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(54) Title: CANNABIS WRAPPER FOR SMOKING ARTICLES

(57) Abstract: A wrapping material for a smoking article is formed from a web that includes extracted pieces of cannabis combined with web building fibers. The web has a basis weight of from about 20 gsm to about 80 gsm and a permeability of from about 10 Coresta to about 100 Coresta. The wrapping material has a natural cannabis smell and taste. The wrapping material is tobacco and nicotine free and can be used as a carrier for flavorings or aerosol delivery compositions.

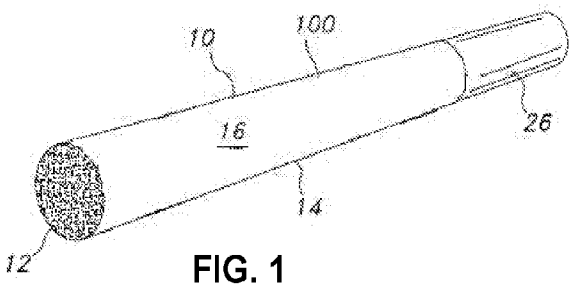


FIG. 1

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CANNABIS WRAPPER FOR SMOKING ARTICLES

RELATED APPLICATIONS

[0001] The present application is based on and claims priority to U.S. Provisional Patent Application Serial No. 62/803,849, filed on February 11, 2019, which is incorporated herein by reference.

BACKGROUND

[0002] Cannabis, or the cannabis plant, may refer to both marijuana, which is generally used for recreational purposes, and hemp, which is generally used in industrial applications. Cannabis is a green and/or brown mixture of dried, shredded leaves, stems, seeds and flowers of the plant, and may reference leaves, stems, seeds, and flowers from a Cannabis plant, varieties of which include Cannabis sativa or Cannabis indica. Hemp (and particularly the industrial hemp variety), have a very similar appearance to marijuana, but unlike the cannabis plant variety referred to by marijuana, hemp generally only contains low amounts of tetrahydrocannabinol (THC), where both hemp and marijuana can include high amounts of cannabidiol (CBD). For instance, hemp, and particularly industrial hemp may contain less than about 0.3% THC where the cannabis variety referred to by marijuana may contain anywhere from 5% to 30% THC. Cannabis, both marijuana and hemp, is a known pain reliever, however, generally, only hemp, or industrial hemp have been used for food, paper, clothing, fabrics, and CBD extracts, due to their low THC content. Recently, over 25 states in the United States have legalized the use of cannabis for at least medical purposes. In addition, Canada has now legalized the use of cannabis for medical and recreational use. In view of these recent developments, the commercialization of cannabis has dramatically increased.

[0003] Cannabis, for instance, is becoming a popular drug for pain relief in lieu of conventional pain relief medicines, such as opioids, as more and more people in the medical community have begun to view cannabis as a legitimate alternative to the use of opioids for pain relief. Cannabis, for instance, contains two different drugs that can help relieve pain, nausea, and other symptoms. Cannabis contains, for instance, tetrahydrocannabinol (THC). THC acts on specific receptors in the brain which lead to a feeling of euphoria and a relaxed state. The highest concentrations of THC in cannabis is found in the dried flowers or buds. Cannabis is typically

regulated based upon the amount of THC found in the material. In addition to THC, cannabis also can contain cannabidiol (CBD). Although CBD does interact with pain receptors in the brain, CBD does not create the same euphoric feeling caused by THC. CBD, however, exerts pain-relieving and anti-inflammatory effects. Cannabinoids, and especially CBD, do not have the same addictive effect as many opioids. Thus, cannabis is becoming much more acceptable for medical and recreational use which has led to legalization in many areas.

[0004] Inhaling combusted cannabis is the most common, effective and least expensive method for incorporating THC and CBD into the body. However, while other methods are gaining in popularity, inhaling combusted cannabis generally uses cannabis wrapped in a wrapping paper in order to combust and inhale the cannabis by smoking.

[0005] It has long been recognized in the industry that wrappers for smoking articles have a significant influence on the smoking characteristics of smoking articles. In this regard, various attempts have been made in the art to alter or modify wrappers for smoking articles in order to achieve a wrapper that improves the overall smoking experience of the smoking article. Wrapping papers for smoking articles were typically formed from pulp fibers, such as wood or flax fibers, combined with filler particles. However, such wrapping papers often produced a “papery” taste that was regarded as unpleasant and unnatural by the user, and has a taste that may alter the original aroma of cannabis.

[0006] Furthermore, pulp fibers are mainly composed of delignified fibers from hardwood and softwood trees, raising concerns regarding the sustainability of a wrapper mainly formed from pulp fibers due to the large reliance upon felled trees. Specifically, between two and three tons of wood are required to manufacture one ton of conventional paper. Since 1950, the worldwide consumption of paper has drastically increased. This increase in consumption has an impact on the forests of the planet, 80% of which would have disappeared as a result of human activity.

[0007] Wrapping homogenized tobacco materials, on the other hand, are typically made of processed tobacco by-products in an amount greater than 50%. Therefore, such wrapping materials also usually contain significant amount of nicotine and generate a characteristic tobacco aroma, that may not be suitable for sensory acceptance of inhaled, combusted cannabis.

[0008] Additionally, some homogenized wrapping materials made of cannabis materials have been produced with a technology generally known as “slurry” but generally have a tensile strength (< 1,000cN/15mm) that is too low to form suitable wrapping materials. Such materials are therefore not suitable for mass production of cannabis smoking articles such as booklets (used for hand-rolling), tubes, cones or cigarettes which require higher tensile strength.

[0009] In view of the above, a need currently exists for a wrapper for a smoking article that has a more neutral or a natural cannabis smell and/or taste, for instance, for use with legal cannabis products or other aerosol releasing articles, and with sufficient tensile strength to enable mass production. Similarly, a need exists to provide a wrapper for a smoking article that has adequate burn properties in addition to having a pleasant or natural cannabis taste. It would also be beneficial to provide a wrapper for a smoking article that has improved smoking characteristics and that is free from nicotine. Furthermore, it would be beneficial to provide a smoking article that has improved smoking characteristics and that may also serve as a carrier for one or more aerosol delivery compositions. Moreover, it would also be an advantage to provide a wrapper that is at least partially formed from a sustainable source. Finally, it would also be an advantage to form a wrapper that, while being tobacco and/or nicotine free itself, may serve as a carrier for aerosol delivery compositions.

SUMMARY

[0010] In general, the present disclosure is directed to a wrapping material for a smoking article that includes a web. The web includes extracted cannabis fibers including cannabis leaves, cannabis stems (also referred to as hurds), cannabis buds, cannabis flowers, residues from cannabis extraction, or mixtures thereof combined with web building fibers. The web has a basis weight of from about 20 gsm to about 80 gsm and have a permeability of from about 10 Coresta to about 100 Coresta.

[0011] In one embodiment, the web building fibers include delignified cellulosic fibers. In a further embodiment, the extracted cannabis fibers include from about 10% to about 100% by weight extracted cannabis leaves, from about 10% to about 100% by weight extracted cannabis buds and/or flowers, and the web includes web building fibers from about 1% by weight to about 70% by weight. Additionally or alternatively, the wet includes web building fibers in an amount from about 1% to

about 50% by weight. In yet a further embodiment, the web is formed from a *Cannabis* plant material containing less than 0.3% by weight tetrahydrocannabinol. Additionally or alternatively, the extracted cannabis fibers further include cannabis stalk.

[0012] In an additional embodiment, the web includes a filler combined with the extracted cannabis fibers and the web building fibers. Further, in an embodiment, the web contains the filler in an amount from about 5% to about 40% by weight, such as in an amount from about 8% to about 20% by weight. In one embodiment, the filler comprises calcium carbonate particles, titanium dioxide particles, kaolin particles, talc particles, barium sulfate particles, bentonite particles, zeolite particles, silicate particles or mixtures thereof. Additionally or alternatively, the filler contained in the wrapper has an average particle size of from about 0.1 microns to about 10 microns.

[0013] In one embodiment, the web has a permeability of from about 30 Coresta to about 80 Coresta, such as from about 40 Coresta to about 60 Coresta. In a further embodiment, the web has a basis weight of from about 30 gsm to about 50 gsm. Moreover, in an embodiment, the web contains the web building fibers in an amount sufficient for the web to have a tensile strength of greater than about 1000 cN/15 mm, such as greater than about 1250 cN/15mm, such as greater than about 1500 cN/15mm, and less than about 4000 cN/15mm when tested according to ASTM Test D828-97.

[0014] In one embodiment, the web according to the present disclosure may be calendared.

