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SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 10-116132- -00001-0000

Fecha: 2010-09-29 16:37:22 Dep. 2020 DIR.NUEVASCR
Tra. 2 PATENTES Eva: 1 REGDEPOSITO
Act. 329 CTOINFORMACION Folios: 55

P-2676

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
DIVISION DE NUEVAS CREACIONES
E. S. D.

Ref.: Expediente No. 10.116.132
Solicitud de Patente a nombre de
JOHNSON & JOHNSON CONSUMER COMPANIES, INC.

Yo, DILIA MARÍA RODRÍGUEZ D'ALEMAN, identificada como aparece al pie de mi firma, domiciliada en la Carrera 11 No. 86-53, piso 6, obrando como apoderada de la sociedad **JOHNSON & JOHNSON CONSUMER COMPANIES, INC.** domiciliada en Skillman, New Jersey, Estados Unidos de América, solicitante de la patente de la referencia, atentamente me permito presentar copia certificada de la solicitud de Patente número 12/568,741 de 29 de septiembre de 2009, con la debida traducción de lo pertinente.

Señor Superintendente,

DILIA MARÍA RODRÍGUEZ D'ALEMAN
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Septiembre 13 de 2010

La presente es para certificar que el anexo es una copia fiel de los registros de la Oficina de Patentes y Marcas de los Estados Unidos, de los documentos de la solicitud de patente identificada más adelante, que cumplieron con los requerimientos para concederse una fecha de presentación de acuerdo con 35 USC 111.

Número de Solicitud: 12/568,741

Fecha de Presentación: septiembre 29 de 2009

EL CÓDIGO DEL PAÍS Y EL NÚMERO DE SU SOLICITUD DE PRIORIDAD, PARA SER USADA EN LA PRESENTACIÓN EXTRANJERA BAJO EL CONVENIO DE PARÍS ES US 12/568,741.

Por la autoridad de

Bajo el Secretario de Comercio para la Propiedad Intelectual y el Director de la Oficina de Patentes y Marcas de los Estados Unidos de América

(fdo) **T. WALLACE**

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FILING DATE UNDER 35 USC 111.**

APPLICATION NUMBER: 12/568,741**FILING DATE: September 29, 2009**

**THE COUNTRY CODE AND NUMBER OF YOUR PRIORITY
APPLICATION, TO BE USED FOR FILING ABROAD UNDER THE PARIS
CONVENTION, IS US12/568,741**

**By Authority of the
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T. Wallace
T. WALLACE
Certifying Officer

Electronic Acknowledgement Receipt

EFS ID:	6162948
Application Number:	12568741
International Application Number:	
Confirmation Number:	7003
Title of Invention:	SOAP BAR CONTAINING HYDROGEL PHASE
First Named Inventor/Applicant Name:	Mac Lai
Customer Number:	27777
Filer:	Brett Freeman/Dana Deinstadt
Filer Authorized By:	Brett Freeman
Attorney Docket Number:	J&J5423USNP
Receipt Date:	29-SEP-2009
Filing Date:	
Time Stamp:	10:43:21
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no				
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal of New Application	TranmsmittalCoverSheet.pdf	213010 55da172db26c1b3c711f42a8d4b47d5551c78e7	no	1
Warnings:					
Information:					

2		SpecFINAL.pdf	469528	yes	36
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	Multipart Description/PDF files in .zip description				
	Document Description	Start	End		
	Specification	1	31		
	Claims	32	35		
	Abstract	36	36		
Warnings:					
Information:					
3	Drawings-only black and white line drawings	JJ5423USNPFIGS.pdf	6227	no	1
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Warnings:					
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4	Oath or Declaration filed	ExecutedDeclaration.pdf	270484	no	6
			9944826074b1b6ae0ba1d1e32ab2c42627b7805		
Warnings:					
Information:					
5	Fee Worksheet (PTO-875)	fee-info.pdf	36631	no	2
			4d395d21d783ae4ee9537d26aa633de83e12961		
Warnings:					
Information:					
Total Files Size (in bytes):			995880		

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UTILITY PATENT APPLICATION TRANSMITTAL (only for new nonprovisional applications under 37 CFR 1.53(b))	Attorney Docket No.	J&J5423USNP
	First Inventor	Mac Lai
	Title	SOAP BAR CONTAINING HYDROGEL PHASE PARTICLES
	I hereby certify that this correspondence is being transmitted via The Office electronic filing system in accordance with 37 CFR 1.6(a)(4)	
APPLICATION ELEMENTS See MPEP Chapter 600 concerning utility patent application contents.		ADDRESS TO: Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450
1. ☒ Fee Transmittal Form (e.g., PTO/SB/17) (submit an original and a duplicate for fee processing) 2. ☒ Specification [Total Pages 36] (Preferred arrangement set forth below) - Descriptive Title of the Invention - Cross Reference to Related Applications - Statement Regarding Fed sponsored R&D - Reference to sequence listing, a table, or a computer program listing appendix - Background of the Invention - Brief Summary of the Invention - Brief Description of the Drawings <i>(if filed)</i> - Detailed Description - Claim(s) - Abstract of the Disclosure 3. ☒ Drawing(s) (35 USC 113) [Total Sheets 1] 4. Oath or Declaration [Total Pages 6] a. ☒ Newly executed (original or copy) b. ☐ Copy from a prior application (37 CFR 1.63(d)) <i>(for continuation/divisional with Box 18 completed)</i> i. ☐ DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b). 5. ☐ Application Data Sheet. See 37 CFR 1.76		6. ☐ CD-ROM or CD-R in duplicate, large table or Computer Program (Appendix) 7. Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary) a. ☐ Computer Readable Form (CRF) b. ☐ Specification Sequence Listing on: i. ☐ CD-ROM or CD-R (2 copies); or ii. ☐ paper c. ☐ Statement verifying identity of above copies ACCOMPANYING APPLICATION PARTS 8. ☐ Assignment Papers 9. ☐ 37 CFR 3.73(b) Statement ☐ Power of Attorney <i>(when there is an assignee)</i> 10. ☐ English Translation Document <i>(if applicable)</i> 11. ☐ Information Disclosure Statement (IDS) PTO-1449 ☐ Copies of IDS Citations 12. ☐ Preliminary Amendment 13. ☐ Return Receipt Postcard (MPEP 503) <i>(Should be specifically itemized)</i> 14. ☐ Certified Copy of Priority Document(s) <i>(if foreign priority is claimed)</i> 15. ☐ Request and Certifications under 35 U.S.C. 122 (b)(2)(B)(i). Applicant must attach form PTO/SB/35 or its equivalent. 16. ☐ Other
17. ☐ If a CONTINUING APPLICATION, check appropriate box and supply the requisite information below and in a preliminary amendment, or in an Application Data Sheet under 37 CFR 1.76: ☐ Continuation ☐ Divisional ☐ Continuation-in-Part (CIP) of prior application No.: , filed Prior application information: Examiner Group Art Unit: For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation <u>can only</u> be relied upon when a portion has been inadvertently omitted from the submitted application parts.		
18. CORRESPONDENCE ADDRESS ☒ Customer Number or Bar Code Label 000027777 or ☐ Correspondence Address below Name: Philip S. Johnson, Esq. Address: Johnson & Johnson One Johnson & Johnson Plaza New Brunswick, NJ 08933-7003 USA		
19. TELEPHONE CONTACT Please direct all telephone calls or telefaxes to Brett T. Freeman at: Telephone: (732) 524-3428 Fax: (732) 524-2808		
20. SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED		
NAME	Brett T. Freeman Reg. No. 46,709	
SIGNATURE	/Brett T. Freeman/	
DATE	September 29, 2009	

SOAP BAR CONTAINING HYDROGEL PHASE PARTICLES

TECHNICAL FIELD

[0001] This invention relates to a cleansing soap bar. In particular, the invention relates to a low total fatty mater (TFM) cleansing soap bar having acceptable properties to consumers, particularly bars made by amalgamating, milling, extruding and stamping.

BACKGROUND

[0002] Traditional soap bars are made from soap noodles, with 70wt% or more of total fatty material (TFM), 10-14wt% water, and include other additives (such as titanium dioxide, surfactant and fragrance). These bars are mainly produced by mixing the soap noodles with other additives, followed by milling, extruding and stamping processes.

[0003] Generally, traditional soaps are alkali (usually sodium) salts of fatty acids from oils or fats, which can come be of animal and/or plant origin. Common sources of oils and fats are, for example, palm oil, palm kernel oil, coconut oil, cattle tallow, sheep tallow, lard, and other similar oils and fats from other organisms. Fats and oils contain in substantial part glycerides of varying chain lengths, which are esters of glycerol (glycerin) and fatty acids. Under alkaline conditions and heat, the glycerides in the fats and oils form glycerin and fatty acid salts, also known as soaps.

[0004] Commercially, soaps are made by adding additives to soap noodles and further processing the mixture into soap. Soap noodles are typically made from oil or fat of blends thereof by three methods commonly known in the art. One method is the direct saponification of oil/fat in which the oil/fat is reacted with an alkali (typically sodium hydroxide) to form glycerin and the soap base (which contains fatty acid alkali salt, e.g., fatty acid sodium salt, which is also carboxylic acid sodium salt). The soap base is the fatty- acid- alkali- salt- containing material that is to be used for forming soap by adding fillers, fragrance, and other additives. Thus, the material after removal

of glycerin (if glycerin is to be removed) and to be further processed is an example of soap base. Another method of making soap involves the neutralization of fatty acid with the alkali (e.g., NaOH) to form the soap base. In the soap-making process, the soap base can be dried and plodded into noodles or chips. As used herein, the term "soap noodles" refers to the pellets or pieces of soap (whether they be in pellet, chip, bits, or other shapes). Soap noodles are typically the result of the drying and extruding of raw soap into unit form such that the soap units or pieces can be further processed into the finished soap bars by mixing with additives, as known to those skilled in the art of soap making. The soap noodle contains the soap base and can optionally contain other materials such as glycerin. Cleansing soap bars are mostly produced by mixing the soap noodles with additives, such as fragrance, fillers, etc., followed by milling, extruding and stamping processes.

