

STRAW FILTERING SHEATH

Description

TECHNICAL FIELD

[0001] The present invention relates to a filtering sheath formed of porous material, which when used in conjunction with a drinking straw provides filtration function for a person imbibing a drink that contains solid particles not meant to be ingested.

BACKGROUND ART

[0002] Improvements to the modern drinking straws are mostly focused on improving packaging efficiency and ease of ingesting desirable solid particles present in a beverage. Telescopic straws, for example, were primarily designed to overcome the limited packaging space that small drink packages allow for. Straws with large diameter and straws with spoon-like end were developed to make it easier to consume desirable solid particles in beverage products, such as tapioca pearl condiments in bubble tea, and cookie crumbs in smoothie etc.

[0003] The usefulness in having a cost-effective solution for a drinking straw or device that can filter out and prevent ingestion of solid particles within a drink is becoming evident. A good industrial application for such a drinking straw or device with filtering capability will be for herbal infusion sold in takeaway clear plastic cups, wherein the brewed herbs such as flowers, leaves, or seeds are intentionally left in the drink for aesthetic enhancement; the brewed herbs will be filtered out by such drinking straw or device and will not reach a person's mouth and negatively impact the drinking experience. Another more direct use for such a drinking straw or device is to filter out any fine impurities, dirt, or insects that may be unintentionally introduced into beverages sold at places having lower hygiene standards, for example, outdoor markets or drink stalls in less developed countries.

[0004] Previous works on drinking straws with filtering capability, such as WO 2013112375 A1 and US 8852439 B2, comprise non-trivial mechanisms, such as ultraviolet light treatment region and microporous hollow fibres respectively. Such drinking straws are more suited for water purification, and are not suitable and cost-effective for mass production for the application examples described in paragraph [0003].

[0005] Recently, there have been a number of patent applications describing drinking straw with filtering capability and whose construct is similar to bombilla – a type of drinking straw that the Argentines have been using for centuries for drinking mate – such as US 20060027675 A1 and US

20100258498 A1. The main embodiment described in these applications comprises a drinking straw with sealed bottom end and a plurality of openings along the straw body. Another type of embodiment described comprises a drinking straw whose bottom end is attached a filter element with openings. However, the practicality of such straws has been found through research and development to be limited for three main reasons.

[0006] Firstly, for both embodiment types described in paragraph [0005], the size of the openings are fixed and often limited by the material used and manufacturing technology available. If the openings are not sufficiently small, tiny particles will pass through easily and reach the user's mouth; but if the openings are too small, the user will require significant effort to draw up the liquid. Secondly, for both said embodiment types, the openings get clogged easily especially if the size of the solid particles (which varies for different drink products) matches that of the openings. In fact, clogging has been a known issue even with the use of modern bombilla, often made of metal and comprises comprehensive filtering components. Thirdly, for the said embodiment that comprises a filter element attachment, the small filter attachment may present as a choking hazard, unless safety features have been incorporated, in which case the cost of manufacturing will be high, thus rendering the straw unsuitable to be mass-produced for disposable use.

[0007] Yet another type of drinking straw with filtering capability was described in US 20100276509 A1, wherein the straw comprises an outer tubular body and an inner filter member that at least partially defines a channel. In other words, the proposed construct would be similar to 'straws-within-straw', wherein the inner 'straws' provide the filtering function according to their sizes and shapes. Unfortunately, such a design is likely to also suffer from the three flaws described in paragraph [0006].

OBJECTS OF THE PRESENT INVENTION

[0008] One object of the present invention is to augment a drinking straw with the ability to filter out and prevent solid particles from reaching a person's mouth.

[0009] Another object of the present invention is to minimize or even eliminate the clogging problem encountered when using a drinking straw with filtering capability to imbibe a drink containing solid particles, as exemplified in paragraphs [0005 – 0007].

[0010] A third object is to ensure that a person using the present invention in conjunction with a drinking straw will not require significant effort to draw up the liquid when imbibing from the top end of the straw.

[0011] A further object of the present invention is that the solution must be cost-effective so that it can be mass-produced for disposable use, such as in the application examples described in paragraph [0003].

SOLUTION

[0012] According to the present invention, the aforementioned objects are achieved by a straw filtering sheath to be fitted over the bottom end of a drinking straw, said straw filtering sheath comprises a main filtering body with a closed bottom and formed of porous material, and an auxiliary component to secure the said main filtering body on to the straw body so that the straw filtering sheath will not come loose when the sheathed straw is placed in liquid.

[0013] In one preferred embodiment of the present invention, said main filtering body is of a generally tubular shape with closed bottom and formed of nonwoven synthetic fabric, such as polypropylene, polyester, polyamide, polyethylene, polylactic acid, rayon, or composites thereof, said auxiliary component is a distinct piece formed of elastic material adjoining said main filtering body.

BRIEF DESCRIPTION OF ACCOMPANYING DRAWINGS

[0014] One preferred embodiment of the present invention will be described in greater detail hereinbelow, with reference to the accompanying drawings. In the accompanying drawings, the straw shown in broken lines is for illustrative purposes only and forms no part of the claimed invention.