[0015] In another embodiment, the wrapping material includes an aerosol delivery composition applied to the web, and the aerosol delivery composition includes an aerosol delivery agent. In one embodiment, the aerosol delivery agent includes a drug or a flavorant. In yet another embodiment, the aerosol delivery composition comprises an oil or a solid. Furthermore, in an embodiment, the aerosol delivery agent includes nicotine, a cannabinoid, tetrahydrocannabinol, or cannabidiol. In a further embodiment yet, the aerosol delivery agent includes a sugar, a licorice extract, honey, a coffee extract, maple syrup, a tea extract, a plant extract, a botanical extract, a tobacco extract, or a fruit extract. In one aspect, the aerosol delivery agent can comprise one or more terpenes. A terpene or a blend of terpenes can be added to the wrapping material in order to impart a distinct aroma that

indicates a high quality cannabis product. Terpenes that can be added to the wrapping material include pinene, humulene, b-caryophyllene, isopulegol, guaiol, nerylacetate, neomenthylacetate, limonene, menthone, dihydrojasmone, terpinolene, menthol, phellandrene, terpinene, geranylacetate, ocimene, myrcene, 1,4-cineole, 3-carene, linalool, menthofuran, perillyalcohol, pinane, neomenthylaceta, and substantial others.

[0016] Additionally or alternatively, the aerosol delivery composition is present on the web in an amount greater than about 1% by weight, such as greater than about 3% by weight, such as greater than about 5% by weight, such as greater than about 10% by weight, such as greater than about 15% by weight, such as greater than about 20% by weight, such as greater than about 25% by weight, such as greater than about 30% by weight, such as greater than about 35% by weight, such as greater than about 40% by weight, and less than about 50% by weight.

[0017] In a further embodiment, the web contains water soluble cannabis components in an amount less than about 40% by weight.

[0018] Additionally or alternatively, in one embodiment, the web building fibers include softwood fibers. In a further embodiment, the web building fibers include flax fibers, hemp fibers, abaca fibers, wood pulp fibers, bamboo fibers, coconut fibers, ramie fibers, jute fibers, or mixtures thereof. In one embodiment, the web building fibers are present in the web in an amount greater than about 5% by weight, such as in an amount greater than about 10% by weight, such as in an amount greater than about 20% by weight, and in an amount less than about 40% by weight.

[0019] In a further embodiment, the wrapping material is tobacco-free.

[0020] In yet another embodiment, the web has been treated with a burn control agent. In a further embodiment, the burn control agent comprises a salt of a carboxylic acid, such as a citrate or a succinate, the burn control agent being present in the web in an amount of from about 0.3% by weight to about 3% by weight, such as in an amount from about 1% by weight to about 2% by weight.

[0021] Furthermore, in an embodiment, the web has been treated with a humectant. In an additional embodiment, the humectant includes glycerol, propylene glycol, or mixtures thereof.

[0022] Additionally or alternatively, in one embodiment, the web is treated with a gum. In one embodiment, the gum includes guar gum, alginate, cellulose, cellulose

derivatives such as carboxymethyl cellulose, arabic gum, or mixtures thereof. In one embodiment, the gum is present on the web in an amount of from about 0.1% by weight to about 2% by weight.

[0023] In a further embodiment, the wrapping material includes a plurality of discrete reduced ignition areas spaced along a first direction of the wrapping material, the reduced ignition areas having a diffusivity of less than about 0.5 cm/s at 23° C. In one embodiment, the plurality of reduced ignition areas are formed by applying a reduced ignition composition to the web.

[0024] In general, the present disclosure is also generally directed to a wrapping material according to the present disclosure incorporated into a smoking article. When the smoking article is tested according to ASTM Test E2187-09, at least 75% of the smoking articles self-extinguish.

[0025] Generally speaking, the present disclosure is also directed to a smoking article that includes a smokeable rod surrounded by the wrapping material of the present disclosure.

[0026] Other features and aspects of the present disclosure are discussed in greater detail below.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027] A full and enabling disclosure of the present disclosure is set forth more particularly in the remainder of the specification, including reference to the accompanying figures, in which:

Fig. 1 is a perspective view of one embodiment of a smoking article incorporating the wrapper of the present disclosure;

Fig. 2 is an exploded view of the smoking article illustrated in Fig. 1;

Fig. 3A illustrates an article according to the present disclosure; and

Fig. 3B illustrates a single piece of the article of Fig. 3a.

[0028] Repeat use of reference characters in the present specification and drawings is intended to represent the same or analogous features or elements of the present invention.

DEFINITIONS

[0029] As used herein, “cannabis” may refer to any variety of the *Cannabis* plant, such as *Cannabis sativa or Cannabis indica,* for instance. More particularly, the present disclosure may refer to leaves, stems, seeds and flowers or any other part of

the Cannabis plant, as cannabis. Nonetheless, cannabis, as referred to herein, includes cannabis that contains average or high levels of THC and/or CBD (usually known as marijuana), hemp, which may contain low, or very low, levels of THC, industrial hemp, which may refer to a cannabis plant that contains less than 0.3% THC, or combinations thereof.

[0030] As used herein, a "reconstituted plant material" refers to a material formed by a process in which a plant feed stock, such as raw plant material from a cannabis plant, is extracted with a solvent to form an extract of solubles, such as water solubles, and an extracted insoluble portion or residue comprising fibrous material. The extracted and insoluble fibrous material is then formed into a sheet or web through any suitable process and the extract may either be discarded or reapplied to the formed sheet. The extract can be fed through various processes for concentrating the extract and optionally removing or adding various components prior to being recombined with the fibrous material. In the present disclosure, the reconstituted plant material is formed from extracted cannabis fibers, optionally combined with web building fibers, such as cellulose fibers. The extract of solubles obtained from the cannabis fibers is optionally reapplied to the sheet.

[0031] As used herein, an "aerosol generating material" is meant to include both a combustible material that undergoes combustion in a smoking article and to an aerosol-forming material that is heated but not combusted to form an inhalable aerosol. Combustible smoking articles can include cigarettes, cigarillos and cigars, pre-rolled cones etc. In a cigarette, the aerosol generating material is generally surrounded by a wrapping material to form a smokable rod, but may also be included in the wrapping material itself. Aerosol generating devices for generating an aerosol include, for instance, devices in which an aerosol is generated by electrical heating or by the transfer of heat from a combustible fuel element or heat source to heat but not burn the aerosol generating material, which releases volatile compounds. As the released compounds cool, they condense to form an aerosol that is inhaled by the consumer.

[0032] As used herein, "extracted cannabis fibers" refers to cannabis fibers that have been subjected to an extraction process in which the cannabis has been contacted with an aqueous solution to remove greater than 75% of the water soluble components contained in the cannabis. The extraction process is different from a

delignification process and from a bleaching treatment.

[0033] As used herein, "extracted byproducts" refers to cannabis biomass that has been subjected to an extraction process for removing selected components, such as cannabinoids, without removing a substantial amount of water soluble components. The extracted byproducts can be referred to as biomass resulting from an extraction process where the extractant is a solvent, such as ethanol, a supercritical fluid such as carbon dioxide, a lipid such as a vegetable oil, or the like. Extracted byproducts, in accordance with the present disclosure, can be subjected to a second extraction process for removing water soluble components during the process of making a reconstituted cannabis material. Extracted byproducts well suited for use in the present disclosure include those that contain water soluble components in an amount greater than about 8% by weight, such as in an amount greater than about 12% by weight, such as in an amount greater than about 18% by weight, such as in an amount greater than about 24% by weight.

[0034] As used herein, "delignified" cellulosic fibers refers to fibers that have been subjected to a pulping or delignification process by which the cellulose fibers are separated from the plant material through chemical means, mechanical means, or through a combination of chemical and mechanical means.

[0035] As used herein, the term "refine" is used to mean that the plant material is subjected to a mechanical treatment that modifies the fibers of the material so that they are better suited to forming a fibrous sheet or substrate. Refining can be accomplished using a conical refiner or a disks refiner or a Valley beater. The mechanical process exerts an abrasive and bruising action on the plant material such that the plant material is defibrillated. Refining is a different process than delignification and pulping.

[0036] As used herein, the "amount of water soluble extracts" present in a substrate or reconstituted plant material or in an aerosol-generating material is determined by taking 5 grams of a sample in boiling distilled water for 10 minutes to obtain an extract containing water soluble components. The weight of dry matter of the extract that is soluble in the solvent is calculated by the difference between the dry weight of the sample and the dry weight of the sample after extraction. The difference in dry weight is then used to determine the percentage of water soluble extracts in the sample.

DETAILED DESCRIPTION

[0037] It is to be understood by one of ordinary skill in the art that the present discussion is a description of exemplary embodiments only, and is not intended as limiting the broader aspects of the present disclosure.

[0038] The present disclosure is generally directed to a wrapping material for a smoking article that is formed from a web that includes cannabis and, optionally, web building fibers. In such a manner, the web for the wrapping material according to the present disclosure may be at least partially or even wholly formed from a sustainable material. Furthermore, it was unexpectedly found that a web formed from extracted cannabis has a pleasant natural cannabis taste and serves as an excellent carrier, even when combined with web building fibers that may include pulp fibers. Moreover, it was found that a wrapping material that is at least partially formed from cannabis unexpectedly had good burn characteristics in addition to a pleasant natural cannabis taste and good carrier properties.