[0005] Traditionally, finished milled soap bars include soap noodle TFM of more than 70wt%, 10-14wt% water, and other additives (such as titanium dioxide, surfactant and fragrance). At the present, milled bars generally have a water content of about 8-15wt% and hard non-milled bars have a water content of about 20-35wt%. Hard non-milled bars can contain moisture of less than 35wt%. Such non-milled bars have a TFM of about 30-65wt%. The reduction in TFM traditionally is done by including insoluble particulate materials and/or soluble silicates in the soap bars. Such non-milled bars are generally quite soft and subjecting the soap bars to the milling process will cause water to separate out.

[0006] Generally, fillers are used as soap noodle replacement in soap formulation design. For example, commonly used fillers include kaolin, talc and other inorganic mineral fillers. More than 16wt% of kaolin can be used in the soap formulation with the acceptable properties and kaolin might reduce the feeling of greasiness on the skin. Other materials that have been added in the making of soap include silica gel, sodium aluminate, and borate compounds. In some cases, water absorbing materials are added in soap-making to increase the content of water. Examples of patent documents related to soaps that have water absorbing material include US 20050276828A and WO2007146027. Examples of patent documents that

are related to adding fillers or including water absorbing material in the soap making process include US2677665, US5703026, US6310016, US6440908, and US7285521.

[0007] However, the inclusion of a large amount of water or fillers into the soap bar not only may affect the cleansing and sensory feel of the soap, but often also adversely affect the processing conditions. There continues to be a need for improved soap bars with an increased amount of water or fillers wherein the soap bars are able to provide effective cleansing property with lowered TFM.

SUMMARY

[0008] The present invention provides a method and a soap bar having hydrogel fillers, which can be a coreless composite. Preferably, the hydrogel fillers are in a hydrogel phase composite and includes polyols or powders. With the inclusion of powdery material in the hydrogel phase of the filler, the filler is a composite because it is made from two or more constituent materials with significantly different physical or chemical properties. The two or more constituent materials remain separate and distinct on a macroscopic level within the finished structure. Inclusion of this unique hydrogel phase in the soap structure leads to new soaps and new soap-making processes, leading to performance enhancement beneficial to the consumers. The present invention also relates to methods of making soap bar having hydrogel fillers.

[0009] In one aspect, the present invention provides a millable solid soap that contains a solid phase soap base and hydrogel phase particles dispersed in the soap base. The soap base is solid to the sensory feel of an average person and maintains its shape during packaging, storage, handling and shipping process without change in shape. Preferably, the particles of the hydrogel phase material are coreless. Preferably, the hydrogel phase particles contain polyols or powdery material and have a large amount of water therein.

[00010] In another aspect, the present invention relates to a method of making solid soap. The method of making the solid soap includes pre-forming a hydrogel liquid, charging the hydrogel liquid into the mixer at high temperature, mixing the liquid solution with soap noodles and other additives, forming the coreless hydrogel

particles in-situ during mixing, and forming a soap bar. The hydrogel liquid is essentially in solution form, although if preferred, certain amount of undissolved material can be present. The forming of the coreless hydrogel particles can be followed by refining, extruding, extruding and stamping. By adjusting the ratio of components that are to be mixed to form the hydrogel particles, such components can be more easily processed into hydrogel particles, without bringing any noticeable negative effect that can be experienced by consumers.

[00011] In one aspect of the invention, a novel soap bar and technique for making a soap bar are provided for a soap bar having composite hydrogel particles containing powdery components therein.

[00012] The present invention provides formulating flexibility for soap making. With the hydrogel phase particles of the present invention, water soluble active ingredients, such as vitamin C, etc., can be added to the hydrogel phase and still the hydrogel phase particles can be stable and maintain their function until being used. Such preservation of active soluble ingredients is very difficult to achieve in traditional bars because of the limitation of 8 -15wt% of water content and the high pH value. With the hydrogel phase, more synthetic surfactants in liquid form can be added into a soap formulation, which provide another way to modify or improve soap performance. With the hydrogel phase of the present invention, the soap noodle ratio in soap can be reduced to a very low level, thereby improving the mildness of the soap. With the present hydrogel phase, glycerin, polyol, and/or other moisturizers can be easily added to the soap without causing hard-to-manage stickiness, and provides more moisturization benefit to the consumer compared to traditional soap. In contrast, generally, if more than 5wt% glycerin or polyols are added into the formulation in the conventional bar making process, the soap noodle will become very sticky in the mixer, thereby making the mixing difficult to control and requiring a long mixing time. Similarly, when incorporating inorganic particles such as talc, the particles can be placed such that they are more concentrated in the hydrogel phase.

[00013] The present invention also provides processing benefits. The hydrogel phase of the present invention can be easily mixed with soap noodle and be processed on the traditional soap finish line. And when adding glycerin or sorbitol into the hydrogel phase, the use of hydrogel is a way to overcome the process difficulty caused by the soap noodle's stickiness compared to adding high level of glycerin in traditional soap making. Adding powdery material such as talc into the hydrogel phase also improves the compatibility of the powdery material with soap noodles to result in reduction or prevention of cracking. Thus, a higher level of such powdery material, such as talc, can be added into soap formulation with the use of hydrogel phase compared to traditional soap-making techniques.

[00014] The hydrogel phase can also act as an advantageous fragrance delivery vehicle in soap matrix and help to deliver flavor and fragrance effectively. The flavor and/or fragrance, being introduced into the soap bar by means of the hydrogel phase particulates, can be slowly released, thus providing favorable impression to the consumer.

[00015] With the inclusion of hydrogel phase fillers, which can act as soap noodle replacement, the present invention reduces the soap noodle dosage to a very low level without significant adverse impact on cleansing property. Compared to traditional soap, such a soap formulation can be made with relatively low cost.

[00016] Since the hydrogel of the present invention contain a large amount of water (in fact, it is mostly water), and the gelling materials are mostly colorless or light in color, the refractive index of the hydrogel phase particles can be adjusted to a large degree through the inclusion of polyols and adjusting the different amount of the polyols included. With transparent or translucent soap noodles, once the refractive index of the material of the hydrogel phase particles are the same or near to that of the soap noodle, the hydrogel phase particles are much less distinguishable from the soap noodle. As a result, transparent and translucent soap bars can be made with hydrogel phase fillers of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[00017] FIG. 1 is a sectional view of an embodiment of a solid soap bar of the present invention.

[00018] FIG. 2 is a flow chart illustrating a typical process for making solid soap bars according to the present invention.

DETAILED DESCRIPTION

[00019] The present invention relates to a soap bar having novel hydrogel fillers. Preferably the hydrogel fillers are coreless. Preferably the hydrogel fillers are composites. The present invention also relates to methods of making soap bars having hydrogel fillers. Introducing a unique hydrogel phase to the soap structure provides new flexibility for designing and making soap and also can bring other performance benefits to the consumer. In an embodiment, the soap bar of the present invention includes fillers in a hydrogel phase in particle form, preferably the particle is coreless. Such solid soap can be used for cleansing purposes as toilet soap or laundry soap, such as for cleaning hands, washing clothes, etc.

[00020] As used herein, the term "soap bar" refers to a unit of solid soap after it is made into a shape suitably stable in general commercial room condition and ready to be used. The bar may have various shapes in sectional view, such as round, oval, rectangle, square, star, etc., as known to the skilled artisans.

[00021] As used herein, the term "coreless" refers to a form of hydrogel in which a unit of hydrogel wherein the inner central part does not have a higher concentration of hydrogel gelling material (such as carrageenan) than the more peripheral regions of the unit (e.g., particle).

[00022] The term "included constituent" or "constituent included" as used herein regarding material in hydrogel refers to an ingredient, especially a nonwater material ingredient that is included in the hydrogel. Preferably, when in the finished soap bar, an

included constituent is present in higher concentration in the hydrogel phase particles than in the soap matrix material outside said particles.

[00023] In describing the present invention, the following terms will be employed, and are intended to be defined as indicated below. As used in this specification and the appended claims, the singular forms "a," "an" and "the" include plural references unless the text content clearly dictates otherwise.

[00024] As used herein, the term "thermoreversible" as applied to hydrogel refers to a hydrogel that is a flowable (which can flow under gravity) sol or liquid at elevated temperature at or above 90°C and forms a non-flowable hydrogel that has a phase surface in atmosphere at room temperature (about 25°C) wherein the hydrogel can become flowable liquid again when heated to the elevated temperature.

[00025] The term "hydrogel solution" refers to a solution in which more than 90% of the hydrogel gelling material has been dissolved or is in colloidal form. The solution can, but need not, be a clear solution.

[00026] "Beneficial agent" is to be construed in its broadest sense to mean any material that is intended to produce some biological, beneficial, therapeutic, or other intended useful effect, such as enhancing permeation, improving sensory feel, and moisturizing.

[00027] FIG. 1 illustrates an embodiment of a soap bar according to this invention. The solid soap bar 4 includes hydrogel phase particles 6 dispersed in soap matrix 8, which is composed of soap base material and other additives but excluding the hydrogel phase particles 6. The soap matrix is the material in which the hydrogel phase particles are embedded. The hydrogel phase particles 6 preferably have well defined phase boundary surface 10 separating the content of the hydrogel phase particles 6 from the soap base material 8. The particle surface need not be smooth, since many of the particles can be formed by breaking up larger pieces of hydrogel. Because the hydrogel solution is mixed well before gelling, the hydrogel gelling agent and water, as well other

beneficial agents are evenly distributed in the hydrogel solution. As the hydrogel solution material gels and eventually forms hydrogel particles that are embedded in the matrix, the content in the hydrogel particles continue to remain in uniform or substantially uniform distribution. In the resulting soap bar, under commercial storage condition at room temperature (such as at 25°C) even over a period of time, during which time water or other vaporizable or liquid material may diffuse away from the hydrogel phase particles into the soap matrix, the diffusion process is slow that such content materials in the hydrogel particles, except for the microscopic boundary conditions at the phase surface, would substantially be distributed evenly in the hydrogel phase particles at the vast majority of the particles. For example, constituents included in the hydrogel, such as talc and glycerin are distributed substantially uniformed within the bulk in the hydrogel phase particles (i.e., in the interior of the particle away from the boundary conditions). As used herein, the term "phase" when referred to the hydrogel particle refers to separation of hydrogel material from soap base material by a boundary of the hydrogel unit (such as a particle) in which the content material (such as water) is distributed substantially uniformly within the unit, whereas such material is present in substantially different distribution outside of the boundary. To facilitate processing, such hydrogel phase particles preferably are of a gel material having gel strength that gives a hardness to the sensory feel of the consumer at a large enough particle size (e.g., 5µm to 2mm diameter) the particles provides a grainy or granular feel to a consumer. Beneficial agents that can be included in the hydrogel phase particles, such as vitamins, fragrance, moisturizing agents, etc., can benefit the skin as the hydrogel phase particles come into contact with the skin. Further, such beneficial agents can migrate slowly past the phase surface boundary into the soap matrix material with time and eventually come into contact with skin to provide beneficial effect when the soap bar is used.