Fig. 1 is a front view showing a preferred embodiment of the present invention;

Fig. 2 is an enlarged cutaway cross-sectional view of the apparatus shown in Fig. 1, taken along lines 2 – 2;

Fig. 3 is a perspective view of the apparatus shown in Fig. 1; and

Fig. 4 is a cross-sectional view of the apparatus shown in Fig. 1, taken along lines 4 – 4.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0015] One preferred embodiment of the present invention comprises a generally tubular main filtering body 13 with closed bottom 14, and an auxiliary component 12 adjoining said main filtering body 13, wherein said main filtering body 13 is made of porous material such as nonwoven polypropylene or polyester, said auxiliary component 12 is made of elastic material so that it clings on to the straw body 10 after fitting the sheath over the bottom end 11 of the straw and the sheath will not come loose when placed in liquid.

[0016] The said porous material from which the main filtering body 13 is formed can be filter paper; woven or nonwoven synthetic fabric, such as polypropylene, polyester, polyamide, polyethylene, polylactic acid, or rayon; woven or nonwoven natural fabric, such as silk, cotton, straw, bamboo, or bast fibres; any of their composite derivatives; or other cost-effective porous material that permits liquid to pass through while filtering out the smallest solid particles possibly present for the targeted application. Nonwoven synthetic fabric, such as polypropylene or polyester, is preferred for its cost-effectiveness and superior liquid filtration properties. An optimal pore size ranging from units to hundreds of microns can be easily chosen to be smaller than the smallest possible solid particles for the targeted application, at the same time balancing other factors such as the ease of drawing up liquid and cost-effectiveness.

[0017] The said auxiliary component 12 is preferred to be elastic for its ease of use. It will be appreciated, however, by those skilled in the art that any flexible means of securing the sheath on to the straw body 10 may be employed, such as one or more drawstrings, buttons, Velcro or any other hook-and-loop fasteners. Furthermore, the entire main filtering body 13 may be formed of material that is both elastic and porous, if the cost of doing so is not prohibitive.

[0018] The lengths and diameters of the said generally tubular main filtering body 13 and the auxiliary elastic component 12 are not critical in achieving the objects laid out in paragraphs [0008] – [0011]. As an example, said main filtering body 13 may have a length between 4 – 8 cm, and a diameter between 6 – 12 mm or customized to slightly larger than that of the intended straw. As an example, said auxiliary elastic component 12 may have a length between 1 – 2 cm, and an unstretched diameter between 3 – 6 mm or customized to sufficiently smaller than that of the intended straw.

[0019] In the broad practice of the present invention, said main filtering body 13 employed in the inventive article may be of any suitable shape and specific size. For example, instead of a generally tubular shape, said main filtering body 13 may be of a baggy configuration. The specific shape and size of the sheath will be readily determinable by those skilled in the art, in application to a particular end use.

[0020] It has been found through development and testing that the preferred embodiment of the present invention is able to filter out even the finest of the herbs present within herbal infusion products, with absolutely no clogging issue, and with great ease of drawing up the liquid. In contrast, using a drinking straw whose bottom end is attached with a plastic filter with openings at 0.4 mm required significant effort to draw up the liquid, and posed serious clogging problem for some of the finest herbs.

[0021] Although the invention has been developed primarily for use in conjunction with a drinking straw in relation to herbal infusions wherein the loose herbs remain, it will be appreciated that it may well be used for other kinds of beverages with undesirable solid particles, impurities, pulps, tea leaves, undissolved granules of sugar or coffee, and the like. In addition, although the invention has been described with reference to specific examples, it will be appreciated by those skilled in the art that the invention may be embodied in many other forms.

Claims

The invention claimed is:

1. An article for sheathing the bottom end (11) of a drinking straw, comprising:
 - (i) a main filtering body (13) with a closed bottom (14), wherein said main filtering body (13) is formed of porous material, thereby augmenting the drinking straw with filtration capability, allowing liquid to be drawn up the straw when imbibing from the top end of the straw, and at the same time blocking and preventing solid particles present in the drink from being drawn up and ingested by the user; and
 - (ii) an auxiliary component (12) to secure the said main filtering body (13) on to the straw body (10) so that the said article will not come loose when the sheathed straw is placed in liquid.
2. The article according to claim 1, wherein said main filtering body (13) is of a generally tubular shape.
3. The article according to claim 1, wherein said main filtering body (13) is of a baggy configuration.
4. The article according to any of the claims 1 – 3, wherein said auxiliary component (12) is a distinct piece formed of elastic material adjoining said main filtering body (13).
5. The article according to any of the claims 1 – 3, wherein said auxiliary component (12) is part of the said main filtering body (13), which is formed of material that is both porous and elastic.
6. The article according to any of the claims 1 – 3, wherein said auxiliary component (12) comprises one or more drawstrings.
7. The article according to any of the claims 1 – 3, wherein said auxiliary component (12) comprises one or more buttons.
8. The article according to any of the claims 1 – 3, wherein said auxiliary component (12) comprises one or more pieces of Velcro or any other hook-and-loop fasteners.
9. The article according to any of the claims 1 – 8, wherein said main filtering body (13) is formed of filter paper.
10. The article according to any of the claims 1 – 8, wherein said main filtering body (13) is formed of woven or nonwoven synthetic fabric.
11. The article according to claim 10, wherein said woven or nonwoven synthetic fabric is selected from the group consisting of: polypropylene, polyester, polyamide, polyethylene, polylactic acid, rayon, and composites thereof.

- 12.** The article according to any of the claims 1 – 8, wherein said main filtering body (13) is formed of woven or nonwoven natural fabric.
- 13.** The article according to claim 12, wherein said woven or nonwoven natural fabric is selected from the group consisting of: wool, silk, cotton, straw, bamboo, bast fibres, and composites thereof.