[0039] Because the reconstituted cannabis material has a natural cannabis taste when smoked and is nicotine free, such wrapping material can be used to produce a nicotine free smoking article that complements and/or mimics the smell and taste of cannabis. For instance, a wrapping material formed from cannabis may add to, or enhance, the taste and/or smell of a smoking article containing cannabis, or may mimic the taste and/or smell of cannabis when it is not desired to consume cannabis, but the taste is still desired. Therefore, a wrapping material according to the present disclosure may provide a replacement for a paper wrapper for use with cannabis or cannabis smokeable articles, or when it is desired to mimic the taste and/or smell of a cannabis or cannabis smokeable article, and may also provide a better sensorial experience.

[0040] In addition, the wrapping material is well suited to being combined with other fibers with aerosol delivery functionality and/or topical additives, which may be jointly referred to as aerosol delivery agents and will be discussed in greater detail below. For instance, due to its good carrier properties, the wrapping material may also be combined with an aerosol delivery agent or have an aerosol delivery agent applied thereto. When combined with a tobacco or cannabis material, the wrapping material of the present disclosure, due to its natural smell and taste characteristics,

can better preserve the taste of the aerosol delivery compositions and, in fact, can enhance the smoking experience by diluting and decreasing irritants.

[0041] However, as will be discussed in greater detail below, a further benefit of a wrapping material according to the present disclosure is that, when used, an aerosol delivery composition can be applied after formation of the wrapper in a metered amount. Therefore, the characteristics of the aerosol delivery composition (*e.g.* nicotine, THC, or CBD) are not merely an inherent property of the material used to form the wrapper, and instead, the amount of the aerosol delivery composition may be carefully controlled and metered when applied to the wrapping material. Therefore, the amount of the aerosol delivery composition on the wrapping material may be measured, known, and evenly distributed, as compared to natural forms of the aerosol delivery composition.

[0042] As described above, the wrapping material of the present disclosure is generally formed from extracted cannabis, optionally combined with web building fibers. Cannabis materials for use in the present disclosure are obtained from a Cannabis plant, and thus, may be referred to as cannabis. Cannabis materials for use in the present disclosure may include all parts of the plant such as hurds, fibers, buds, flowers, leaves, seeds and optionally stalk components, or may consist in residues from cannabis extraction. Furthermore, as will be discussed herein, some or all of the THC, CBD, or other soluble components may be extracted from the cannabis during the formation of the reconstituted cannabis material, and the soluble portion that contains for example, THC or CBD may, optionally, be re-applied to the web . Thus, the wrapping material of the present disclosure in one embodiment, is formed from cannabis stalks or hurds, fibers, leaves, seeds, flowers and buds, as well as residues from the cannabis extraction, and thus may generally include all parts of the raw plant material obtained from cannabis.

[0043] In one embodiment, the cannabis components are obtained from cannabis plants that have a relatively low THC content. For instance, the amount of THC in the cannabis components can be less than about 1% by weight THC, such as less than about 0.3% by weight THC, such as less than about 0.2% by weight THC, such as less than about 0.1% by weight THC. Using cannabis components from low THC plants can offer various advantages and benefits. Producing a reconstituted cannabis material low in THC, for instance, allows for better control over THC

deliveries when the THC is topically applied to the material. In addition, a reconstituted material can be produced that contains no detectable amounts of THC so that the material can deliver other active agents, such as CBD, flavorings, nicotine, or the like. It should be understood, however, that in other embodiments the reconstituted cannabis material can be made from THC containing plants, such as from the species *Cannabis Indica*.

[0044] Additionally or alternatively, the reconstituted cannabis material of the present disclosure can be produced from various parts of the cannabis plant, including the stalks or hurds, fibers, leaves, seeds, flowers and buds. These different parts of the plant can be combined in different ratios and amounts depending upon the particular application and the desired result. Although the reconstituted cannabis material can be made exclusively from cannabis leaves and stems or can be made exclusively from cannabis buds and flowers, in one embodiment, the reconstituted material is made from a mixture of leaves and hurds combined with buds and/or flowers. For example, in one embodiment, the weight ratio between the leaves and hurds and the buds and/or flowers is from about 1:8 to about 8:1, such as from about 1:5 to about 5:1, such as from about 1:4 to about 4:1, such as from about 2:1 to about 1:2. In one embodiment, the ratio can be about 1:1.

[0045] In one embodiment, the reconstituted cannabis material may contain cannabis leaves and hurds in an amount greater than about 10% by weight, such as in an amount greater than about 20% by weight, such as in an amount greater than about 30% by weight, and generally in an amount of up to 100% by weight. Similarly, the reconstituted cannabis material may contain buds and/or flowers in an amount greater than about 10% by weight, such as in an amount greater than about 20% by weight, such as in an amount greater than about 30% by weight, such as in an amount greater than about 40% by weight, such as in an amount greater than about 50% by weight, such as in an amount greater than about 60% by weight, and generally in an amount of up to 100% by weight.

[0046] In one aspect, at least a portion of the cannabis components collected for producing the reconstituted cannabis material are cannabis extracted byproducts. Cannabis extracted byproducts include cannabis biomass that has already been subjected to a first extraction process for removing desired components from the plant, but without removing substantial amounts of the water soluble components.

For example, the cannabis extracted byproducts can be the biomass that remains after one or more cannabinoids have been extracted from the cannabis plant material, such as THC and/or CBD. These types of extraction processes can use different solvents and supercritical fluids. For example, in one embodiment, the extracted byproducts result from a cannabis extraction process in which the cannabis material is ground and combined with a solvent. The solvent, for instance, can be an alcohol, such as ethanol, an organic ester, a petroleum derived hydrocarbon such as toluene or trimethylpentane, or a lipid, such as a vegetable oil. Examples of vegetable oils include safflower oil, coconut oil, and the like. In an alternative embodiment, during the extraction process, the cannabis plant material can be contacted with a supercritical fluid, such as carbon dioxide. In general, the extraction process includes grinding or cutting the plant material to a desired size and then contacting the material with an extractant, such as a solvent or a supercritical fluid. The material can be heated during contact with the solvent. When contacted with a supercritical fluid, for instance, the temperature can be from about 31°C to about 80°C and the pressure can be from about 75 bar to about 500 bar.

[0047] Using extracted byproducts as a portion of the cannabis components can provide various advantages. For instance, the cannabis extracted byproducts may produce a more mild aerosol and may be in a form that is easier to handle than the virgin plant materials. In order to produce a reconstituted cannabis material, the cannabis extracted byproducts can undergo a second extraction process for removing the water soluble components. The cannabis extracted byproducts, for instance, may contain water soluble components in an amount greater than about 8% by weight, such as in an amount greater than about 12% by weight, such as in an amount greater than about 18% by weight, such as in an amount greater than about 24% by weight, such as in an amount greater than about 28% by weight, and generally in an amount less than about 60% by weight, such as in an amount less than about 50% by weight.

[0048] Particularly, the present disclosure has found that, by selectively forming a web according to the presently disclosure, fibers or pieces of plant material obtained from cannabis may be combined with cellulosic web building fibers to form a

wrapping material that displays a good, natural cannabis taste, as well as good tensile strength and burn properties.

[0049] In one embodiment, the cannabis is optionally sized or ground and then subjected to an extraction process for removing water soluble components. The extracted cannabis can then be optionally combined with web building fibers and formed into a substrate, such as a reconstituted sheet or web. The substrate can optionally be treated with the extract obtained from the cannabis. Alternatively, the extract obtained from the cannabis can be discarded and not recombined with the water insoluble fibers and other materials. The reconstituted material is then dried and formed into a web and/or a wrapping material. The web and/or a wrapping material can then optionally be combined with various other components. For instance, the wrapping material can be treated with various aerosol delivery agents and/or combined, either during or after the initial refining process, with various other aerosol delivery compounds, such as tobacco materials or other herbal fillers, such that the wrapping material itself is formed from a combination of cannabis fibers and at least one additional aerosol delivery compound. Alternatively, the wrapping material may merely be used to surround or encompass aerosol delivery agents and compounds, or may, in one embodiment, be both treated with an aerosol delivery compound and surround an aerosol delivery compound.

[0050] In forming the wrapping material of the present disclosure, the cannabis materials (*e.g.* stalks or hurds, fibers, leaves, seeds, flowers and buds) are first collected and optionally reduced in size. For example, in one embodiment, the cannabis materials can be subjected to a grinding operation, milling operation or beating operation that can reduce the size of the cannabis materials and/or reduce the cannabis into individual fibers. For example, in one embodiment, the cannabis materials can be fed to a hammer mill that beats the cannabis materials against a screen for producing a fibrous material.

[0051] Nonetheless, the cannabis may then be subjected to a gentle extraction process for removing water soluble components. Specifically, the compounds naturally present in cannabis that are soluble in the solvent may give rise to problems, such as bonding to the drying cylinders, difficulties in draining or problems of fermentation in the tanks. In one embodiment, the extraction process may simply include placing the cannabis materials in water and allowing the water soluble

portions to be extracted into the water. In an alternative embodiment, various solvents that are water-miscible, such as alcohols (e.g., ethanol), and/or suitable oils and fats, can be combined with water to form an aqueous solvent. For example, suitable oils and fats may be those in which THC and/or CBD are soluble, in order to extract THC and/or CBD from the plant fibers during the extraction phase. The water content of the aqueous solvent can, in some instances, be greater than 50 wt. % of the solvent, and particularly greater than 90 wt. % of the solvent. Deionized water, distilled water or tap water may be employed. The amount of the solvent in the suspension can vary widely, but is generally added in an amount from about 50 wt.% to about 99 wt.%, in some embodiments from about 60 wt.% to about 95 wt.%, and in some embodiments, from about 75 wt.% to about 90 wt.% of the suspension. However, the amount of solvent can vary with the nature of the solvent, the temperature at which the extraction is to be carried out. In one embodiment, the solvent may be heated. Of course, while a variety of solutions may be used, the extraction solution should also be selected so as to be effective for removing soluble compounds while leaving the cannabis fibers unharmed. In one embodiment, for instance, the extraction solution may be a hot aqueous solution that may include water.