[00028] One of the ingredients of the solid soap bar of the present invention is fatty acid soap, which is generally provided in the form of soap noodles in the soap making process. The term of fatty acid soap denotes alkali salts of carboxylic fatty acid. The soap may be derived from any of the triglycerides conventionally used in soap manufacture. Consequently the carboxylate anions in the soap may contain from 8 to 22

carbon atoms. The fatty acid soap can be made from the usual fatty acid sources such as animal fats and vegetable oils or combinations thereof, which can include palm oil, palm kernel oil, castor oil, rice bran oil, sunflower oil, coconut oil, soybean oil, peanut oil, tallow, lard, fish oil, and blends thereof, and the like. Typical blends of palm and palm kernel oils, palm and coconut kernel oils, can be at blend ratios of about 40/60 to 97/3 of various oils and fats. As mentioned above, techniques and processes of making soap from fats and oils are well known in the art.

[00029] Generally, the fatty acid soap material (which is the same as TFM) can constitute about 40wt% to 90wt%, preferably about 50wt% to 90wt%, more preferably about 60wt% to 80wt%, preferably 70wt% or less of the soap bar of the present invention. Preferably, the fatty acid soap material is provided as soap noodles, such as those made from saponification processes. The soap noodles can be mixed and further processed with hydrogel to result in the final soap bar through mixing, milling, extruding, and stamping, etc. From the soap noodle type, the TFM can be determined. Typically, the soap noodle manufacturer provides the information on the TFM of the soap noodle. For example, soap noodle of a palm and palm kernel oils blend of 80:20 has a TFM of about 82wt%. Depending on the weight percentage of the soap noodle used in making the soap bar, the percent of TFM in the soap bar can then be calculated. Although synthetic soap bars can be made to include the hydrogel particles of the present invention, to provide physical property such that the soap can have the quality of a hard, milled bar, it is preferred that the soap bar is made from soap noodles. As used herein, the term "synthetic soap bar" refers to a soap bar that is made by molding a composition that contains synthetic surfactants and binders and rather than fatty acid alkali salt from soap noodles.

[00030] Other than sodium hydroxide and traditional natural fatty acids in or from animal fats and vegetable oils, soap can also be made from other alkali metal or alkanol ammonium alkali and alkane- or alkene monocarboxylic acids. Sodium, magnesium, potassium, calcium, mono-, di- and tri-ethanol ammonium cations, or combinations thereof can be used. The salts formed from the reaction between fatty acids and such cations are considered fatty acid alkali salts herein. The soaps can be

made from fatty acids having about 8 to 22 carbon atoms, preferably about 12 to about 18 carbon atoms. The soap (such as soap noodles) forms a soap base in which hydrogel can be mixed with and processed into soap bars that have the hydrogel phase particulate material in which a significant amount of water is bound.

[00031] The present invention enables the replacement of soap noodles by water-containing fillers by utilizing hydrogel, and also provides a new method of introducing hydrogel phase material to process with soap noodle to make low TFM composition bars. Generally, fillers are materials that can replace soap in a soap bar without adversely affecting the cleansing property of the soap bar. The present invention utilizes hydrogel as a filler. A hydrogel is a gel which contains water but is not soluble in water. For example, when water is put on top of a hydrogel, the hydrogel and the water are clearly separated into two phases. Preferably, this hydrogel phase material is a three dimensional, metal-ions-caused, physically cross-linked network formed by polymer gelling agents, preferably polysaccharides or derivatives thereof. Preferably, the gelling agent is hydrophilic polymeric material that can form a three dimensional, physically cross-linked structure. Preferably the physical cross-link is thermoreversible such that the gelling is thermoreversible. Although hydrogel particles can be made by chemical cross-linking polymeric material, such as poly (2-hydroxyethyl methacrylate), carboxylated methylstarch, hydrolyzate of acrylonitrile-grafted starch, polyacrylamide, poly(acrylic acid) salt, hydrolyzate of vinyl acetatemethyl acrylate copolymer, polyoxyethylene, poly(vinyl pyrrolidone), polystyrene sulfonate, poly(vinyl alcohol), etc., by chemical reaction, radiation, or the like, the preferred physically cross-linked hydrogels, especially thermoreversible hydrogels, enable the hydrogels to be processed into particulate units of desirable physical and chemical property in the resulting soap bars.

[00032] The preferred polymeric gelling agent is a polysaccharide (which can include natural polysaccharides or derivatives thereof) that can be easily dissolved in water at suitable temperature and form hydrogel when cooled to a lower temperature, e.g., room temperature, in some cases through the use of cations. Suitable polysaccharide-related materials suitable for forming the hydrogel include carrageenan,

konjac gum, agar/agarose, locust bean gum (carob gum), cassia gum, gellan gum, alginate, and combinations thereof.

[00033] A preferred gelling agent is carrageenan. Carrageenan is a high molecular weight linear polysaccharide comprising repeating galactose units and 3,6-anhydrogalactose (3,6 AG), both sulfated and non-sulfated, joined by alternating α -(1,3) and β -(1,4) glycosidic links. The main species of *Rhodophyceae* used in the commercial production of carrageenan include *Euchema cottonii* and *E. spinosum*. Generally the types of carrageenans include kappa, iota, and lambda, the molecular weight of the carrageenans is from 5×10^4 to 70×10^4 Dalton. Different types of carrageenans might form gels of different softness or toughness characteristics. Due to the better gelling property, Kappa and Iota carrageenans are more preferred, and Kappa carrageenan is even more preferred for forming hydrogels for the soap bar of the present invention. Carrageenans are available as stable sodium, potassium, and calcium salts or, most generally, as a mixture of these. All carrageenans are dispersible in cold water, and when heated above 80°C they are completely dissolved. During cooling process Kappa and Iota carrageenans form double helix molecular structures cross-linked by potassium and calcium ions, forming a tridimensional gel-type network. It has been found that carrageenan has to be dispersed well before its solubilization to avoid the formation of lumps and to obtain its complete functionality. Carrageenan is preferably premixed with other dry ingredients, adding into cold liquid with agitation to solubize the carrageenan. To achieve the more preferred gelling/melting point, potassium is the most effective metal ion to modify the gelling/melting point of carrageenan.

[00034] It has been found that there is a synergetic interaction between selected polysaccharides and other small molecules to improve the gel properties, especially between carrageenan and konjac gum. A combination of carrageenan and konjac gum is a more preferred gelling material because they provide gels of especially suitable gelling strength and processing parameters conducive for easy processing, such as mixing and forming hydrogel particles of the desirable sizes. Preferably, the ratio of carrageenan to konjac gum in wt% is about 1:10 to 10:1, more preferably about 6:4 to 4:6. With such preferred ranges, the resultant hydrogel can contain a large amount of

water, is easily processed, and yet produces particulates of desirable sizes in the soap bar. It was found that higher gel rigidity improves the breaking up of the hydrogel chunks to form smaller particles as the soap mix is being mixed. Thus, the synergistic interaction of carrageenan and konjac improves gel strength and leads to smaller particles which reduce the grainy feeling of the resultant soap bar. Konjac contains the konjac mannan in their tubers. Konjac mannan is a heteropolysaccharide consisting of β -D-glucose (G) and β -D-mannose (M), with a G/M ratio of 1 to 3. The typical average range of konjac's molecular weight is 0.1×10^5 to 10×10^6 Dalton. The primary gelling agent or polysaccharide (such as carrageenan) builds up the three-dimensional cross-linked network to hold the structure and bind water. Any synergistic interaction with the three dimensional cross-linked network by other polymers (such as konjac) that can be used to enhance the structure or increase the water retention capability can be used for the formation of hydrogel. Similar to the synergetic interaction between carrageenan and other gums, locust bean gum (carob gum) or konjac gum or selected polyols can be used to help improve the hydrogel water retention capability.

[00035] It is desirable that the hydrogel particles are small enough that they do not produce a sensation of roughness to the consumers and small enough to allow beneficial material, such as glycerin or fragrance enclosed in the hydrogel particles to be released. It is desired that 95% (by number %, not wt%) of the diameter of the hydrogel particles is in the range of about $1\mu\text{m}$ to $200\mu\text{m}$, more preferably about $5\mu\text{m}$ to $100\mu\text{m}$, more preferably $5\mu\text{m}$ to $60\mu\text{m}$. Generally in soap bars, once the particle size is smaller than $60\mu\text{m}$, it will not be noticeable in daily use for consumers. If the particle size is larger than $60\mu\text{m}$, the consumer will be able to notice the particles. If the particles are hard, such as certain inorganic fillers, talc, calcite and so on, they will result in a highly undesirable grittiness feel to consumers. If the particles are soft or elastic, they provide a massaging function, which is considered pleasurable to some consumers. The present invention also provides a robust formulation design with a wide range of particle size distribution. It is contemplated that the polysaccharides can be modified to form derivatives slightly different from the natural polymers and still retain significant water binding ability. The polysaccharide can be modified, e.g., to form hydroxyalkyl (e.g., hydroxypropyl) derivatives, cationic derivatives, and the like.

Methods of making hydroxyalkyl and cationic polymers from polysaccharides are known in the art.

