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(54) Title: USE FOR HIGH-MOLECULAR-WEIGHT POLYMER AND COMPOSITION INCLUDING SAME

(54) 发明名称: 高分子聚合物的用途及其组成物

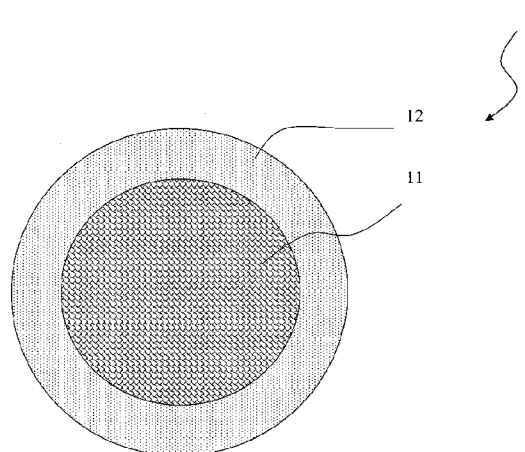


图 1 / Fig. 1

(57) Abstract: Provided are a high-molecular-weight polymer and a composition including same. Said polymer comprises polymer fibers, natural fibers, synthetic fibers, and a polymeric absorber. Said composition is prepared by combining said polymer with a biologically compatible vehicle. Said polymer and said composition can absorb a harmful substance that has entered an organism and eliminate said substance therefrom, preventing the organism from being harmed by said substance.

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(57) 摘要:

提供一种高分子聚合物及其组成物，该高分子聚合物包括高分子纤维、天然纤维、人造纤维和高分子吸收体，其组成物由前述高分子聚合物结合于生物可相容的赋形剂制备而成。前述高分子聚合物及其组成物可吸收进入生物体内的有害物质并将其排出体外，以保护生物体免于受到有害物质的伤害。

USE FOR HIGH-MOLECULAR-WEIGHT POLYMER AND COMPOSITION INCLUDING SAME

FIELD OF THE INVENTION

[0001] The present invention relates to a new use of a high molecular weight polymer and a composition thereof; especially the invention relates to a new use which applies a high molecular weight polymer in indirectly adsorbing or absorbing harmful or toxic substances existed or contained in body fluid or solution so that they can be removed, and a composition containing a high molecular weight polymer.

BACKGROUND OF THE INVENTION

[0002] A conventional high molecular weight polymer includes, for example, a natural biomedical polymeric material (such as a high molecular weight fiber or a polymer which is originated from animal including a collagen, a gelatin, a hyaluronic acid, a chitin, a chitosan and a derivative thereof and a high molecular weight fiber or polymer which is originated from plant including an alginates, a cellulose and a derivative thereof. Since it has excellent biocompatibility and bio-degradability and contains hydrolysable bonding, it can be degraded to small molecules in an organism, and is removed out of the body through a kidney filtering and metabolizing.

[0003] Those high molecular weight fibers and polymers might be used as a food additive due to well swelling property, so they can generate full sense after eating, and decrease dietary requirement to achieve the purpose of slimming. Moreover, the high molecular weight polymers comprise a lot of fiber so that they can improve the movement of the gastrointestinal tract and be used as a stool softener (such as Sterculia BP or Frangula BPC) to promote the defecation of a constipated patient.

[0004] However, the above mentioned applications of the high molecular weight fibers and polymers focus on their superior water adsorbability but other potential applications are ignored. Therefore, their actually industrial values are decreased.

OBJECT

[0004A] It is an object of the present invention to provide a composition, a use of a composition in the absorption of a toxin or harmful substance in a liquid or solution intaked into an organism and/or a use of a composition in the manufacture of a medicament for the absorption of a toxin or harmful substance in a liquid or solution intaked into an organism, or to at least provide the public with a useful choice.

DESCRIPTIONS OF THE INVENTION

[0005] In one aspect the present invention provides a use of a high molecular weight polymer in the absorption of body fluid (such as digestive juice) in an organism or of a liquid or solution to be intaked into an organism containing a toxin or harmful substance. That is, the use relates to direct absorption of a liquid or solution to indirectly adsorb the toxin or harmful substance therein, decrease of digestive juice in an organism, decrease of digestion and absorption of food in an organism and improvement of excretion of these harmful substances to prevent the organism from being damaged by the toxin or the harmful substance. These high molecular weight polymers have good biocompatibility, so they will not harm the health of an organism after being intaked into it.

