6.83	1.7×10^5		35.1	
Tampon with 1.0% BTC and 0.25% Tween 20	4.7	8.3	7.06	<100	<100	267.69	382.64 Std. = 236.02
	4.9	7.4	6.96	<100		787.2	
	5.3	8.6	6.92	<100		177.26	
	5.0	8.3	6.92	<100		507.74	
	5.0	8.4	7.04	<100		173.32	
	5.4	12.9	7.05	<100	<100	0.97	17.18 Std. = 18.23
	5.3	11.5	6.94	<100		30.07	
	4.9	11.1	6.99	<100		6.12	
	5.5	11.6	7.04	<100		1.96	
	6.0	11.4	6.97	<100		46.81	
Tampon with 1.0% BTC and 2.5% Tween 20	4.0	10.0	6.37	1.3×10^9	1.4×10^9	482.86	440.09 Std. = 60.62
	4.0	10.0	6.38	1.3×10^9		477.79	
	4.0	10.0	6.39	1.6×10^9		480.07	
	4.0	10.0	6.37	1.5×10^9		323.88	
	4.0	10.0	6.37	1.4×10^9		435.96	
Innoculum Control							

Starting load of S. aureus MN8: 1.6×10^6 CFU/ml, incubated @ 35C $\pm$ 2C for 22 hours.

As demonstrated by this data, it has been found that tampons with 1.0 wt.% BTC 2125®M and 2.5 wt.% Tween®-20 significantly reduced the growth of S. aureus, as compared to the innoculum control, by greater than 7 logs from the average of 1.4×10^9 CFU/ml. The growth was reduced by greater than 4 logs from an initial bacterial load of 1.6×10^6 CFU/ml. In addition, the innoculum control average TSST-1 of 440.09 ng/ml was reduced by greater than 96% to an average of 17.18 ng/ml.

The antibacterial agent and/or the finishing agent may be incorporated in or on the surface of the absorbent article and/or fiber(s) of the present invention by any suitable process known in the art. Suitable processes may include, for example, spraying, rolling, saturating, extruding, printing, incorporating the antibacterial agent and/or finishing agent into a viscose solution prior to forming rayon fiber, applying the antibacterial agent and/or finishing agent to fibers prior to forming the absorbent article, or any combinations thereof.

Various modifications to the present invention may be made as will be apparent to those skilled in the art. Thus, it will be obvious to one of ordinary skill in the art that the foregoing description is merely illustrative of certain preferred embodiments of the present invention.

WHAT IS CLAIMED IS:

1. An absorbent product comprising an absorbent material and a composition disposed within said absorbent material, the composition having:

at least one antibacterial agent; and

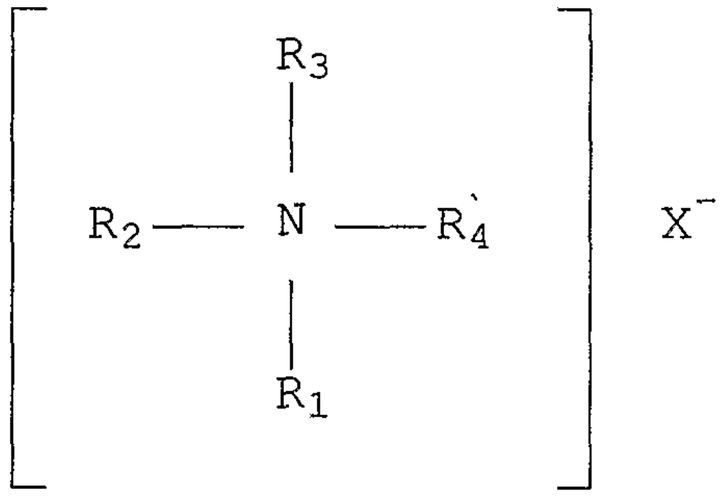
at least one finishing agent,

wherein the composition has synergistic antibacterial properties effective to neutralize the production of toxin and reduce Staphylococcus aureus bacteria growth.

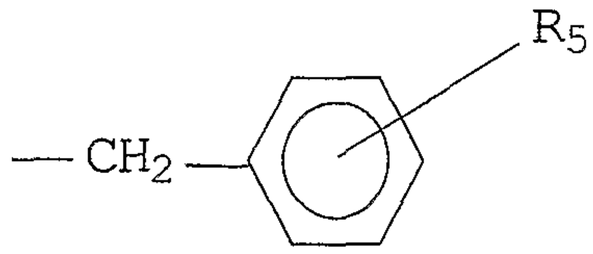
2. The absorbent product of claim 1, wherein said at least one antibacterial agent is selected from the group consisting of: quaternary ammonium compound, glyceryl monolaurate, 5-chloro-2-(2,4-dichlorophenoxy)-2,4,4′-trichloro-2′-hydroxy diphenyl ether (triclosan), p-chloro-m-xylenol, N-(4-chlorophenyl)-N′-(3,4-dichlorophenyl) urea (triclocarban), 2-N-octyl-4-isothiazolin-3-one, iodine-based compounds, and any mixtures thereof.