[0052] The cannabis materials in solvent may optionally be agitated by stirring, shaking or otherwise mixing the mixture in order to increase the rate of solubilization. Typically, the process is carried out for about 10 minutes to about 6 hours. Process temperatures may range from about 10°C to about 100°C., such as from about 40°C to about 80°C.

[0053] After the cannabis materials are soaked and optionally agitated, the insoluble portion of the cannabis materials can be mechanically separated from the soluble portion of the cannabis materials using a press or a centrifuge or otherwise separated from the solvent which now contains the soluble portion of the cannabis. Once the soluble fraction is separated from the insoluble fraction, the soluble fraction can be discarded or further processed, such as by being concentrated. The soluble fraction can be concentrated using any known type of concentrator, such as a vacuum evaporator. In one embodiment of the present disclosure, the soluble fraction can be highly concentrated. In one embodiment, for instance, the soluble fraction can be evaporated so as to have a final brix or dry matter of from about 10%

to about 60%, such as from about 20% to about 40%, such as from about 25% to about 35%.

[0054] While the extraction process removes soluble compounds in order to facilitate the processing of the wrapping material, the extraction process can also be used to remove other undesired compounds. For instance, through the extraction process, pesticides and other compounds may be removed from the cannabis in the soluble portion, and then may be further eliminated from the soluble portion prior to the optional concentration of the soluble portion. While this process is discussed in regards to pesticides, it should be understood that the extraction process may be used to remove undesired compounds from other plants used in the web building fibers, such as tobacco, nicotine, caffeine, and any other undesirable compound. Further, the present disclosure also contemplates that any undesirable compounds such as caffeine or nicotine may be minimized or reduced instead of eliminated, by purifying or concentrating a soluble portion as discussed herein.

[0055] The resulting concentrated soluble fraction may be discarded, used in a separate process, or can be later applied onto the wrapping material of the present disclosure as will be described in greater detail below.

[0056] The resulting water insoluble cannabis fraction is generally in an unrefined state. The cannabis material can comprise particles and fibers. In one embodiment, the insoluble and extracted cannabis fraction can be subjected to a refining process. For instance, the extracted cannabis material can be fed through any suitable refining device, such as a conical refiner or a disks refiner. Other refining devices that may be used include a beater, such as a Valley beater. Refining can occur while the cannabis materials are moist or after being combined with water. For instance, in one embodiment, refining can occur while the cannabis material is at a consistency of less than about 10%, such as less than about 5%, such as less than about 3%.

[0057] In accordance with the present disclosure, the extracted cannabis material is optionally combined with web building fibers in forming a fiber substrate. For example, the extracted cannabis can be combined with water or an aqueous solution to form a slurry. The web building fibers, such as delignified cellulosic fibers, can be combined with the cannabis material in forming the slurry. The fiber slurry is then used to form a continuous reconstituted sheet or web. For example, in one

embodiment, the fiber slurry is fed to a papermaking process that can include a forming wire, gravity drain, suction drain, a felt press, and a dryer, such as a Yankee dryer, a drum dryer, or the like. Similarly, in one embodiment, the fiber slurry is formed into a continuous sheet on a Fourdrinier table.

[0058] In one embodiment, the fiber slurry is laid onto a porous forming surface and formed into a sheet. Excess water is removed by a gravity drain and/or a suction drain. In addition, various presses can be used to facilitate water removal. The formed sheet can be dried and further treated.

[0059] Optionally, the wrapping material that is produced can also be treated with the soluble cannabis portion, such as a concentrated soluble cannabis portion that was separated from the insoluble fraction. The soluble portion can be applied to the web using various application methods, such as sizing, coating etc. The amount of water soluble cannabis extracts applied to the reconstituted material can depend upon various factors and the anticipated end use application. For example, the soluble cannabis extracts can be applied to the wrapping material in an amount insufficient to adversely interfere with the inherent taste of the underlying material. For instance, in one embodiment, the water soluble cannabis extracts are applied to the reconstituted material such that the reconstituted material contains water soluble cannabis extracts in an amount up to about 10% by weight, such as in an amount less than about 8% by weight, such as in an amount less than about 6% by weight, such as in an amount less than about 4% by weight, such as in an amount less than about 2% by weight, such as in an amount less than about 1% by weight and generally in an amount greater than about 0.5% by weight. However, in another embodiment of the Invention, the water soluble cannabis extracts can be re-applied in the reconstituted material in an amount greater than 10%, such as 15% or 20% or 25%, or up to 35% in order to provide a distinct cannabis aroma to the final smoking article.

[0060] While, thus far, the formation of the wrapping material has been described by first extracting and refining the cannabis materials and then mixing with the refined pulp fibers, it should be understood that one or more types of plant fibers, as will be discussed in greater detail below, may be mixed with the cannabis materials during the extraction stage, such that the cannabis and the optional web building fibers undergo extraction and refining at the same time. Of course, as discussed

above, the cannabis may be extracted separately, and then mixed with the web building fibers during the pulping process.

[0061] Notwithstanding the method used to form the web or sheet, and while the web building fibers may be fibers from any plant that has one or more properties desired to be included in the web or sheet, in one embodiment, the web building fibers may be fibers of a plant which have undergone extraction in a solvent, for instance, to yield a pulp. While the web building fibers may be obtained from any type of plant, in one embodiment, the web building fibers are delignified cellulosic fibers. For instance, the web building fibers may preferably include hemp pulp fibers. The hemp pulp fibers can have an average fiber length of generally greater than about 0.5 mm, such as greater than about 1 mm, such as greater than about 1.5 mm, such as greater than about 1.8 mm, and generally less than about 4 mm, such as less than about 3 mm, such as less than about 2.5 mm, such as less than about 2.35 mm.

[0062] Other cellulosic fibers that may be used include wood pulp fibers such as softwood fibers or hardwood fibers, flax fibers, abaca fibers, bamboo fibers, coconut fibers, cotton fibers, kapok fibers, ramie fibers, jute fibers, or mixtures thereof. In one particular embodiment, the reconstituted plant material contains hemp pulp fibers alone or in combination with other fibers such as softwood fibers or flax fibers, or the like.

[0063] Regardless of the fibers selected to form the web building fibers, the web or wrapping material may include the cannabis materials in an amount of from about 1 to about 100% by weight, such as from about 20% to about 95%, such as from about 30% to about 90%, such as from about 40% to about 80% cannabis fibers by weight based upon the weight of the web or wrapping material, or any ranges therebetween.

[0064] Moreover, the web or wrapping material may include the web building fibers in an amount of from about 0% to about 99% by weight, such as from about 5% to about 80%, such as from about 10% to about 50%, such as from about 15% to about 30% web building fibers by weight based upon the weight of the wrapping material or web, or any ranges therebetween.

[0065] In one embodiment, the web building fibers incorporated into the reconstituted plant material include a combination of longer fibers and shorter fibers.

The longer fibers can generally have a length of greater than about 2 mm, while the shorter fibers can generally have a length of less than about 1.5 mm. The longer fibers can be used to improve strength and integrity, while the shorter fibers can better retain the cannabis fibers and other components within the fiber substrate. In one embodiment, for instance, the short fibers may be present in the reconstituted plant material in an amount greater than about 5% by weight, such as in an amount greater than about 10% by weight, and generally in an amount less than about 20% by weight. The longer fibers, on the other hand, can be present in the reconstituted web material in an amount greater than about 10% by weight, such as in an amount greater than about 20% by weight, and generally in an amount less than about 50% by weight, such as in an amount less than about 40% by weight. In one embodiment, the shorter fibers comprise hardwood fibers, while the longer fibers comprise hemp pulp fibers, flax fibers or softwood fibers.

[0066] Particularly, the present inventors have found that, by forming a wrapping material according to the present disclosure, a web or sheet may be formed using cannabis that has good strength, suitable smoothness, basis weight, and adjustable permeability. Thus, a wrapping material according to the present disclosure may be able to withstand a papermaking process as well as the mechanical stress of mass production of smoking articles, and may also have good sensory characteristics and burn properties. Furthermore, as will be discussed in greater detail below, it was also found that the wrapping material functions well as a carrier for other taste or aerosol delivery compositions.