[0006] The invention applies a high molecular weight polymer to a body fluid (such as digestive juice) in an organism or a liquid or a solution to be intaked into an organism so that harmful or toxic substances contained therein can be removed through indirect adsorption or absorption and excretion. Since most high molecular weight polymers have a common feature in adsorbing liquid, they can indirectly absorb the harmful or toxic substances in the liquid. Therefore, the application field of the high-molecular weight polymer is wider and the polymer has an improved commercial potential.

[0007] The high-molecular weight polymer of the invention includes: a high-molecular weight fiber, a natural fiber, a synthetic fiber, and a high molecular weight absorber. Preferably,

the natural fiber is Sterculia BP or Frangula BPC. Preferably, the natural fiber is collagen, cellulose, chitin and chitosan. These natural fibers have high cross-linking molecular structure, so they can absorb alcohol in wine and a liquid or solution that may have harmful substance (such as caffeine, theine, uric acid, lipid, cholesterol, strong acid and strong base) by utilizing the feature of directly absorption of the liquid or solution to indirect adsorb toxic substances, and then they are excreted from the body to reduce absorption of such substances by the body, so the toxicity, side effect and adverse effect caused by such substances can be further reduced to achieve the effect of protecting organ, tissue and cells of an organism.

[0007A] In another aspect the present invention provides the use of a composition in the absorption of a toxin or a harmful substance in a liquid or solution intaked into an organism, wherein the composition comprises:

a high-molecular weight polymeric core comprising a high molecular weight polymer wherein the high molecular weight polymer is Sterculia BP, Frangula BPC or chitin;

a shell disposed outside of the high-molecular weight polymeric core comprises a biocompatible excipient; and where

the high-molecular weight polymer is present in an amount sufficient to convert the intaked liquid or solution to a semi-solid to solid colloid.

[0008] In another aspect the present invention provides a composition comprising a high molecular weight polymer, wherein the high molecular weight polymer is combined with a layer of biocompatible excipient, for example, an outer shell formed by the excipient, which has a plurality of micropores. When the high molecular weight polymer is taken by an organism, the biocompatible excipient can prevent the high molecular weight polymer from damage by a body fluid of the organism, an acid or a base. In one embodiment, after the high molecular weight polymer coated with the biocompatible excipient is orally administered to an organism, harmful substances in the organism enter into the composition through the micropores of the biocompatible excipient and then absorbed by the high molecular weight polymer. Since the high molecular weight polymer has a cross-linking structure, so micropores can be constituted. Thus, harmful substances can be fixed in the micropores to reduce contact of the substances with tissues of the organism and prevent the organism from damage by these harmful substances.

[0009] Since absorption of a liquid is a common feature of most high molecular weight polymers, they can absorb body fluid (such as digestive juice) in an organism to decrease the digestive juice in body and thus reduce digestion and absorption of a food. Alternatively, they can assist to adsorb harmful substances contained in body fluid of a body and remove the harmful substances. Therefore, the application field of the high-molecular weight polymer is wider and the polymer has an improved commercial potential.

[0009A] In a further aspect the present invention provides a composition comprising a high-molecular weight polymeric core and a shell disposed outside of the high molecular weight polymeric core comprising a biocompatible excipient, wherein the high-molecular weight polymer core is Sterculia BP, Frangula BPC or chitin.

[0009B] In another aspect the present invention provides the use of the composition of the preceding paragraph, in the manufacture of a medicament for the adsorption of a toxin or a harmful substance in a liquid or solution intaked into an organism.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Fig. 1 is a cross- sectional view of a composition comprising a high molecular weight polymer in accordance with the present invention.