[00036] To allow the hydrogel phase particles to form well, in one aspect, it is preferred that the hydrogel is a thermoreversible gel. In thermoreversible gels, the gel network is a physically cross-linked network in which the physical cross-links can be disrupted by heat therefore allowing the gel to melt and yet to re-gel again when the heat is removed, rather than a network chemically cross-linked by covalent bonds. Other than carrageenan, konjac, and agar, other thermoreversible gels, such as synthetic materials can also be used. US5306501 is an example illustrating thermoreversible polyoxyalkylene block copolymers. The thermoreversible gel is advantageous because the hydrogel solution can be charged into a mixer and allowed to form a gel that is easy to break into chunks and particles. The hydrogel is dispersed among the soap noodle material and cools in the mixer to form a gel, which gets broken down into small pieces and particles. The hydrogel particles can be dispersed among the soap noodle material. On the contrary, nonthermoreversible covalently cross-linked gels are hard to break and therefore would have been hard to mix well with soap noodles.

[00037] Hydrogel particles of the present invention can be used to replace soap noodle to a significant amount. The hydrogel can be used at any percentage of the final soap formulation up to about 50wt%, preferably about 5wt% to 45wt%, more preferably about 5wt% to 35wt%, and even more preferably about 5wt% to 25wt%. The preferred ranges of hydrogel amount result in soap bars that are relatively easy to process and produce desirable cleansing property. In terms of water content in the finished soap bar, the finished soap bar generally contains 15wt% to 50wt%, preferably 15wt% to 30wt%, preferably 15wt% or more, more preferably 20wt% to 25wt% of water. In terms of the amount of hydrogel content in the soap bar, the gelling material (such as a polysaccharide such as Kappa carrageenan, or a combination of gellants) constitutes preferably about 0.05wt% to 10wt%, more preferably about 0.1wt% to about 5wt% of the soap bar.

[00038] The inclusion of hydrogel phase material in the soap bar provides advantages over soap bars in which the gelling material is not a hydrogel that gels from a true hydrogel solution, not merely swollen gelling particles. In the hydrogel phase particulates of the present invention, included constituents are incorporated into the hydrogel solution when the gel is made before the hydrogel is broken up into particulate units. Thus, the included constituents are more evenly distributed in the hydrogel particles and do not easily leach out of the hydrogel particles during the soap-bar-making process, even under pressure or in an elevated temperature, such as those present in the mixing, milling, extruding and stamping processes. This significantly reduces the loss of fragrance during process (if fragrance is included), reduces the viscosity to allow easier mixing if glycerin is included, and facilitates mixing and the breaking of hydrogel chunks into smaller particulates if talc or other inorganic powdery materials are included in the hydrogel.

[00039] In the present invention, the hydrogel is made to include a large amount of water when it is mixed with the soap noodle in an amalgamator or mixer. Since the hydrogel is made by dissolving in hot water and then gelled, it is a hydrogel with a cross-linked network binding water in a more or less uniform fashion over the whole gel. Particles formed from this hydrogel can therefore be formed coreless. In fact, as the hydrogel particles become affixed in the soap bar, some of the water from the hydrogel may become lost to the soap base and to the atmosphere, the concentration of water at the inner or more central part of the hydrogel particle is no less than that at the more peripheral part of the hydrogel. Hydrogel constituents such as talc, humectant, certain fragrance, etc., that do not cross the hydrogel phase into the soap base or leave the hydrogel particle easily, would remain at a relatively uniform concentration in the hydrogel bulk even if the hydrogel containing soap bar is placed in commercial storage in a stable condition for a period of time. Thus, the hydrogel particles are unlike gelling particles that are simply mixed in the soap mix or in a liquid with wetting the gelling material. Gelling particles if merely dispersed in the soap base mixed with water or dispersed in an aqueous solution or water to absorb water without dissolving will simply swell. Such swelling requires water to slowly migrate into a dry core. Thus, the gelling material will form a swollen particle with a core that has less water than the

peripheral part of the particle. In some cases, the core may never even become hydrated since the peripheral part of the particle impedes water penetration and water does not diffuse into dry material. Thus, the outer part of the swollen particle may be very wet but the inside may be dry. Such swollen particles if formed by absorbing an aqueous solution via dispersing the gelling agent in an aqueous solution may lose a significant amount of the aqueous solution originally held in the swollen particles when the swollen particles are placed under pressure causing the soap mix (i.e., the material that includes soap base and hydrogel that is being mixed) to become soft or mushy during processing, as when the soap mix is processed through milling, extruding and stamping, etc. Thus, excipients such as vitamins, fragrance, etc., that are originally absorbed into the gelling material during wetting by the aqueous solution can easily be lost during processing of the soap mix into a soap bar.

[00040] In the formation of certain hydrogel particles, such as from carrageenan material, waiting for the hydrogel solution to start to gel before mixing into the soap noodle base allows the hydrogel to form into phase chunks and particles to be mixed with the soap base in the mixer rather than as a mixture of water and gelling material particles.

[00041] Comparing with the traditional soap finishing process, in the present invention, only an extra pre-mixer is needed for making hydrogel solution. The following indicates a set of general steps for a modified soap finishing process. To make a thermoreversible hydrogel, water is put into a pre-mixer, and gelling agent (e.g. polysaccharides such as carrageenan and konjac gum) and other additives (e.g., talc and glycerin) are added into the water, and the material is agitated and heated (for example, to about 90°C). The relevant salts (e.g., KCl for carrageenan), if needed, are then added to the mixture solution. The mixture solution is then cooked for a period of time, e.g., 4-10 minutes to ensure that the gelling material is dissolved well to form a homogenous solution mixture. Insoluble materials such as talc, if included, may be present in the hydrogel solution mixture. Preferably such insoluble materials are also relatively well mixed in the solution such that when made into particles, the insoluble materials particles will be distributed substantially uniform in a particle. At this time, the

hydrogel solution is charged into a mixer to be mixed with soap noodle and other additives immediately. As the hydrogel solution gels as it is being mixed by agitators with the soap noodle and other additives, it becomes well dispersed among the soap noodle material and forms the hydrogel particles in-situ when the temperature drops during the mixing, the larger pieces and chunks of hydrogel are broken into smaller pieces. The hydrogel phase particles will eventually become embedded in the soap matrix after a soap bar is formed.

[00042] The mixed material is then processed further by other processing steps such as milling, extruding and stamping, etc. FIG. 2 illustrates a flow chart of a typical process of the present invention. The illustrative process includes premixing the hydrogel agent with ingredient materials and water in a heated pre-mixer 16. The premixed material is charged into a mixer 18 and mixed with soap noodles. The mixed material is then further processed in a refiner 20, miller 24, plodder 28, and a stamper 32, which are well known soap making machines. Generally, the material is mixed by extrusion through orifices in a refiner, extruded into thin sheets in a miller, and extruded into solid soap rods in a plodder. The soap rod is cut and stamped into soap bars. Through this process, the material becomes well mixed in the soap base mix and particulate ingredients in the soap base mix are dispersed and well distributed in the resultant soap bar.

[00043] In a simple form, the soap making method of the present invention will not require great changes the traditional soap finishing process, but merely the inclusion of a simple pre-heating pre-mixer vessel for making the hydrogel solution. Using the hydrogel as the soap noodle replacement, the replacement percentage range can be achieved up to 45wt% based on formulation, preferably up to 35wt%. To make sure the polysaccharides solution can form gels that can act as the solid filler, the gel strength and gelling point can be control for effective processing. Metal cations, polyols and synergetic interaction between polysaccharides can be used to facilitate the hydrogel formation for this invention.

[00044] It is contemplated that the hydrogel solution can be formed into small particles before being mixed with the soap noodles. It is contemplated that the hydrogel solution can be sprayed or spun into droplets to mix with soap noodles, thereby forming hydrogel phase particles in the soap base mix. It is further contemplated that the hydrogel can gel and broken up into particles before mixing into with the soap noodles.

[00045] Apart from thermoreversible gels, other polysaccharide gels or their derivatives that can form hydrogels can also be used to form soap bars of the present invention. For example, alginate, gellan gum, carob gum, and the like, can be made to gel by interacting with certain cations. For example, alginate or gellan gum can be made to gel by introduction of calcium ions and carob gum can be made to gel at about pH 5.5 to 7 in the presence of sodium borate. By using the appropriate amount of the cations in relation to a suitable amount of gelling material and water, gelling can be controlled so that as the gel solution is gelling, the gelling solution is charged into the mixer to be mixed with the soap base to form the soap mix. Such gels are cross-linked by physical interactions with the aid of ions, which can be controlled easier and therefore more preferred than covalently cross-linked gels. For example, the gelling of the gellan gum can be controlled by the amount of cations added and the temperature. Thus, the cross-linking in the cation controlled hydrogels, e.g., gellan gum, alginate, etc., are based on the physical interference between strands of the gellant polymer, rather than by covalent bonds. As the hydrogel is formed and broken down by mixing and agitation, hydrogel particles of the right dimensions can be made.

[00046] Many different ingredients can be advantageously used in the hydrogel particles. Suitable materials can be solid, liquid, semi-liquid, etc., and can be hydrophilic or even hydrophobic. For a hydrophobic material, dispersing aids such as emulsifiers can be used to interact with various ingredients so as to allow even distribution of the ingredients in the hydrogel. Flavor and fragrances, such as those traditionally known in the art, can be incorporated into the hydrogel by use of gelling agents. Dispersing aids, emulsifiers, etc., and other aids for aiding the incorporation of hydrophobic materials, such as fragrance oils, are known in the art and widely used for flavor release technology. Making use of different gelling mechanisms and interactions

with the flavoring compounds, the flavor release can be easily controlled. For example, by controlling the hydrogel particle size, the hardness of the gel, the water content, the emulsifying system, etc., the release of the flavor or fragrance can be controlled in the soap design. With the benefit of the present invention disclosure, fragrance release benefit can be easily achieved using hydrogel particles.

[00047] Another useful ingredient in the hydrogel is processing aid, such as inorganic powdery material, e.g., talc, calcite, kaolin, silicon dioxide, titanium dioxide, diatomaceous earth, etc. We found that such inorganic powdery material included in the hydrogel facilitates the breaking up of the hydrogel in the mixing process with the soap noodles so that hydrogel particles can be made into particles of suitable sizes with high efficiency. Talc, calcite and kaolin are preferred material. An even more preferred inorganic powdery materials are talc and calcite. Generally, the inorganic powdery material is added to make the hydrogel solution in the range of a weight percentage of inorganic powdery material to hydrogel of 1.0wt% to 40wt%, more preferably from about 2.0wt% to 30%, and even more preferably about 5wt% to about 25wt% of the hydrogel. Preferably the inorganic powdery material in the soap bar is about 0.05wt% to 16wt%, more preferably from about 0.1wt% to 12wt%, and more preferably about 0.25wt% to about 10wt%. Generally, the particle size of the inorganic powdery material is higher than about 200 meshes.