[0067] For instance, wrapping materials made in accordance with the present disclosure have excellent mechanical characteristics and have a very desirable and aesthetic appearance. In general, the wrapping material has a basis weight of greater than about 20 gsm, such as greater than about 30 gsm, such as greater than about 40 gsm, such as greater than about 50 gsm, such as greater than about 60, gsm, such as greater than about 70 gsm, such as greater than about 80 gsm, such as greater than about 85 gsm. The basis weight of the wrapping material is generally less than about 100 gsm, such as less than about 90 gsm, such as less than about 80 gsm, such as less than about 70 gsm, such as less than about 60 gsm, such as less than about 50 gsm, or any ranges therebetween. Within the above basis weights, the wrapping material is very strong and can exhibit a tensile

strength of greater than about 1,000 cN/15 mm, such as greater than about 1,500 cN/15 mm and generally less than about 3,000 cN/15 mm. Tensile strength can be measured using ASTM Test D828-97.

[0068] The wrapping material according to the present disclosure may also have a permeability that facilitates suitable smoking properties, such as good mainstream smoke control or good smoking comfort. For instance, the wrapping material according to the present disclosure may have a permeability measured in Coresta units of from about 0 Coresta to about 100 Coresta, such as from about 20 Coresta to about 90 Coresta, such as from about 30 Coresta to about 80 Coresta, such as from about 35 Coresta to about 60 Coresta, or any ranges therebetween.

[0069] While the wrapping material according to the present disclosure may naturally or inherently have a desired permeability, in one embodiment, it may be desirable to also perforate the wrapping material after formation. Perforation may be performed as known in the art, and the number and size of the perforations may be selected as needed for the desired application.

[0070] In addition to the above physical properties, the wrapping material made in accordance with the present disclosure can exhibit a distinct natural appearance with natural speckling and/or coloration from the one or more cannabis fibers or particles. Optionally, the wrapping material may be formulated with pigments (natural or synthetic) to adjust its final coloration.

[0071] Furthermore, in addition to having a natural appearance, the wrapping material according to the present disclosure may also have a pleasant texture. The wrapping material can have a relatively rough surface, which emphasizes its natural appearance or can be further calendared to provide a smoother feeling.

[0072] The wrapping material of the present disclosure may also be used to produces smoking article having better taste and sensory properties. For instance, the wrapping material of the present disclosure produces a less papery taste than conventional smoking papers. Instead, a pleasant neutral or distinct, natural cannabis taste has been observed, even when the wrapping material contains cellulosic web building fibers. While the wrapping material according to the present disclosure may have more or less web building fibers by weight, it was surprising that the pleasant natural cannabis taste was maintained even when a portion of the wrapping material was formed of cellulosic web building fibers.

[0073] In addition, the wrapping material produces a cohesive ash with a similar or improved ash appearance over conventional wrapping material.

[0074] While the wrapping material may have a suitable taste and burn properties, as discussed above, it was also surprisingly found that the wrapping material is a good carrier for other aerosol delivery agents, such as aerosol generating fillers and topical additives which may include flavorings, active ingredients, oils, and extracts. For instance, as discussed above, one example of a topical additive may be the soluble portion of the extracted cannabis materials, which may be optionally concentrated, may be re-applied to the wrapping material after formation of the web to impart further taste and smoke characteristics. Whereas, an aerosol generating filler may be fibers from a fibrous plant or herb that are incorporated into the reconstituted web for added flavoring or components. Therefore, as used herein, an aerosol delivery agent may be used to refer to both, an aerosol generating filler and/or a topical additive.

[0075] Particularly, once the reconstituted plant material has been formed into a fibrous substrate, such as a wrapping material, as described above, the material can be used as a wrapping material for use with any suitable smoking article. The wrapping material of the present disclosure produces an aerosol or smoke that has a pleasing taste. Of particular advantage, the wrapping material of the present disclosure is nicotine free and thus can be used to produce a nicotine-free smoking article or a nicotine-free aerosol generating product or can be used to control nicotine delivery in the above products.

[0076] In one embodiment of the invention, the cannabis fibers used to produce the wrapping material of the present disclosure can be blended with a tobacco material, optionally in addition to the web building fibers, for forming an aerosol generating material with reduced nicotine deliveries and a desirable taste and smell. The tobacco material blended with the cannabis fibers of the present disclosure can comprise, for instance, cut leaf tobacco, stems, scraps, dust or any other by-products from the tobacco plant.

[0077] For instance, the wrapping material of the present disclosure can be combined with tobacco during the production of the wrapping material, or may be used to surround a tobacco material to form an aerosol generating material that produces an aerosol or smoke with a controlled amount nicotine in comparison to an

aerosol generated by the tobacco material by itself. For example, the wrapping material of the present disclosure can be combined with, or surround, any suitable tobacco material in an amount sufficient to produce an aerosol that contains a controlled amount of nicotine or tobacco flavoring. For instance, in one embodiment, the wrapping material may contain a low amount of nicotine, particularly as compared to a natural tobacco product, and may contain about 0.5% or less nicotine by weight of the wrapping material. Alternatively, a wrapping material may be formed that contains a "high" amount of nicotine as compared to the low nicotine embodiment described above, such that the wrapping material contains greater than about 0.5% nicotine by weight of the wrapping material.

[0078] In still another embodiment, the wrapping material of the present disclosure, instead of being combined with, or surrounding, a tobacco material or in addition to being combined with, or surround, a tobacco material, may be treated with an aerosol delivery composition containing nicotine or tobacco flavoring. The aerosol delivery composition, for instance, can be topically applied to the wrapping material for incorporating into the material controlled amounts of nicotine. Applying nicotine to the wrapping material can provide numerous benefits and advantages. For example, applying nicotine to the wrapping material allows for precise amounts of nicotine delivery when the wrapping material is converted into an aerosol and inhaled. In addition, the nicotine can be applied to the wrapping material in a manner such that the amount of nicotine contained in an aerosol generated by the material is uniform and consistent from puff to puff. Consequently, in one embodiment, the wrapping material of the present disclosure can be used to produce an aerosol generating material that is neutral and pleasant in taste while still delivering controlled amounts of nicotine.

[0079] For example, in one embodiment, the aerosol delivery composition applied to the wrapping material can contain a low amount of nicotine, particularly as compared to a natural tobacco product, and may contain about 0.5% or less nicotine by weight of the wrapping material. Alternatively, a wrapping material may be formed that contains a "high" amount of nicotine as compared to the low nicotine embodiment described above, such that the wrapping material contains greater than about 0.5% nicotine by weight of the wrapping material. Additionally or alternatively, a tobacco material that may have all or a portion of the nicotine extracted therefrom

can be used to produce a tobacco taste and smell while nicotine can be applied separately to the wrapping material in the form of an aerosol delivery composition for better controlling nicotine levels. In this embodiment, the amount of tobacco material in the aerosol generating material can be less than about 50% by weight, such as less than about 40% by weight, such as less than about 30% by weight, such as less than about 20% by weight, such as less than about 10% by weight, and generally greater than about 2% by weight.

[0080] In addition to being combined with tobacco materials, it should be understood that the wrapping material of the present disclosure can be combined with any suitable aerosol generating fibers, or may surround any suitable aerosol generating fillers. For instance, the wrapping material of the present disclosure can also be combined with aerosol generating fillers made from other plant materials, such as herbal plants, botanical plants, and trees, including herbs, plants and trees that may be used to form smokable fibers or herbal smokable articles, such as cocoa tree, coffee tree or coffee bean, tea tree or tea leaf, vine, ginger, ginkgo, camomile, tomato, ivy, maté, rooibos, cucumber, mint, a cereal such as wheat, barley or rye, or other trees such as broadleaved or resinous trees, and the like, as well as combinations thereof.

[0081] In addition to nicotine, the wrapping material of the present disclosure is well suited to receiving other aerosol delivery agents. The wrapping material, for instance, is highly absorbable and can contain up to 40% by weight of topical additives. In this regard, the wrapping material of the present disclosure is also well suited to acting as a carrier for various different aerosol delivery compositions. Each aerosol delivery composition, for instance, can contain one or more aerosol delivery agents.

[0082] Aerosol delivery compositions that can be applied to the wrapping material of the present disclosure include solutions, suspensions, oils, and the like. Solutions and suspensions, for instance, can be applied to the wrapping material and later dried leaving behind a solid residue within the fiber substrate.

[0083] In one embodiment, an aerosol delivery composition may be obtained by extracting a plant substance from a plant for application to the wrapping material. Additionally or alternatively, the present disclosure may include a step for isolating at least one compound from a plant substance, concentrating a plant substance, or

even purifying or eliminating a compound from a plant substance, in order to obtain a modified plant substance to be applied to the wrapping material. While optional, such a process may result in the transformation of an original raw plant substance into a modified plant substance, whether in the form of dry extracts, liquid extract, a liquor or an isolated substance, based upon the desired end properties of the plant substance to be applied to the wrapping material. Of course, while the plant substance may be an original plant substance or a modified plant substance, in one embodiment, the plant substance is applied to the wrapping material without undergoing any further processing after extraction. Furthermore, while the aerosol delivery composition has been described as being extracted from a plant, it should be understood that synthetic or naturally occurring aerosol delivery compositions (e.g. without needing to be extracted) may also be used.