DESCRIPTIONS OF THE SYMBOLS OF THE ELEMENTS

[0011] 1 Composition comprising a high molecular weight polymer

[0012] 11 Layer of high molecular weight polymer

[0013] 12 Layer of outer shell

PREFERRED EMBODIMENTS OF THE INVENTION

[0014] The invention provides a new use of a high molecular weight polymer, which utilizes a high molecular weight polymer to adsorb a body fluid (such as digestive juice) or a liquid or solution in an organism containing toxins or stimulating components (by directly absorb the liquid or solution to indirectly adsorb toxic substances) to decrease body fluid in a body, reduce digestion and absorption of food by a body or prevent tissues of an organism from direct contact of these harmful substances, absorption of the harmful substances and hazard to health. Since absorption of a liquid is a common feature of most high molecular weight polymers, by utilizing the common feature of the high molecular weight polymer in absorbing a liquid, the harmful substances contained in the liquid can be indirectly adsorb and then excreted. Therefore, the application field of the high-molecular weight polymeric composition is wider and the polymer has an improved commercial potential.

[0015] The high-molecular weight polymer of the invention includes: a high-molecular weight fiber, a natural fiber, a synthetic fiber, and a high molecular weight absorber. Preferably, the natural fiber is selected from the group consisting of: Sterculia BP, Frangula BPC, collagen, cellulose, chitin and chitosan. These natural fibers have good biocompatible and network molecular structure with slits in various sizes. Therefore, after the high molecular weight polymer coated with the biocompatible excipient is taken by an organism, no hazard can be caused. In addition, harmful substances can be fixed in the slits of the high molecular weight polymer to prevent the organism from contact with the harmful substances and hazard by these harmful substances.

[0016] Example 1

[0017] In this example, Sterculia BP is selected to adsorb a coffee solution to illustrate the new use of the high molecular weight polymer of the present invention. The Sterculia BP is a kind of high molecular fiber, which can be applied single or mixed with another adsorptive polymer material. In this example, 25% by weight of Sterculia BP is mixed with 75% by weight of Frangula BPC to form a high molecular weight fiber mixture (hereafter referred to as "high

molecular weight fiber"). One gram of the high molecular weight fiber mixture is added into 30 ml espresso coffee and then mixed well to form a fiber-coffee mixture. After 5 minutes, the fiber-coffee mixture exhibited sticky. After 10 minutes, the fiber-coffee mixture converts to a semi-solid colloid and was continuously getting sticky. After 30 minutes, the fiber-coffee mixture was almost solidified and lost fluidity. It can be known from this example that when a person intakes the fiber mixture before drinking the espresso coffee, the caffeine in the coffee can be adsorbed by the fiber-coffee mixture through the adsorption of espresso coffee. Therefore, most caffeine is isolated from the cells of human body so that the damage to health resulting from the caffeine can be reduced.

[0018] The Sterculia BP and Frangula BPC can be mixed with any ratio. The Sterculia BP and Frangula BPC can be used individually or be mixed with any other high molecular weight polymer.

[0019] Example 2

[0020] A cola that is commonly consumed by general public was used as an example to illustrate the new use of the high molecular weight fiber of the present invention. The 25% by weight of Sterculia BP is mixed with 75% by weight of Frangula BPC to form a high molecular weight fiber mixture. One gram of fiber mixture is added into 30 ml cola then mixed well to form a high molecular fiber-cola mixture. After 5 minutes, the high molecular fiber-coffee mixture exhibited sticky. After 10 minutes, the viscosity of the fiber-cola mixture increased and around 95% cola was absorbed by the fiber-cola mixture and lost fluidity. After 30 minutes, the fiber-cola mixture was almost solidified. Obviously, the high molecular weight fiber can rapidly absorb the liquid in a short time. During the absorption, toxic or harmful substances can be adsorbed by the fiber accordingly to achieve the effect of preventing body from contact with and damage by these harmful substances.

[0021] Example 3

[0022] This example illustrates the effect of absorbing alcohol by the high molecular weight polymer of Example 1. One gram high molecular weight polymer mixture was added into 30

ml sorghum wine containing 58% alcohol to form a high molecular weight fiber- sorghum wine mixture. The high molecular weight fiber-wine mixture exhibited stringy after 5 minutes mixing. After 10 minutes, the high molecular weight fiber-wine mixture showed gel exhibition. After 20~30 minutes, the high molecular weight fiber-wine mixture showed paste exhibition. After one hour, the high molecular weight fiber-wine mixture lost fluidity and became solid state. Accordingly, the high-molecular weight polymer of the present invention has capability to adsorb the intaked alcohol and prevent the alcohol from directly contacting the tissue and generating health damage.