[00048] Water is major component of the hydrogel phase particles. Preferably, more water is contained in the hydrogel phase particles than in the soap base material outside of the hydrogels. Preferably, most of the water that is in the resultant soap bar is in the hydrogel phase particles and there is less, preferably very little water in the soap bar outside of the hydrogel phase particles. Preferably, more than 90% of the water is in the hydrogel particles. In this way, the hydrogel, containing an amount of water and acting as fillers, will interfere less with the soap noodle mixing than the equivalent amount of free water directly in the soap base mix. In the hydrogel phase particles, preferably water constitutes more than about 50wt%, more preferably about 50wt-90wt%, more preferably about 50wt% to 75wt%. It has been found that after the hydrogel solution has been charged into the mixer and the soap base mix processed into

soap bars, the weight loss due to water evaporation is less than about 2.0% of the water present in the formulation. It has been found that the water that is in the hydrogel phase does not migrate rapidly out of the hydrogel particles into the soap matrix material rapidly with time. Thus, as observable by average consumers, the soap bar does not become wet or mushy in storage under normal ambient room condition. Soap noodles themselves sometimes contain a little water, such as about 8wt% to 15wt%. Thus, knowing the approximate water content of the soap noodle, the water content of the soap bar after manufacture can be estimated, and can also be determined by experiments, such as by removing all the water by evaporation.

[00049] The hydrogel phase can optionally further contain a humectant. Humectants can be selected from the group consisting of polyhydric alcohols (polyols), water soluble alkoxylated nonionic polymers, and mixtures thereof. The humectants contained in the hydrogel can be used at levels of the composition from about 0.1wt% to 30wt%, more preferably from about 0.5wt% to 25%, and more preferably about 5% to about 20% of the hydrogel. Polyhydric alcohols useful herein include glycerin, sorbitol, propylene glycol, butylene glycol, hexylene glycol, ethoxylated glucose, 1, 2-hexane diol, hexanetriol, dipropylene glycol, erythritol, trehalose, diglycerin, xylitol, maltitol, maltose, glucose, fructose, and mixtures thereof. Water soluble alkoxylated nonionic polymers such as polyethylene glycols and polypropylene glycols are useful as well. A particularly useful humectant is glycerin. Humectants can benefit users as moisturizers when contacting the skin.

[00050] It is noted that it is a well known facts that humectants, such as glycerin, glycols, etc., that are viscous liquids tend stick to other materials to make the mixing process difficult to control if present in the material being mixed. Thus, if gelling material and humectants are directly mixed with soap noodles and water, the mixing material tends to become highly viscous and difficult to handle. For the present invention, in which the humectant(s) are included in the hydrogel instead of being present in substantial quantity in the soap base mix material, the viscosity of the mixing material is reduced substantially compared to having the humectants in the soap base directly. The humectant, e.g., glycerin, can be present in the hydrogel in an amount of

0.1wt% to 60wt%, more preferably from about 5wt% to 50wt%, and even more preferably about 10wt% to about 40wt% of the hydrogel.

[00051] It is noted that surfactants also can be added into the hydrogel filler to further improve the lathering properties and skin feeling during use. The synthetic surfactants can be used in this invention include anionic, amphoteric, nonionic, zwitterionic, and cationic surfactants. Synthetic surfactants can generally be used in the present hydrogel filler at a level of from 0.1wt% to about 40wt% in hydrogel filler, preferably from about 0.5wt% to about 20wt%.

[00052] Examples of anionic surfactants include but are not limited to alkyl sulfates, anionic acylsarcosinates, methyl acryl taurates, N-acyl glutamates, acyl isethionates, alkyl ether sulfates, alkyl sulfosuccinates, alkyl phosphate esters, ethoxylated alkyl phosphate esters, trideceth sulfates, protein condensates, mixtures of ethoxylated alkyl sulfates and the like. Alkyl chains for these surfactants are C8-C22, preferably C10-C18. Zwitterionic surfactants can be exemplified by those which can be broadly described as derivatives of aliphatic quaternary ammonium, phosphonium, and sulfonium compounds, in which the aliphatic radicals can be straight chain or branched and wherein one of the aliphatic substituents contains from about 8 to 18 carbon atoms and one contains an anionic water-solubilizing group, for example, carboxy, sulfate, sulfonate, phosphate, or phosphonate. Examples include: 4-[N, N-di(2-hydroxyethyl)-N-octadecylammonio]-butane-1-carboxylate; 3-[N, N-dipropyl-N-3-dodecoxy-2-hydroxypropylammonio]-propane-1-phosphonate. Examples of amphoteric surfactants which can be used in the hydrogel filler are those which can be broadly described as derivatives of aliphatic secondary and tertiary amines in which the aliphatic radical can be straight chain or branched and wherein one of the aliphatic substituents contains from 8 to about 18 carbon atoms and one contains an anionic water solubilizing group, e.g., carboxy, sulfonate, sulfate, phosphate, or phosphonate. Examples of compounds falling within this definition are sodium 3-dodecylaminopropionate, sodium 3-dodecylaminopropane sulfonate; N-alkyltaurines, such as the one prepared by the reacting dodecylamine with sodium isethionate according to the teaching of U.S. Pat. No. 2,658,072; N-higher alkyl aspartic acids, such as those produced according to the

teaching of U.S. Pat. No. 2,438,091. Other amphoterics such as betaines are also useful in the hydrogel filler. Examples of betaines useful herein include the high alkyl betaines such as coco dimethyl carboxymethyl betaines, lauryl dimethyl carboxy-methyl betaine, lauryl dimethyl alpha-carboxyethyl betaine, cetyl dimethyl carboxymethyl betaine, lauryl bis-(2-hydroxyethyl)carboxymethyl betaine, stearyl bis-(2-hydroxypropyl)carboxymethyl betaine, oleyl dimethyl gamma-carboxypropyl betaine, and the like. Examples of suitable cationic surfactants include stearyl dimethylbenzyl ammonium chloride; dodecyltrimethylammonium chloride; nonylbenzylethyldimethyl ammonium nitrate; tetradecylpyridinium bromide; laurylpyridinium chloride; cetylpyridinium chloride; laurylpyridinium chloride; laurylisoquinolium bromide; dilauryldimethyl ammonium chloride; and stearylalkonium chloride; and other cationic surfactants known in the art. Nonionic surfactants used in the hydrogel filler can be broadly defined as compounds produced by the condensation of alkylene oxide groups (hydrophilic in nature) with an organic hydrophobic compound, which may be aliphatic or alkyl aromatic in nature.

[00053] The hydrogel filler can optionally contain other beneficial agents, including hydrophilic and/or hydrophobic beneficial agents. Beneficial agents include other polyols, vitamins, drugs, nutrients, permeation enhancers, colorants, sunblocks, anti-bacterial ingredients, etc. Many of such beneficial agents are well known and commercially available. Further, in the soap bar, external to the hydrogel filler particles, many optional materials can also be included. Beneficial agents, surfactants, salts, fatty acids, structurants, other fillers (such as inorganic fillers), colorants, fragrance, processing aids, etc., as known to those skilled in the art, and can also be included as such optional material in the soap bar. If needed, the pH range of the hydrogel can be adjusted to be compatible with some of the beneficial agents.

[00054] The following examples illustrate the soap bars that can be formed with the present invention. All percentages are wt% unless clearly specified otherwise in the content.

Example 1:

[00055] The following method was used in making soap bars: Charge the amount of water and sorbitol according to the formula into the pre-mixer, stir at room temperature, and add the talc (or calcite or other powdery material) into the pre-mixer. Stir the material in the pre-mixer at 500 – 600 rpm for a few minutes to disperse the ingredients evenly. Heat the solution to 50- 60 °C, add the carrageenan into the solution, increase the stirring speed to 800 rpm, continue to heat the solution to 85°C, and maintain the temperature until the carrageenan is totally dissolved. Then add the KCl to the solution and keep the temperature for a few minutes to totally dissolve the KCl. Charge the soap noodle and other additives into a double sigma mixer to mix for a few minutes until the soap noodle is totally broken down to very small powdery form, then charge the hot hydrogel solution into the double sigma mixer once the solution is ready. Mix them for a few minutes and charge them into the refining machine and follow by milling, extruding, extruding, and stamping.

Table 1 Soap bar formulations with carrageenan hydrogel fillers (contents in wt%)

Ingredients	Control	1	2	3	4	5	6
Soap noodle	98.70	83.26	77.96	77.30	80.16	80.16	80.16
Titanium Dioxide	0.20	0.20	0.20	0.20	0.3	0.3	0.3
EDTA	0.1	0.10	0.10	0.10	0.1	0.1	0.1
Fragrance	1.0	1.00	1.00	1.00	1.0	1.0	1.0
Carrageenan	-	0.27	0.37	0.70	0.27	0.27	0.27
KCl	-	0.17	0.37	0.70	0.17	0.17	0.17
Talc	-	2.50	2.50	-	3.0		0
Calcite	-	-	-	-	-	3.0	3.0
Sorbitol	-	-	-	-	5.0	5.0	5.0
Surfactant	-	-	-	-	-	-	1.5
Water	-	12.50	17.50	20.00	10.0	10.0	8.5
Hydrogel Dosage	0	15.44	20.74	21.40	18.44	18.44	18.44

Gel Break Strength g/cm ²	-	2266	2089	4825	1342	2320	1431
Gelling Point / °C	-	68 ± 2	75 ± 2	92 ± 2	72±2	82±2	74±2

[00056] Table 1 shows the characteristics of milled soap bars made with the above described process. The carrageenan used in these examples was kappa-carrageenan, code name E407, obtained from Shanghai Brilliant Gum Co., Ltd. In Table 1, the hydrogels were formed from water, carrageenan and KCl and in some cases included talc as an ingredient. For comparison, a control bar was made of soap noodles (98.7wt%), EDTA, fragrance, and 0.2wt% titanium dioxide without any other filler material. The hydrogel soap bars all contained the same wt% in relation to the soap bar formulation of EDTA and fragrance as the control, and either 0.2 wt% or 0.3wt% of titanium oxide present in the base mix (i.e., the base material that does not have hydrogel fillers). The gel strength was measured using the Standard test method used in food industry using a TA.XTPlus Texture Analyzer with a 0.5inch (1.27cm) Radius Cylinder (P/0.5R) Cylinder probe. The international standard test method named ISO 9665: 1998(E) can be used with the following settings: test mode is compression, pre-test speed is 0.5 mm/sec, test speed is 0.5mm/sec, post-test speed is 0.5mm/sec, target mode is distance, trigger type is force, trigger force is 5g. Said ISO 9665: 1998(E) testing method, as described in International Method – Adhesives-Animal Glues-Methods of Sampling and Testing, ISO 9665, Second Edition (1998-09-15) is herein incorporated by reference. All gel strength measurements in this application were done with this method. The gelling point was tested by the following method: Put the polysaccharide solution into a 95°C water bath to make sure the solution would not form a gel. Control the temperature decreasing rate of the water batch at 1°C/min, and record the temperature when the solution forms the hydrogel. We were able to incorporate from about 10 to 20wt% of water into the soap formulation and form stable soap bars with the traditional mixing, refining, milling, extruding, and stamping processes.