[0084] Examples of aerosol delivery agents that may be contained in the aerosol delivery composition include , or may be an extract of, (in addition to nicotine) sugars, licorice extracts, menthol, honey, coffee extracts, maple syrup, tobacco extracts, botanical extracts, plant extracts, tea extracts, fruit extracts, flavorings such as clove, anise, cinnamon, sandalwood, geranium, rose oil, vanilla, caramel, cocoa, lemon oil, cassia, spearmint, fennel, or ginger, fragrances or aromas such as cocoa, vanilla, and caramel, medicinal plants, vegetables, spices, roots, berries, bar, seeks, essential oils and extracts thereof, such as anise oil, clove oil, carvone and the like, artificial flavoring and fragrance materials such as vanillin, and mixtures thereof. The extracts applied to the wrapping material can be water soluble or water dispersible. Thus, various different carrier liquids can be used to apply the aerosol delivery agents to the wrapping material.

[0085] In one embodiment, the wrapping material of the present disclosure can be used as a carrier for components obtained from cannabis. Cannabis, for instance, has recently been legalized in many states in the United States for both medical and recreational use. In addition, various chemicals and compounds contained in cannabis are becoming more and more popular drugs for pain relief in lieu of conventional pain relief medicines, such as opioids. Cannabis, for instance, contains various cannabinoids that can be used for pain relief. Inhaling an aerosol created by cannabis is the most common and least expensive method for delivering drugs contained in cannabis to a user. Unfortunately, however, merely inhaling

aerosol generated from dried cannabis buds or leaves can lead to non-uniform deliveries of the pain relief drugs contained in the plant. Deliveries of the cannabinoids, for instance, can vary dramatically depending upon the particular plant and the particular plant parts being used to generate the aerosol. In addition, cannabinoid deliveries can vary dramatically based upon other factors such as the packing density of the material, the particular type of aerosol-generating device or smoking article used to produce an aerosol, and the like. In addition, aerosols created from cannabis plant can contain irritants and produce a relatively harsh aerosol or smoke. For instance, the aerosol generated from the wrapping material of the present disclosure is non-irritating, and has a neutral taste. Cannabinoids that can be incorporated into the wrapping material of the present disclosure include cannabidiol (CBD) and tetrahydrocannabinol (THC). THC contained in cannabis acts on specific receptors in the brain which lead to a feeling of euphoria and a relaxed state. CBD, on the other hand, also interacts with pain receptors in the brain but does not create the same euphoric feeling caused by THC. In accordance with the present disclosure, in one embodiment, THC can be applied to the wrapping material of the present disclosure, CBD can be applied to the wrapping material or, alternatively, both THC and CBD can be applied to the wrapping material.

[0086] In addition to THC and CBD, various other cannabinoids can also be incorporated into an aerosol delivery composition and applied to the wrapping material in accordance with the present disclosure. For instance, other cannabinoids contained in cannabis include cannabichromene, cannabinol, cannabigerol, tetrahydrocannabivarin, cannabidivarin, cannabidiolic acid, other cannabidiol derivatives, and other tetrahydrocannabinol derivatives. The above cannabinoids can be used singularly or in any combination and applied to the wrapping material.

[0087] The cannabinoids described above can be applied to the wrapping material using various different methods. For instance, in one embodiment, the cannabinoid, such as CBD, can be formulated into a water soluble form or powder that can be applied to the wrapping material as a solution or aqueous suspension. Alternatively, a cannabis oil extract may be obtained from raw cannabis plants. The oil extract may contain THC alone, CBD alone, or a combination of THC and CBD. The oil extract can be applied to the wrapping material so that an aerosol generated by the material contains controlled amounts of the cannabinoids. In addition to

containing controlled amounts of the cannabinoids, the wrapping material can also be designed to provide uniform deliveries of the cannabinoids in the aerosol generated from the material.

[0088] Another component that can be added to the reconstituted cannabis material are various flavorants, especially terpenes. A terpene or a blend of terpenes, for instance, can be used to develop desirable aromas and indicate to the user the quality of the product. One or more terpenes can also improve the sensory reaction to inhaling an aerosol created by the reconstituted material.

[0089] Various different terpenes can be applied to the reconstituted plant material. Such terpenes include but are not limited to pinene, humulene, b-caryophyllene, isopulegol, guaiol, nerylacetate, neomenthylacetate, limonene, menthone, dihydrojasmone, terpinolene, menthol, phellandrene, terpinene, geranylacetate, ocimene, myrcene, 1,4-cineole, 3-carene, linalool, menthofuran, perillyalcohol, pinane, neomenthylaceta, alpha-bisabolol, borneol, camphene, camphor, caryophyllene oxide, alpha-cedrene, beta-eudesmol, fenchol, geraniol, isoborneol, nerol, sabinene, alpha-terpineol, and mixtures thereof.

[0090] In one embodiment, various different terpenes can be blended together in order to mimic the ratios of terpenes found in natural cannabis plants. For instance, from about 2 to about 12 terpenes can be blended together and applied to the reconstituted plant material. Each terpene can be applied to the reconstituted plant material in an amount greater than about 0.001% by weight and generally less than about 2% by weight. For instance, each terpene can be applied in an amount from about 0.01% by weight to about 1.5% by weight. For instance, each terpene can be applied in an amount from about 0.1% to about 1.1% by weight.

[0091] Exemplary blends of terpenes include alpha-pinene, beta-caryophyllene, and beta-pinene; alpha-humulene, alpha-pinene, beta-caryophyllene, beta-pinene, and guaiol; beta-caryophyllene, beta-pinene, and d-limonene; beta-caryophyllene, beta-pinene, and nerolidol; beta-caryophyllene, beta-pinene, d-limonene, and terpinolene; alpha-bisabolol, alpha-pinene, beta-caryophyllene, beta-myrcene, beta-pinena, and d-limonene; beta-caryophyllene, beta-pinena, and p-cymene; alpha-humulene, beta-caryophyllene, beta-pinene, d-limonene, linalool, and nerolidol; beta-caryophyllene and beta-pinene; beta-caryophyllene, beta-myrcene, and terpinolene;

alpha-pinene, beta-caryophyllene, beta-pinene, d-limonene; alpha-humulene, alpha-pinene, beta-caryophyllene, beta-myrcene, beta-pinena, d-limonene, and guaiol.

[0092] Regardless of the aerosol delivery composition and agent selected, the wrapping material according to the present disclosure may be used as a carrier for the aerosol delivery composition and agent. As the wrapping material has a pleasant natural cannabis taste and smell, the wrapping material may also exhibit a taste and smell imparted by the aerosol delivery composition and agent. The aerosol delivery composition and agent may be contained in the wrapping material in an amount greater than about 0.1% by weight, such as at least about 1% or greater, such as at least about 5% or greater, such as at least about 10% or greater, such as at least about 15% or greater, such as at least about 20% or greater, such as at least about 25% or greater, such as at least about 30% or greater, such as at least about 35% or greater, such as 40% or less, or any ranges therebetween. Of course, in one embodiment, the soluble portion of the cannabis materials may be reapplied to the wrapping material. While the soluble portion may be applied in any amount as discussed above in regards to the aerosol delivery composition, the soluble portion of the cannabis material may be contained in the wrapping material in an amount greater than about 0.1% by weight, such as at least about 1% or greater, such as at least about 5% or greater, such as at least about 10% or greater, such as at least about 15% or greater, such as at least about 20% or greater, such as at least about 25% or greater, such as at least about 30% or greater, such as at least about 35% or greater, such as 40% or less..

[0093] Wrapping materials made according to the present disclosure can be incorporated into all different types of smoking articles and aerosol-generating materials. For illustrative purposes only, one such smoking article is shown in Figs. 1 and 2. As shown, the smoking article 10 includes a smokable column 12. The smoking article 10 may also include a wrapping material 100 that defines an outer circumferential surface 16 when wrapped around the smokable column 12. The article 10 may also include a filter 26 that may be enclosed by a tipping paper, however, depending upon the smokable column material, a filter may be optional or omitted.

[0094] The smoking article shown in Figs. 1 and 2 generally comprises a cannabis cigarette. In other embodiments, however, the wrapping material of the

present disclosure can be used to produce other cannabis and cannabis products, as well as herbal cigarettes, cigarillos, and little cigars, or pre-rolled cones or even conventional tobacco smoking articles. While not shown, a cigarillo, for example, can include a plastic tip.

[0095] Notwithstanding the articles that may utilize a wrapping material 100 according to the present disclosure, Fig. 3a shows an embodiment of the present disclosure wherein the wrapping material 100 is formulated as a booklet of individual wrapping materials 100 affixed to one or more adjacent wrapping materials 100 via a natural, or at least smokable or edible, adhesive 104. As shown in Fig. 3b, in one embodiment, the adhesive 104 may only be located on a portion of the wrapping material 100, such as on an edge 106 thereof. Additionally or alternatively, the adhesive may only be located on a first side 108, which is opposite a second side 110. In such an embodiment, the first side 108 of a first wrapping material 100 may have an adhesive 104 located thereon, and may be oriented so as to be placed in contact with a second side 110 of an adjacent piece of wrapping material 100. As such, each piece of wrapping material 100 may have adhesive on a single side, so as to adhere to an immediately adjacent piece of wrapping material 100 or to a backing material 112. However, it should be understood that, in an alternative embodiment, the adhesive 104 may be located on both sides, 108 and 110, or on one or more portions of either side 108 and 110.