[0023] One gram Sterculia BP was added to 50 ml sorghum wine and Sterculia BP exhibited absorption similar to the above fiber and the high molecular weight fiber-sorghum wine mixture gradually exhibited semi-fluidity state or non-fluid paste or solid state. The high molecular weight fiber was mixed with sorghum wine containing 58% alcohol and then stirred to form a high molecular weight fiber-wine mixture. After 5 minutes, the high molecular weight fiber-wine mixture exhibited sticky. After 10 minutes, the high molecular weight fiber-wine mixture showed gel exhibition. After 20~30 minutes, the high molecular weight fiber-wine mixture showed paste exhibition. After one hour, the high molecular weight fiber-wine mixture lost fluidity and became solid state. Accordingly, the high-molecular weight polymer of the present invention has capability to adsorb the intaked alcohol and prevent the alcohol from directly contacting the tissue and generating health damage.

[0024] The high molecular weight polymer can be produced in a chewable form and consumers can be administered by chewing; especially for those consumers who need to drink wine frequently. If the high molecular weight polymer is intaked before drinking, upon drinking, the high molecular weight polymer stayed in gastrointestinal tract can absorb alcohol in the wine so that not too much alcohol is absorbed by body through cells in the gastrointestinal tract and the body will not be harmed by alcohol. The high molecular weight polymer also can be applied in patients dependent on stimulating components such as caffeine and theine. The high molecular weight polymer of the invention can be applied in absorption of acidic or basic material. For example, in case of drinking strong acid or base by mistake or excess secret of gastric juice, the

high molecular weight polymer can absorb the strong acid or base to prevent tissues and cells from hazard by the strong acid or base to alleviate the uncomfortableness caused by the strong acid or base.

[0025] The high-molecular weight polymeric composition in this embodiment is mixed with a biocompatibility excipient to form a pill, a tablet, a capsule, a micro particle, a emulsion or an injection that are injected, spread, oral administrated or sprayed to the body. With reference to Fig. 1, high-molecular weight polymeric composition of the embodiment is manufactured as a pill 1 and comprises a high-molecular weight polymeric core 11 and a shell 12. The shell 12 is disposed outside of the high-molecular weight polymeric core 11 and is made of at least one biocompatibility biocompatibility excipient and comprises multiple holes. The toxin or the harmful substance gets into the pill and is fixed between fibers of high-molecular weight polymeric core 11 within the high-molecular weight polymeric core 11 and is blocked to move out from the hole of the shell 12 to contact with the tissues.

[0026] Accordingly, the high-molecular weight polymeric composition promptly receives and adsorbs the toxin or stimulating substance existed in the liquid or solution to avoid the harmful toxin or stimulating substance from directly contacting to the tissue to reduce the toxicity, damage degree and side affection. The new use of the high-molecular weight polymeric composition is to directly adsorb the intaked solution or liquid to indirectly garb the harmful substance and toxin existed in the solution or liquid that is removed out of the body with the high-molecular weight polymeric composition. Therefore, the application field of the high-molecular weight polymeric composition is wider to improve the commercial potential.

INDUSTRIAL APPLICABILITY

[0027] The invention provides a new use of a high molecular weight polymer in the absorption of body fluid (such as digestive juice) in an organism or a liquid or solution to be intaked into an organism containing a toxin or a stimulating component. That is, the new use relates to direct absorption of a liquid or solution to indirectly adsorb the toxins or stimulating components existed therein, decrease of digestive juice in body, decrease of digestion and

absorption of food in a body and improvement of excretion of these harmful substances to prevent the body from being damaged by the toxin or the stimulating substance. These high molecular weight polymers have good biocompatibility, so they will not harm health of an organism after being intaked into it. The invention applies a high molecular weight polymer to a body fluid (such as digestive juice) in an organism or a liquid or a solution to be intaked into an organism so that harmful or toxic substances contained therein can be removed through indirect adsorption or absorption and excretion. Since most high molecular weight polymers have a common feature in adsorbing liquid, they can indirectly absorb the harmful or toxic substances in the liquid. Therefore, the application field of the high-molecular weight polymeric composition is wider to improve the commercial potential.