3. The absorbent product of claim 1, wherein said at least one antibacterial agent is one or more quaternary ammonium compounds.

4. The absorbent product of claim 3, wherein said one or more quaternary ammonium compounds have a chemical structure:



wherein X is selected from the group consisting of: a halogen and a saccharinate; R_1 and R_3 is a straight or branched C_1-C_4 alkyl; R_2 is a straight or branched C_6-C_{22} alkyl; and R_4 is of the chemical structure:



wherein R_5 is selected from the group consisting of: H, a straight or branched C_1-C_4 alkyl group, and a halogen.

5. The absorbent product of claim 4, wherein said one or more quaternary ammonium compounds are selected from the group consisting of: alkyl dimethyl benzylammonium chloride, alkyl dimethyl ethylbenzylammonium chloride, myristyl dimethyl benzylammonium chloride, lauryl dimethyl ethylbenzylammonium chloride, alkyl dimethyl

benzylammonium bromide, alkyl dimethyl benzylammonium cetyl phosphate, alkyl dimethyl benzylammonium saccharinate, and any mixtures thereof.

6. The absorbent product of claim 4, wherein said one or more quaternary ammonium compounds are a mixture of alkyl dimethyl benzylammonium chloride and alkyl dimethyl ethylbenzylammonium chloride.

7. The absorbent product of claim 6, wherein said quaternary ammonium compounds are present in an amount of about 1.0 wt.% based on the total weight of the absorbent product.

8. The absorbent product of claim 3, wherein said quaternary ammonium compounds are present in an amount about 0.01 wt.% to about 5 wt.% based on the total weight of the absorbent product.

9. The absorbent product of claim 1, wherein said at least one antibacterial agent is present in the absorbent product in an amount about 0.01 wt.% to about 5 wt.% based on the total weight of the absorbent product.

10. The absorbent product of claim 1, wherein said at least one finishing agent is one or more surfactants.

11. The absorbent product of claim 10, wherein said one or more surfactants are selected from the

group consisting of nonionic, anionic, cationic, amphoteric, and any mixtures thereof.

12. The absorbent product of claim 10, wherein said one or more surfactants are present in an amount about 0.01 wt.% to about 10 wt.% based on the total weight of the absorbent product.

13. The absorbent product of claim 10, wherein said one or more surfactants are one or more nonionic surfactants.

14. The absorbent product of claim 10, wherein said one or more nonionic surfactants are selected from the group consisting of one or more: alcohol ethoxylates, alkylphenol ethoxylates, carboxylic acid esters, ethoxylated anhydrosorbital esters, glycerol esters, poly(oxyethylene-co-oxypropylene) based surfactants, polyoxyethylene fatty acid amines, polyoxyethylene fatty acid esters, polyethylene glycol, polyethylene glycol esters, and any mixtures thereof.

15. The absorbent product of claim 14, wherein said one or more nonionic surfactants are one or more polyoxyethylene fatty acid esters.

16. The absorbent product of claim 15, wherein said polyoxyethylene fatty acid ester is present in an amount about 2.5 wt.% based on the total weight of the absorbent product.

17. The absorbent product of claim 1, wherein said at least one finishing agent is present in an amount about 0.01 wt.% to about 10 wt.% based on the total weight of the absorbent product.

18. The absorbent product of claim 1, wherein said absorbent product is selected from the group consisting of:
catamenial tampons, wound dressings, disposable diapers, sanitary napkins, medical tampons, surgical tampons, dental tampons, and nasal tampons.

19. The absorbent product of claim 1, wherein said composition further comprises one or more additional components selected from the group consisting of: preservative, deodorant, fragrance, malodor counteractant material, humectant, and any combinations thereof.

20. A method of inhibiting the production of TSST-1 toxin by exposing TSST-1 toxin-producing Staphylococcus aureus bacteria to an absorbent product, the absorbent product having an absorbent material and a composition, the composition comprising:

at least one antibacterial agent; and

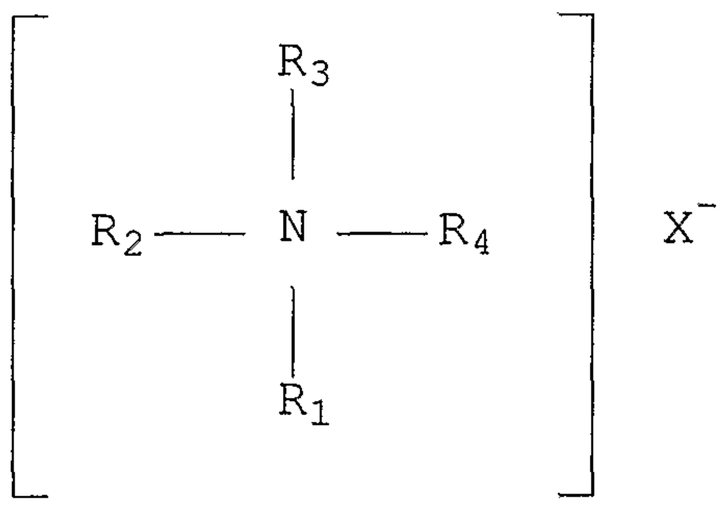
at least one finishing agent,

wherein the composition effectively neutralizes the production of toxin and reduces Staphylococcus aureus bacteria growth.