[0096] Regardless of the manner in which the adhesive is applied, the adhesive may be selected to be “resealable” in that the adhesive may serve to releasably affix a piece of wrapping material 100 to an adjacent piece of wrapping material 100, until such a time as a user wishes to remove a piece of wrapping material 100 from an adjacent piece of wrapping material. At such a point, the adhesive 104 may retain its adherence properties, and may serve to adhere to a portion of the wrapping material 100 to which the adhesive 104 has been applied, such as, for example, referring to Fig. 2, the adhesive 104 may adhere a first edge 114, or an area of the wrapping material adjacent to the first edge 114, of the wrapping material 100 to a second edge 116, or area of the wrapping material adjacent to the second edge 116, when forming a smokable article. Of course, the adhesive 104 may also be used to attach the wrapping material 100 to a second piece of wrapping material 100, or to any portion on either side of the wrapping material 100 to which the adhesive 104 has

been applied. For instance, an embodiment where an adhesive 104 may be utilized or desired, is for hand-rolled smoking articles

[0097] Regardless, while a seal or resealable material, such as an adhesive, may be applied by many different processes, in one embodiment, the sealable material or adhesive is applied by an off-line process or on-line sizing process. Either method, or another method, may be used to apply an adhesive 104 to at least one portion, such as at least two portions, at least three portions, or more portions of the wrapping material, and in one embodiment, may be used to apply an adhesive 104 to all or a majority of at least one side of the wrapping material. Nonetheless, when off-line gumming is used to apply the adhesive 104, the adhesive 104 may be applied by various techniques including coating, spraying, and printing. Conversely, on-line sizing may include adding one or more adhesives 104 to a size-press during the production process of the wrapping material as described in the present disclosure.

[0098] Notwithstanding the manner in which the adhesive 104 is applied to the wrapping material 100, in one embodiment, the adhesive may include alginates, arabic gum, guar gum, pectin, polyvinyl alcohol, polyvinyl acetate, cellulose derivatives such as ethyl cellulose, methyl cellulose, and carboxymethyl cellulose, starch, starch derivatives, and the like.

[0099] In one particular embodiment, the adhesive material may include an Arabic gum, cellulose, and/or cellulose derivatives. In one embodiment, cellulose derivatives include carboxy methyl cellulose (CMC), methylcellulose (CM), hydroxypropyl methyl cellulose (HPMC). Of course, it should be understood that other adhesive materials may be used as known in the art.

[00100] Regardless of the adhesive used, the adhesive may be present on the wrapping material or web in an amount of from about 0.1% to about 15% by weight, such as from about 2% to about 5% by weight. In one embodiment, the adhesive may be applied via a spray, such as a microspray, or may be otherwise applied so as to form a thin coating over the desired area.

[00101] In one embodiment, smoking articles made according to the present disclosure can also have reduced ignition propensity characteristics. For instance, the wrapping material of the present disclosure may be used as an outer wrapper of the smoking article, and can include a plurality of discrete reduced ignition areas spaced in the axial direction of the smoking article. For instance, in one

embodiment, the discrete reduced ignition areas may be in the form of circular bands. The bands can have a width so that oxygen is limited to the burning coal for a sufficient length or period of time to extinguish the coal if the smoking article were left in a static burn condition. The bands, for instance, can have a width of generally greater than about 3 mm, such as greater than about 4 mm, such as greater than about 5 mm, and generally less than about 10 mm, such as less than about 8 mm, such as less than about 7 mm.

[00102] The spacing between the reduced ignition areas can also vary depending upon a number of variables. The spacing should not be so great that the cigarette burns for a sufficient length of time to ignite a substrate before the coal burns into a reduced ignition area. The spacing also affects the thermal inertia of the burning coal, or the ability of the coal to burn through the reduced ignition areas without self-extinguishing. In general, the band spacing should be greater than about 5 mm, such as greater than about 10 mm, such as greater than about 15 mm, and generally less than about 50 mm, such as less than about 40 mm, such as less than about 30 mm. Each smoking article can contain from about 1 to about 3 bands.

[00103] In general, any suitable ignition reducing composition can be applied to the outer wrapper/wrapping material of the smoking article. In one embodiment, for instance, the ignition reducing composition contains a film-forming material. For example, film-forming materials that can be used in accordance with the present invention include alginates, guar gum, pectin, polyvinyl alcohol, polyvinyl acetate, cellulose derivatives such as ethyl cellulose, methyl cellulose, and carboxymethyl cellulose, starch, starch derivatives, and the like.

[00104] In one particular embodiment, the film-forming material may comprise an alginate, alone or in combination with starch. In general, an alginate is a derivative of an acidic polysaccaride or gum which occurs as the insoluble mixed calcium, sodium, potassium and magnesium salt in the Phaeophyceae brown seaweeds. Generally speaking, these derivatives are calcium, sodium, potassium, and/or magnesium salts of high molecular weight polysaccarides composed of varying proportions of D-mannuronic acid and L-guluronic acid. Exemplary salts or derivatives of alginic acid include ammonium alginate, potassium alginate, sodium alginate, propylene glycol alginate, and/or mixtures thereof.

[00105] In one embodiment, a relatively low molecular weight alginate may be used. For example, the alginates may have a viscosity of less than about 500 cP when contained in a 3% by weight aqueous solution at 25°C. More particularly, the alginates may have a viscosity of less than 250 cP at the above conditions, particularly less than 100 cP, and in one embodiment at a viscosity of about 20-60 cP. As used herein, viscosity is determined by a Brookfield LVF Viscometer with a suitable spindle according to the viscosity. At the above lower viscosity levels, alginate compositions can be formed at a higher solids content, but yet at a low enough solution viscosity to permit the application of the composition to a paper wrapper using conventional techniques. For example, the solids content of an alginate solution made in accordance with the present invention can be greater than about 6%, particularly greater than about 10%, and more particularly from about 10% to about 20% by weight.

[00106] At the above solids levels, alginate compositions used in accordance with the present invention can have a solution viscosity of greater than about 250 cP, particularly greater than about 500 cP, more particularly greater than about 800 cP, and in one embodiment at a viscosity of greater than about 1,000 cP at 25°C. In general, the solution viscosity of the alginate film-forming composition can be adjusted depending upon the manner in which the composition is being applied to the wrapper. For instance, the solution viscosity of the composition can be adjusted depending upon whether or not the composition is being sprayed onto the paper or printed onto the paper.

[00107] In other embodiments, it should also be understood that depending upon the application a relatively high molecular weight alginate may be used. For example, the alginate may have a viscosity of greater than about 500cP when contained in a 3% by weight aqueous solution at 25°C.

[00108] In addition to the film-forming material, the reduced ignition composition applied to the wrapper can contain various other ingredients.

[00109] For instance, in one embodiment, a filler can be contained within the composition. The filler can be, for instance, calcium carbonate, calcium chloride, calcium lactate, calcium gluconate, and the like. In addition to calcium compounds, other various particles may be used including magnesium compounds such as magnesium oxide, clay particles, and the like.

[00110] The ignition reducing composition, in one embodiment, can be water based. In particular, the ignition reducing composition may comprise an aqueous dispersion or aqueous solution. Alternatively, the ignition reducing composition prior to being applied to the paper wrapper may comprise a non-aqueous solution or dispersion. In this embodiment, for instance, an alcohol may be present for applying the composition to the wrapper.

[00111] As opposed to a film-forming composition, the ignition reducing composition may also comprise a cellulose slurry (a type of dispersion). As used herein, a slurry containing papermaking materials is not a film-forming composition. The cellulose slurry applied to the paper substrate may comprise fibrous cellulose, one or more fillers, and/or cellulose particles. As used herein, cellulose fibers and cellulose particles are to be differentiated from derivatized cellulose such as carboxymethyl cellulose. Cellulose fibers and cellulose particles, for instance, are not water soluble. In one embodiment, the cellulose slurry applied to the paper substrate may comprise microcrystalline cellulose.

[00112] Once the ignition reducing composition is formulated, the composition can be applied to a paper wrapper in discrete areas. The manner in which the composition is applied to the paper wrapper can vary. For example, the composition can be sprayed, brushed, applied with a moving orifice, or printed onto the wrapper. To form a treated area, the composition can be applied in a single pass or in a multiple pass operation. For instance, the composition can be applied to the wrapping paper in successive steps in order to form areas on the paper having reduced ignition proclivity. In general, during a multiple pass process, the treated areas can be formed by applying the composition during from about 2 to about 8 passes.

[00113] The amount of reduced ignition composition applied to the wrapper can also vary. For instance, the composition can be applied to the wrapper in an amount less than about 15% by weight, such as less than about 10% by weight, such as less than about 8% by weight. In general, the composition is applied in an amount greater than 1% by weight based upon the weight of the composition within the reduced ignition areas.

[00114] As used herein, the above weight percentages are based on the area treated with the chemical components. In other words, the weight percentages

above for the reduced ignition composition is the amount applied within the treated areas as opposed to the total amount applied over the entire surface of the wrapper.