Table 2 Performance results of soap bars of Table 1

Parameters	Control	1	2	3	4	5	6
Foam Volume/cm	21.0	22.0	21.8	22.0	21.0	21.3	21.0

[00057] Table 2 shows the foaming performance of the soap bars of Table 1. The forming method used was the Ross-Mile test method (ISO696-1975 or GB7462-87) at soap concentration of 0.5g/L and a water hardness of 150 ppm. The same method was used in all foaming performance tests in this application. It is generally accepted by skilled artisans in soap technology that foaming performance (foam volume/cm) is a representation of the cleansing property of a soap bar. Table 2 shows that the soap bars of Table 1 have similar cleansing property. Thus, the soap bars that contain a large amount of water in hydrogel fillers performed similarly well as the control bar that did not contain any water containing filler.

Table 3 Soap bar formulations with hydrogel fillers formed by carrageenan/konjac (contents in wt%)

Ingredients	7	8	9	10	11	12	13	14*
Soap noodle	87.81	82.67	77.99	77.67	72.97	67.97	67.97	62.90
Titanium Dioxide	0.30	0.30	0.20	0.30	0.30	0.30	0.30	0.30
EDTA	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Fragrance	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Carrageenan	0.11	0.16	0.19	0.16	0.27	0.27	0.27	0.30
Konjac	0.09	0.14	0.18	0.14	0.18	0.18	0.18	0.20
KCl	0.09	0.14	0.35	0.14	0.18	0.18	0.18	0.20
Talc	-	-	2.50	-	-	5.00	-	10.0
Sorbitol	-	-	-	5.00	-	-	-	10.0
Glycerin	0.50	0.50	-	0.50	10.00	10.00	12.50	-

Water	10.00	15.00	17.50	15.00	15.00	15.00	17.50	15.00
Hydrogel Dosage	10.80	16.00	20.80	20.40	25.60	30.60	30.60	35.70
Gel Break Strength (g/cm ²)	4252	4252	-	3842	3079	2402	670	-
Gelling Point / °C	63 ± 2	63 ± 2	-	67 ± 2	82 ± 2	85 ± 2	80 ± 2	-

a: The hydrogel solution of this Number 14 example was very viscous and paste-like. It gelled very quickly during the transferring from the glass beaker into the container. The gel formed before it could be put into the container. So the gel strength and gelling point were not tested by the test methods we used for measuring these two parameters in the other samples.

[00058] Table 3 shows the formulations of soap bars that contain hydrogel phase fillers made from carrageenan, konjac, KCl, and water and include ingredients selected from glycerin, sorbitol and talc. The hydrogel dosage varied from about 11wt% to 36wt% in the formulation and the amount of water in the hydrogel fillers varied from about 10wt% to 17.5wt%. The soap noodle content varied from 63wt% to 88wt%.

[00059] It was observed that in general, the higher the gelling point of the hydrogel, the sooner the polysaccharides solution will form the hydrogel phase during mixing with soap noodles. Thus, higher water retention during mixing with soap noodle for hydrogel can be achieved. Preferably, the soap bars of the present invention are made from hydrogels that have a gelling temperature of about 35°C to 95°C, more preferably 45°C to 85°C. Also, it was observed that the higher gel strength the hydrogel, the higher the water retention capability that can be achieved. Preferably, the soap bars of the present invention are made from hydrogels that have gel strength of 200g/cm² to 15000g/cm², more preferably 600g/cm² to 6500g/cm².

Table 4 Performance results of the soap bars of Table 3

Parameters	7	8	9	10	11	12	13	14
Foam Volume /cm	21.5	21.0	21.0	21.0	21.4	21.2	21.4	21.4

[00060] Table 4 shows the foaming performance of the soap bars of Table 3. The forming method used was the Ross-Mile test method at soap concentration of 0.5 g/L at a water hardness of 150 ppm. Table 2 and Table 4 show that the soap bars of the two tables have similar cleansing property. Thus, the soap bars that contain a large amount of water in hydrogel fillers performed similarly well as the control bar that did not contain any water containing filler.

Table 5 Soap bar formulations with agar hydrogel fillers (contents in wt%)

Ingredients	15	16	17	18
Soap noodle	85.94	80.83	74.90	69.90
Titanium Dioxide	0.20	0.20	0.20	0.20
EDTA	0.10	0.10	0.10	0.10
Fragrance	1.00	1.00	1.00	1.00
Agar	0.26	0.37	0.80	0.80
Sorbitol	-	-	5.50	5.50
Talc	-	-	-	5.00
Water	12.50	17.50	17.50	17.50
Hydrogel Dosage	12.76	17.87	23.8	29.0
Gel Break Strength g/cm ²	1086	1086	831	1886
Gelling Point °C	43 ± 2	43 ± 2	50 ± 2	70 ± 2

[00061] Table 5 shows the formulations of hydrogel soap bar made from agar. Agar is a strongly gelling hydrocolloid from marine algae. Its main structure is chemically characterized by repetitive units of D-galactose and 3, 6-anhydro-L-galactose, with few variations, and also a low content of sulfate esters. Useful molecular weight of agar is from 1×10^4 to 5×10^6 Dalton. The agar used in these examples was obtained from Shanghai Brilliant Gum Co., Ltd, with a code name

BLR6001. The hydrogel dosage varied from 13wt% to 29wt%. The water content in the hydrogel varied from about 12.5wt% to 17.5wt% of the soap bar formulation material.

Table 6 Performance results of soap bars of Table 5

Parameters	Glycerin Bar ^a	15	16	17	18
Foam Volume/cm	21.0	21.8	22.2	21.6	19.8

a: The Glycerin Bar was a Savlon Bar with aloe vera (a soap product of Johnson & Johnson for India market, made by VVF limited, ingredients : sodium palmate, sodium palm kernelate, glycerin, water, fragrance, triclosan, Aloe Barbadensis Leaf Extract, CI 74260, CI 11680)

[00062] Table 6 shows the foaming performance of the soap bars of Table 5 and a commercial glycerin bar. Table 2 and Table 6 show that the soap bars of the two Tables have similar cleansing property. Thus, the soap bars that contained a large amount of water in agar hydrogel fillers performed similarly well as the control bar and the SAVLON glycerin bar that did not contain any water containing filler. Further, comparing Table 4 and Table 6 shows that glycerin bars can be made according to the present invention with hydrogel fillers that perform similarly with nonhydrogel commercial glycerin bars.

Table 7 Soap bar formulations with sodium alginate hydrogel fillers (contents in wt%)

Ingredients	19	20
Soap noodle	85.94	80.58
Titanium Dioxide	0.20	0.20
EDTA	0.10	0.10
Fragrance	1.00	1.00
Sodium Alginate	0.26	0.35
EDTA	-	0.17

CaCl ₂	0.00	0.1
Water	12.50	17.50
Hydrogel Dosage	12.76	18.12

[00063] Table 7 shows the formulations of hydrogel soap bar made from sodium alginate, which is not thermoreversible. The hydrogel dosage varied from 13wt% to 18wt%. The water content in the hydrogel varied from about 12.5wt% to 17.5wt% of the soap bar formulation material. Alginate is a family of unbranched binary copolymers of (1→4) linked β-D-mannuronic acid (M) and α-L-guluronic acid (G) residues of widely varying composition and sequence with a molecular weight range from 3×10^4 to 1×10^6 Dalton. For example, the commercial alginates produced from *Laminaria hyperborean*, *Macrocystis pyrifera*, *Laminaria digitata*, *Ascophyllum nodosum*, *Laminaria japonica*, *Eclonia maxima*, *Lessonia nigrescens*, *Durvillea Antarctica* and *Sargassum* can be used for the soap bars of this invention. For the hydrogel formed by alginate without CaCl₂, as an illustration, the 0.26wt% alginate was dispersed into the 12.5 wt % water, and the resulting solution was heated to 80°C. The solution was stirred continually at 800 rpm for adequate time until the alginate was totally dissolved. The solution was cooled to room temperature, at which point the solution formed a highly viscous paste and was charged into the mixer and mixed it with soap noodle and other ingredients. For the hydrogel formed by alginate with CaCl₂, the 0.10wt% CaCl₂ and 0.17wt% EDTA were dissolved into a 1wt% water portion, and the 0.35wt% alginate was dissolved into a 16.5wt% water portion to form the solutions containing the 17.5wt% water. The alginate solution was heated to 60°C. The CaCl₂/EDTA solution was added into the alginate solution slowly to ensure that the hydrogel can be formed properly. After the hydrogel solution has been formed, it was cooled to room temperature and charged into the mixer and mixed it with soap noodle and other ingredients.

Table 8 Performance results of soap bars of Table 7

Parameters	19	20
Foam Volume/cm	21.8	21.0

[00064] Table 8 shows that the soap bars that contained a large amount of water in sodium alginate hydrogel fillers performed similarly well as the control bar.