21. The method of claim 20, wherein said at least one antibacterial agent is selected from the group consisting of: quaternary ammonium compound, glyceryl monolaurate, 5-chloro-2-(2,4-dichlorophenoxy)-2,4,4'-trichloro-2'-hydroxy diphenyl ether (triclosan), p-chloro-m-xylenol, N-(4-chlorophenyl)-N'-(3,4-dichlorophenyl) urea (triclocarban), 2-N-octyl-4-isothiazolin-3-one, iodine-based compounds, and any mixtures thereof.

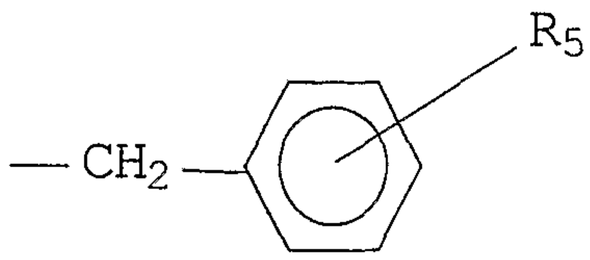
22. The absorbent product of claim 21, wherein said at least one antibacterial agent is one or more quaternary ammonium compounds.

23. The method of claim 22, wherein said one or more quaternary ammonium compounds has a chemical structure:



wherein X is selected from the group consisting of: a halogen and a saccharinate; R_1 and R_3 is a straight or

branched C_1-C_4 alkyl; R_2 is a straight or branched C_6-C_{22} alkyl; and R_4 is of the chemical structure:



wherein R_5 is selected from the group consisting of: H, a straight or branched C_1-C_4 alkyl group, and a halogen.

24. The method of claim 22, wherein said quaternary ammonium compounds are present in an amount about 0.01 wt.% to about 5 wt.% based on the total weight of the absorbent product.

25. The absorbent product of claim 21, wherein said one or more quaternary ammonium compounds are selected from the group consisting of: alkyl dimethyl benzylammonium chloride, alkyl dimethyl ethylbenzylammonium chloride, myristyl dimethyl benzylammonium chloride, lauryl dimethyl ethylbenzylammonium chloride, alkyl dimethyl benzylammonium bromide, alkyl dimethyl benzylammonium cetyl phosphate, alkyl dimethyl benzylammonium saccharinate, and any mixtures thereof.

26. The method of claim 25, wherein said one or more quaternary ammonium compounds are a mixture of alkyl dimethyl benzylammonium chloride and alkyl dimethyl ethylbenzylammonium chloride.

27. The method of claim 25, wherein said one or more quaternary ammonium compounds are present in an amount about 1.0 wt.% based on the total weight of the absorbent product.

28. The method of claim 20, wherein said at least one antibacterial agent is present in an amount about 0.01 wt.% to about 5 wt.% based on the total weight of the absorbent product.

29. The method of claim 20, wherein said at least one finishing agent is one or more surfactants.

30. The method of claim 29, wherein said one or more surfactants are selected from the group consisting of: nonionic, anionic, cationic, amphoteric, and any mixtures thereof.

31. The method of claim 29, wherein said one or more surfactants are one or more nonionic surfactants.

32. The method of claim 31, wherein said one or more nonionic surfactants are selected from the group consisting of: alcohol ethoxylates, alkylphenol ethoxylates, carboxylic acid esters, ethoxylated anhydrosorbital esters, glycerol esters, poly(oxyethylene-co-oxypropylene) based surfactants, polyoxyethylene fatty acid amines, polyoxyethylene fatty acid esters, polyethylene glycol, polyethylene glycol esters, and any mixtures thereof.

33. The method of claim 32, wherein said one or more nonionic surfactants are one or more polyoxyethylene fatty acid esters.

34. The method of claim 33, wherein said one or more polyoxyethylene fatty acid esters are present in an amount about 2.5 wt.% based on the total weight of the absorbent product.

35. The method of claim 20, wherein said at least one finishing agent is present in an amount about 0.01 wt.% to about 10 wt.% based on the total weight of the absorbent product.

36. The method of claim 29, wherein said one or more surfactants are present in an amount about 0.01 wt.% to about 10 wt.% based on the total weight of the absorbent product.

37. The method of claim 20, wherein said absorbent product is selected from the group consisting of: catamenial tampons, wound dressings, disposable diapers, sanitary napkins, medical tampons, surgical tampons, dental tampons, and nasal tampons.

38. The method of claim 20, wherein said composition further comprises one or more additional components selected from the group consisting of: preservative, deodorant, fragrance, malodor counteractant material, humectant and any combinations thereof.