[0028] Unless the context clearly requires otherwise, throughout the description and the claims, the words “comprise”, “comprising”, and the like, are to be construed in an inclusive sense as opposed to an exclusive or exhaustive sense, that is to say, in the sense of “including, but not limited to”.

[0029] The reference to any prior art in the specification is not, and should not be taken as, an acknowledgement or any form of suggestion that the prior art forms part of the common general knowledge in Australia.

WHAT IS CLAIMED IS:

1. A use of a composition in the absorption of a toxin or harmful substance in a liquid or solution intaked into an organism, wherein the composition comprises:

a high-molecular weight polymeric core comprising a high molecular weight polymer wherein the high molecular weight polymer is Sterculia BP, Frangula BPC or chitin;

a shell disposed outside of the high-molecular weight polymeric core comprising a biocompatible excipient; and wherein

the high-molecular weight polymer is present in an amount sufficient to convert the intaked liquid or solution to a semi-solid to solid colloid.

2. The use of Claim 1, wherein the high molecular weight polymer is applied by injection, daub, oral administration or spraying.

3. The use of Claim 2, wherein the toxin or harmful substance is acid, alcohol, caffeine, base, theine or uric acid.

4. The use of any one of Claims 1 to 3, wherein 1 g of the high-molecular weight polymer is used to absorb 30 ml to 50 ml of the liquid or solution.

5. The use of any one of Claims 1 to 4, wherein the colloid formed is removed from the organism by excretion.

6. A composition comprising:

a high-molecular weight polymeric core; and

a shell disposed outside of the high molecular weight polymeric core comprising a biocompatible excipient;

wherein the high-molecular weight polymer core is Sterculia BP, Frangula BPC or chitin.

7. A use of the composition of Claim 6, in the manufacture of a medicament for the adsorption of a toxin or a harmful substance in a liquid or solution intaked into an organism.

8. The use of Claim 7, wherein the composition is formulated to be administered by injection, daub, oral administration or spraying.

9. The use of Claim 8, wherein the toxin or harmful substance is acid, alcohol, caffeine, base, theine or uric acid.

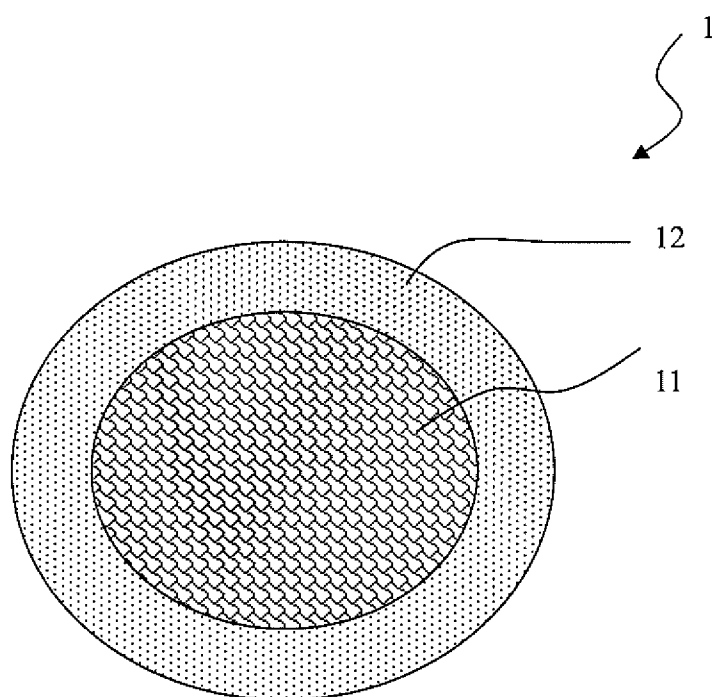


Fig. 1