Table 9 Soap bar formulations with gellan gum hydrogel fillers (contents in wt%)

Ingredients	21	22
Soap noodle	85.91	83.14
Titanium Dioxide	0.20	0.20
EDTA	0.10	0.10
Fragrance	1.00	1.00
Gellan Gum	0.26 (LA)	0.38 (LA:HA =1:1) ^a
CaCl ₂	0.03	0.18
Water	12.50	15.00
Hydrogel Dosage	12.79	15.56
Gel Break Strength g/cm ²	4441	656

a: LA means low acyl gellan gum, HA means high acyl gellan gum, LA:HA=1:1 means the weight ratio of LA to HA is 1:1.

[00065] Table 9 shows the formulations of hydrogel soap bar made from gellan gum, which is not thermoreversible. The hydrogel dosage varied from 13wt% to 16wt%. The water content in the hydrogel varied from about 12.5wt% to 15wt% of the soap bar formulation material. The gellan gum used was an extracellular polysaccharide secreted by the micro-organism *Sphingomonas elodea* previously referred to as

Pseudomonas elodea with a molecular weight range from 3×10^4 to 2×10^6 Dalton. The primary structure of gellan gum used in this design is composed of a linear tetrasaccharide repeat unit: $\rightarrow 3)-\beta\text{-D-Glcp}-(1 \rightarrow 4)-\beta\text{-D-GlcpA}-(1 \rightarrow 4)-\beta\text{-D-Glcp}-(1 \rightarrow 4)-\alpha\text{-L-Rhap}-(1 \rightarrow$. The gellan gum was obtained from CP Kelco with a brand name KELCOGEL CG-HA for high acyl gellan gum and KELCOGEL CG-LA for low acyl gellan gum. The gellan gum hydrogel were made by the following process: The CaCl_2 was dissolved in de-ionized (DI) water to make a CaCl_2 solution, Gellan gum was added into DI water, and the dispersion was heated to 50-60°C to dissolve the gellan gum.

After the gellan gum was totally dissolved in the water, the CaCl_2 solution was added into the gellan gum solution, the solution was cooled to room temperature to form the hydrogel. The hydrogel was charged into the mixer and mixed with the soap noodle and other ingredients.

Table 10 Performance results of soap bars of Table 9

Parameters	21	22
Foam Volume/cm	21.6	21.6

[00066] Table 10 shows that the soap bars that contain a large amount of water in gellan gum hydrogel fillers perform similarly well as the control bar.

[00067] The practice of the present invention will employ, unless otherwise indicated, conventional methods used by those in soap product development within those of skill of the art. Embodiments of the present invention have been described with specificity. The embodiments are intended to be illustrative in all respects, rather than restrictive, of the present invention. It is to be understood that various combinations and permutations of various parts and components of the schemes disclosed herein can be implemented by one skilled in the art without departing from the scope of the present invention. Further, where a substance is described to comprise certain ingredients, it is contemplated that a substance in some cases can also be made consisting essentially of

the ingredients. All patent documents cited herein are incorporated by reference in their entireties herein.

REIVINDICACIONES

1. Un jabón sólido que puede molerse y que comprende:
una base de jabón en fase sólida; y
5 partículas de fase hidrogel incrustadas en la base de jabón.
2. El jabón sólido de la reivindicación 1, en donde las partículas de fase hidrogel contienen un agente gelificante de polisacárido.
- 10 3. El jabón sólido de la reivindicación 1, en donde las partículas de fase hidrogel contienen carragenina.
4. El jabón sólido de la reivindicación 1, en donde las partículas de fase hidrogel contienen al menos dos agentes gelificantes de polisacáridos diferentes.
- 15 5. El jabón sólido de la reivindicación 1, en donde las partículas de fase hidrogel contienen al menos carragenina y konjac.
6. El jabón sólido de la reivindicación 1, en donde el jabón sólido contiene al
20 menos 15 % en peso de agua y las partículas de fase hidrogel no tienen núcleo.
7. El jabón sólido de la reivindicación 1, en donde el jabón sólido contiene al menos 15 % en peso de agua y al menos 0,1 % en peso de poliol, en donde hay

más agua y más poliol en las partículas de fase hidrogel que fuera de las partículas en fase hidrogel.

8. El jabón sólido de la reivindicación 1, en donde el jabón sólido contiene al menos 15 % en peso de agua y las partículas de fase hidrogel que contienen al menos 2 % en peso de partículas inorgánicas en el jabón y hay más agua en las partículas de fase hidrogel que fuera de las partículas de fase hidrogel.
9. El jabón sólido de la reivindicación 1, en donde el jabón sólido contiene al menos 15 % en peso de agua y las partículas de fase hidrogel contienen al menos 2 % en peso de talco en el jabón, las partículas de fase hidrogel contienen carragenina y otro polisacárido.
10. El jabón sólido de la reivindicación 1, en donde el jabón comprende menos que 80 % en peso de sal alcalina de ácido graso o surfactante.
11. El jabón sólido de la reivindicación 1, en donde las partículas de fase hidrogel se forman a partir del hidrogel con punto de gelificación de 35 °C a 95 °C.
12. El jabón sólido de la reivindicación 1, en donde las partículas de fase hidrogel se forman a partir del hidrogel con resistencia de gel de 200 g/cm² a 15.000 g/cm².

13. El jabón sólido de la reivindicación 1, en donde las partículas de fase hidrogel se forman a partir del hidrogel con punto de gelificación de 45 °C a 85 °C y con resistencia de gel de 600 g/cm² a 6500 g/cm².
- 5 14. El jabón sólido de la reivindicación 1, en donde el jabón sólido contiene menos que 70 % en peso de sal alcalina de ácido graso o surfactante, contiene al menos 15 % en peso de agua, y las partículas de fase hidrogel contienen carragenina y otro polisacárido y al menos 1 % en peso de partículas inorgánicas en las partículas en fase hidrogel, y las partículas de fase hidrogel se forman a
10 partir del hidrogel con punto de gelificación de 45 °C a 85 °C y con resistencia de gel de 600 g/cm² a 6500 g/cm².
- 15 15. El jabón sólido de la reivindicación 1, en donde la partícula de fase hidrogel y la base de jabón sólido tiene índices refractivos que son cercanos de manera que el jabón sólido es transparente o translúcido.
16. El jabón sólido de la reivindicación 1, en donde las partículas de fase hidrogel constituyen 5 % en peso a 50 % en peso del jabón sólido.
- 20 17. Un método de fabricación de un jabón sólido, el método comprende:
proporcionar una base de jabón sólido;
formar una solución líquida de hidrogel; y

usar la solución líquida de hidrogel para formar las partículas de fase hidrogel dispersas en la base de jabón.

18. El método de la reivindicación 17, que comprende mezclar la solución
5 líquida de hidrogel con la base de jabón sólido y gelificar la solución líquida de hidrogel en las partículas de fase hidrogel dispersas en la base de jabón sólido.

19. El método de la reivindicación 17, que comprende romper las piezas de hidrogel más grandes en partículas de fase hidrogel más pequeñas cuando se
10 mezclan en la base de jabón.

20. El método de la reivindicación 17, que comprende enfriar una solución líquida de hidrogel caliente para permitir que un hidrogel de polisacárido forme partículas de fase hidrogel mientras se mezclan en la base de jabón.

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21. El método de la reivindicación 17, que comprende incluir partículas inorgánicas insolubles en agua en la solución líquida de hidrogel antes de que se formen las partículas en fase hidrogel.

22. El método de la reivindicación 17, que comprende usar agua que es 15 %
20 en peso o más del peso del jabón sólido para formar la solución líquida de hidrogel y que se forma a partir de la solución líquida de hidrogel en las partículas de fase hidrogel sin núcleo en el jabón sólido.

23. El método de la reivindicación 17, que comprende formar el jabón sólido con 70 % en peso o menos de materia grasa total por medio del uso de al menos una carragenina y konjac para formar la solución líquida de hidrogel, en donde la solución líquida de hidrogel, si se deja gelificar, resultará en un hidrogel con un punto de gelificación de 35 °C a 95 °C y resistencia de gel de 200 g/cm² a 15.000 g/cm².

24. Partícula de hidrogel para usar como relleno para una composición de limpieza, la partícula comprende un polímero hidrogel físicamente reticulado en una fase hidrogel que contiene agua, la partícula de hidrogel con un volumen de fase hidrogel rodeada por una superficie de fase, la superficie de fase permite que el material vaporizable o soluble en agua abandone el volumen de fase hidrogel cuando se usa la composición de limpieza.

What is claimed is:

1. A millable solid soap comprising:
solid phase soap base; and
hydrogel phase particles embedded in said soap base.
2. The solid soap of claim 1 wherein the hydrogel phase particles contains polysaccharide gelling agent.
3. The solid soap of claim 1 wherein the hydrogel phase particles contains carrageenan.
4. The solid soap of claim 1 wherein the hydrogel phase particles contains at least two different polysaccharide gelling agents.
5. The solid soap of claim 1 wherein the hydrogel phase particles contains at least carrageenan and konjac.
6. The solid soap of claim 1 wherein the solid soap contains at least 15wt% water and the hydrogel phase particles are coreless.
7. The solid soap of claim 1 wherein the solid soap contains at least 15wt% water and at least 0.1wt% polyol, wherein more water and more polyol are in the hydrogel phase particles than outside of the hydrogel phase particles.
8. The solid soap of claim 1 wherein the solid soap contains at least 15wt% water and the hydrogel phase particles containing at least 2wt% of inorganic particles on the soap and more water is in the hydrogel phase particles than outside of the hydrogel phase particles.

9. The solid soap of claim 1 wherein the solid soap contains at least 15wt% water and the hydrogel phase particles contain at least 2wt% of talc on the soap, the hydrogel phase particles containing carrageenan and another polysaccharide.
10. The solid soap of claim 1 comprising less than 80wt% fatty acid alkali salt or surfactant.
11. The solid soap of claim 1 wherein the hydrogel phase particles formed from hydrogel with gelling point from 35°C to 95°C.
12. The solid soap of claim 1 wherein the hydrogel phase particles are formed from hydrogel with gel strength of 200g/cm² to 15000g/cm².
13. The solid soap of claim 1 wherein the hydrogel phase particles are formed from hydrogel with gelling point from 45°C to 85°C and with gel strength of 600g/cm² to 6500g/cm².
14. The solid soap of claim 1 wherein the solid soap contains less than 70wt% fatty acid alkali salt or surfactant, contains at least 15wt% water, and the hydrogel phase particles contain carrageenan and another polysaccharide and at least 1wt% of inorganic particles in the hydrogel phase particles, and the hydrogel phase particles are formed from hydrogel with gelling point from 45°C to 85°C and with gel strength of 600g/cm² to 6500g/cm².
15. The solid soap of claim 1 wherein the hydrogel phase particle and the solid soap base have refractive indexes that are close such that the solid soap is transparent or translucent.
16. The solid soap of claim 1 wherein the hydrogel phase particles constitute 5wt% to 50wt% of the solid soap.
17. A method of making a solid soap comprising:
providing a solid soap base;

forming a hydrogel liquid solution; and
using the hydrogel liquid solution to form hydrogel phase particles dispersed in
said soap base.

18. The method of claim 17 comprising mixing the hydrogel liquid solution with the solid soap base and gelling the hydrogel liquid solution into the hydrogel phase particles dispersed in the solid soap base.
19. The method of claim 17 comprising breaking up larger pieces of hydrogel into smaller hydrogel phase particles when mixing in the soap base.
20. The method of claim 17 comprising cooling a hot hydrogel liquid solution to allow a polysaccharide hydrogel to form hydrogel phase particles while mixing in the soap base.
21. The method of claim 17 comprising including inorganic water-insoluble particles in the hydrogel liquid solution before forming the hydrogel phase particles.
22. The method of claim 17 comprising using water that is 15wt% or more of weight on the solid soap to form the hydrogel liquid solution and forming from the hydrogel liquid solution into coreless hydrogel phase particles in the solid soap.
23. The method of claim 17 comprising forming the solid soap with 70wt% or less of total fatty matter by using at least one of carrageenan and konjac to form the hydrogel liquid solution wherein the hydrogel liquid solution if allowed to gel will result in a hydrogel having a gelling point of 35°C to 95°C and gel strength of 200g/cm² to 15000g/cm².
24. Hydrogel particle for use as filler for a cleansing composition, comprising hydrogel polymer physically cross-linked in a hydrogel phase containing water, the hydrogel particle having a hydrogel phase bulk surrounded by a phase

surface, the phase surface allowing water soluble or vaporizable material to leave the hydrogel phase bulk as the cleansing composition is used.

ABSTRACT

A millable solid soap. The millable solid soap contains a solid phase soap base and hydrogel phase particles dispersed in said soap base. The hydrogel phase particles act as fillers to render a low total fatty matter solid soap.

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DECLARATION AND POWER OF ATTORNEY FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63) ☒ Declaration Submitted with Initial Filing ☐ Declaration Submitted after Initial Filing (Surcharge (37 CFR 1.16(e)) required)	Attorney Docket Number	J&J5243USNP
	First Named Inventor	Mac Lai
	COMPLETE IF KNOWN	
	Application Number	
	Filing Date	September 29, 2009
	Group Art Unit	
Examiner Name		

As a below named inventor, I hereby declare that:

My residence, mailing address, and citizenship are as stated below next to my name.
I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

SOAP BAR CONTAINING HYDROGEL PHASE PARTICLES
(Title of the Invention)

the specification of which

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☐ was filed on (MM/DD/YYYY) as United States Application Number or PCT International Application Number and was amended on (MM/DD/YYYY) (if applicable).

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NAME OF SOLE OR FIRST INVENTOR:		☐ A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any)) Mac		Family Name or Surname Lai	
Inventor's Signature <i>Mac Lai</i>		Date <i>Sept. 27, 2009</i>	
Residence: City Shanghai	State	Country China	Citizenship China
Mailing Address 3285 Dongchuan Road, Minhang District			
City Shanghai	State	ZIP 200245	Country China
I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.			
NAME OF SECOND INVENTOR:		☐ A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any)) Jayprakash		Family Name or Surname Vidwans	
Inventor's Signature		Date	
Residence: City Mumbai	State	Country India	Citizenship India
Mailing Address Lal Bahadur Shastri Marg, Mulund (West)			
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NAME OF THIRD INVENTOR:		☐ A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any)) Qian		Family Name or Surname Wu	
Inventor's Signature <i>Qian Wu</i>		Date <i>Sept. 27, 2009</i>	
Residence: City Shanghai	State	Country China	Citizenship China
Mailing Address 3285 Dongchuan Road, Minhang District			
City Shanghai	State	ZIP 200245	Country China

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☒ Declaration Submitted with Initial Filing ☐ Declaration Submitted after Initial Filing (Surcharge (37 CFR 1.16(e)) required)		OR	
Examiner Name			

As a below named inventor, I hereby declare that:

My residence, mailing address, and citizenship are as stated below next to my name.
 I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

SOAP BAR CONTAINING HYDROGEL PHASE PARTICLES
(Title of the Invention)

the specification of which

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I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

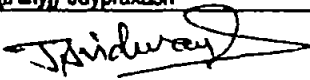
I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
			☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

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DECLARATION - Utility or Design Patent Application		
I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.		
Application Number(s)	Filing Date (MM/DD/YYYY)	☐ Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.
I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:		
Application Serial No.	Filing Date	Status
		Patented Patented Patented
AUTHORIZATION TO PERMIT ACCESS TO APPLICATION BY PARTICIPATING OFFICES ☐ If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), and any other intellectual property offices in which a foreign application claiming priority to the above-identified application is filed access to the above-identified patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, or other intellectual property office in which a foreign application claiming priority to the above-identified application is filed to have access to the application. In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the application-as-filed with respect to: 1) the above-identified application, 2) any foreign application to which the above-identified application claims priority under 35 USC 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the above-identified US application, and 3) any U.S. application form which benefit is sought in the above-identified application. In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing the Authorization to Permit Access to Application by Participating Offices.		
I hereby appoint: ☒ Practitioners at Customer Number 000027777 Place Customer Number Bar Code Label Here AND ☐ Practitioner(s) named below: <u>Name</u> <u>Registration Number</u>		
as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith.		
Address all telephone calls to Brett T. Freeman at telephone number (732) 524-3428.		
Direct all correspondence to: ☒ Customer Number ☐ or Bar Code Label 000027777		

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.			
NAME OF SOLE OR FIRST INVENTOR:		☐ A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any)) Mac		Family Name or Surname Lai	
Inventor's Signature		Date	
Residence: City Shanghai	State	Country China	Citizenship China
Mailing Address 3285 Dongchuan Road, Minhang District			
City Shanghai	State	ZIP 200245	Country China
I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.			
NAME OF SECOND INVENTOR:		☐ A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any)) Jayprakash		Family Name or Surname Vidwans	
Inventor's Signature 		Date 27 th Sept. 2009	
Residence: City Mumbai	State	Country India	Citizenship India
Mailing Address Lal Bahadur Shastri Marg, Mutund (West)			
City Mumbai	State	ZIP 400080	Country India
I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.			
NAME OF THIRD INVENTOR:		☐ A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any)) Qian		Family Name or Surname Wu	
Inventor's Signature		Date	
Residence: City Shanghai	State	Country China	Citizenship China
Mailing Address 3285 Dongchuan Road, Minhang District			
City Shanghai	State	ZIP 200245	Country China

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FIG. 1

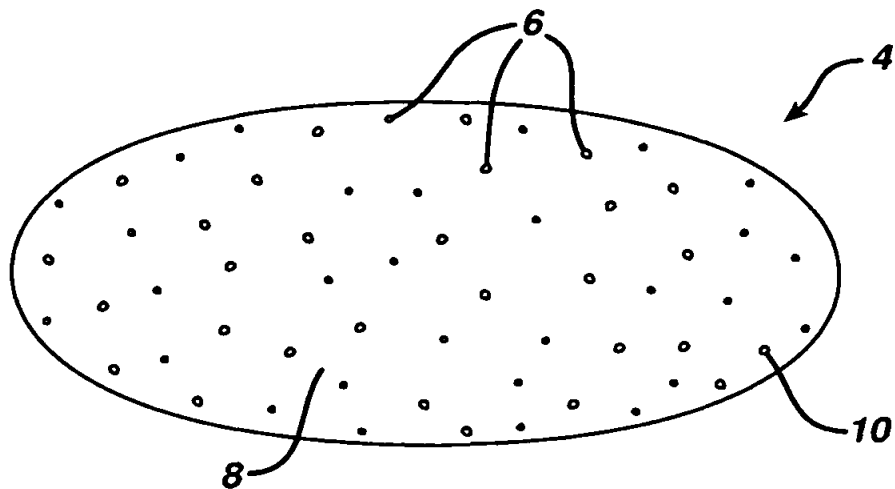
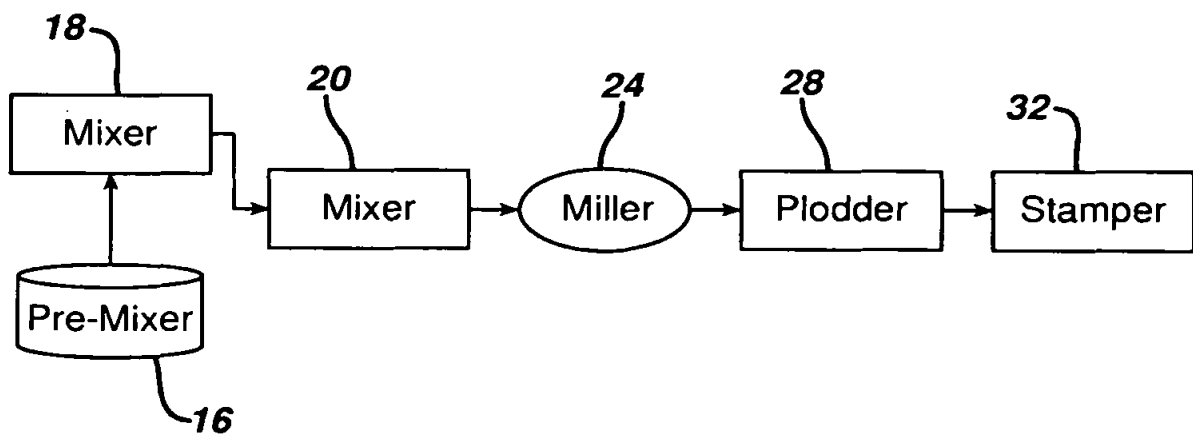


FIG. 2



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