[00115] Through the process of the present disclosure, reduced ignition areas can be produced having a relatively high permeability while also having a relatively low diffusivity. For instance, the reduced ignition areas can have a permeability greater than 10 CORESTA while still being capable of producing smoking articles that pass ASTM Test E2187-09 at least 75% of the time.

[00116] In general, the reduced ignition areas have a diffusivity that is relatively low. The diffusivity can be measured at room temperature (23°C). In general, the diffusivity at 23°C of the reduced ignition areas is less than about 0.5 cm/s, such as less than 0.4 cm/s, such as less than 0.3 cm/s. In one embodiment, the reduced ignition areas may have a diffusivity of greater than about 0.05 cm/s, such as greater than about 0.15 cm/s, such as greater than 0.16 cm/s, such as greater than 0.17 cm/s, while still having the desired reduced ignition proclivity characteristics. Diffusivity is measured using a Sodim CO2 diffusivity tester.

[00117] While additives may not be necessary in the wrapping material, as the wrapping material according to the present disclosure naturally has good manufacturing properties (*e.g.* tensile strength) and sensory properties, generally, a wrapping material according to the present disclosure may include one or more additives. Additives may be used for manufacturing wrapping papers so as to develop or give the wrapping material new properties, for instance chemical, optical, sensory or mechanical properties such as tear strength or folding resistance. In one embodiment, an additive may be a humectant, fillers, burn control additives, gums, wet strength agent, an oil-barrier and fat-barrier agent, a antiblocking agent, a dry strength agent, a softener, a wetting agent or lattices.

[00118] In one embodiment, the reconstituted web material can further contain a humectant. The humectant can be incorporated into the wrapping material for various different reasons in order to provide different benefits and advantages. For instance, in one embodiment, a humectant may be incorporated into the wrapping material in order to improve the processability and handling of the resulting fiber substrate.

[00119] While various humectants may be incorporated into the wrapping material of the present disclosure, humectants may include a polyol, a non-polyol or a mixture

thereof. Typically a polyol generating agent may be sorbitol, glycerol, propylene glycol, triethylene glycol or a mixture thereof. Typically a non-polyol generating agent may be lactic acid, glyceryl diacetate, glyceryl triacetate, triethyl citrate or isopropyl myristate or a mixture thereof. In one embodiment, the humectant is glycerol, propylene glycol, or a mixture of glycerol and propylene glycol, glycerol being preferred glycerol, propylene glycol, or mixtures thereof. Regardless of the humectant selected, the humectant may be present in the wrapping material in an amount of from 0.1% to about 20% by weight of the wrapping material, such as from about 1% to about 10%, such as from about 2% to about 8% by weight of the wrapping material, or any ranges therebetween.

[00120] The wrapping material of the present disclosure may also optionally contain a filler. The filler can comprise particles incorporated into the reconstituted web material for any desired purpose, such as for facilitating formation of the wrapping material and/or for affecting the appearance or strength of the material. Fillers may include kaolin clay, magnesium oxide, titanium dioxide, calcium carbonate, talc, barium sulfate, a bentonite, a zeolite, a silicate, mica, or a mixture thereof. Furthermore, as the wrapping material according to the present disclosure has a natural color an appearance, it is not necessary to select a white filler. Therefore, additional fillers may be used as are known in the art. The addition of this filler may modify some of the mechanical properties of the wrapping material, in particular the properties allowing it to be printed or written on it. This filler may also give the wrapping material certain sensory properties.

[00121] The amount of filler in the wrapping material according to the invention is from 0% to 40%, preferably from 5% to 20%, even more preferentially from 10% to 20% by weight of the wrapping material.

[00122] Furthermore, in one embodiment, the particle size of the filler may be carefully controlled such that the average particle size of the filler is from about 10 microns or less, such as about 7.5 microns or less, such as from about 5 microns or less, and may also be about 0.1 microns or greater. Of course, in an alternative embodiment, the particle size may be more varied based upon the desired characteristics to be obtained from the filler.

[00123] The burn control agent, for instance, may comprise a salt of a carboxylic acid. For example, the burn control agent may comprise an alkali metal salt of a

carboxylic acid, an alkaline earth metal salt of a carboxylic acid, or mixtures thereof. Examples of burn control agents that may be used include a salt of acetic acid, citric acid, malic acid, lactic acid, tartaric acid, carbonic acid, formic acid, propionic acid, glycolic acid, fumaric acid, oxalic acid, malonic acid, succinic acid, nitric acid, phosphoric acid, or mixtures thereof. Particular burn controlling agents that may be used include potassium citrate, sodium citrate, potassium succinate, sodium succinate, or mixtures thereof. When present, the burn control agent can be applied to the wrapping material generally in an amount greater than about 0.1% by weight, such as in an amount greater than about 0.5% by weight, such as in an amount greater than about 1% by weight and generally less than about 5% by weight, such as less than about 4% by weight, such as less than about 3% by weight, such as less than about 2% by weight.

[00124] Gums may include alginates, arabic gum, guar gum, pectin, polyvinyl alcohol, polyvinyl acetate, cellulose derivatives such as ethyl cellulose, methyl cellulose, and carboxymethyl cellulose, starch, starch derivatives, and the like. In one particular embodiment, the gum may comprise an alginate, alone or in combination with starch. In general, an alginate is a derivative of an acidic polysaccaride or gum which occurs as the insoluble mixed calcium, sodium, potassium and magnesium salt in the Phaeophyceae brown seaweeds. Generally speaking, these derivatives are calcium, sodium, potassium, and/or magnesium salts of high molecular weight polysaccarides composed of varying proportions of D-mannuronic acid and L-guluronic acid. Exemplary salts or derivatives of alginic acid include ammonium alginate, potassium alginate, sodium alginate, propylene glycol alginate, and/or mixtures thereof. Gums may be used in addition to adhesive agents, or in one embodiment, the gum serves as the adhesive agent, and is provided as part of the web instead of being applied to an exterior of the wrapping material as discussed above.

[00125] A wet strength agent may reduce the potential for degradation of the wrapping material if the latter is placed in contact with a liquid, such as water. Typically, the wet strength agent may be chosen from polyamides, such as epichlorohydrin resin, a polyamine-epichlorohydrin resin, a poly(aminoamide)-epichlorohydrin resin, a urea-formaldehyde resin, a melamine-formaldehyde resin; an alkyl-ketene dimer; alkylsuccinic anhydride; a polyvinylamine; an oxidized

polysaccharide. Typically, the amount of wet strength agent is from 0.1% to 30%, preferably from 1% to 15%, even more preferentially from 5% to 10% by dry weight of the wrapping material.

[00126] An oil-barrier and fat-barrier agent may reduce the absorption of fats by the paper. Typically, the oil-barrier and fat-barrier agent may be chosen from carboxymethylcellulose, polyacrylamides, acrylic esters and latices.

[00127] A antiblocking agent may limit the adhesion of a material to the paper. Typically, the antiblocking agent may be chosen from carboxymethylcellulose, polyacrylamides, acrylic esters, silicones and latices.

[00128] A dry strength agent may increase the resistance of the wrapping material if the latter is subjected to large mechanical stresses. The dry strength agent may be chosen from starches and modified gums, cellulose polymers, synthetic polymers, for instance carboxymethylcellulose and polyacrylamides. Typically, the amount of dry strength agent is from 0.1% to 15%, preferably from 1% to 10%, even more preferentially from 1% to 5% by dry weight of the wrapping material.

[00129] A softener may improve the softness of the wrapping material. Typically, a softener is a fatty acid, a siloxane compound, a silicone compound, an aminosilicone compound, an extract of aloe vera, an extract of sweet almond, an extract of camomile, a quaternary ammonium compound. Typically, the amount of softener is from 0.1% to 30%, preferably from 1% to 15%, even more preferentially from 5% to 10% by dry weight of the wrapping material.

[00130] The finished web or wrapper is dried and wound into rolls. For instance, in one embodiment, the dried sheet is wound into bobbins having a width of from about 15 mm to about 54 mm, such as from about 19 mm to about 28 mm. Prior to winding the web into a bobbin, the web may be calendered to increase the smoothness and runnability of the material. In one embodiment, for instance, a multi-nip calendar device may be used.

[00131] Wrapping materials made in accordance with the present disclosure have excellent mechanical characteristics and have a very desirable and aesthetic appearance. The aesthetic appearance can be further improved by the addition of dyes (synthetic and/or natural) and filigreeing technologies.

[00132] The present disclosure may be better understood with reference to the following examples.

EXAMPLES

EXAMPLE 1

[00133] A cannabis wrapper according to the invention utilizing cannabis fibers was manufactured according to the following method: cannabis hurds were ground to a particle size between 250 and 500 µm. The ground cannabis material was then pulped in water at 70°C for 30 minutes, in a cannabis to water ratio of 1:20. The mixture was then processed through a centrifuge so as to separate the soluble portion (cannabis water solubles) from the insoluble portion (insoluble hemp fiber residue). The insoluble portion was mixed with bleached hemp pulp, used as web building fibers from hemp, in a ratio of the insoluble portion to hemp pulp of 3:1 (dry weight :dry weight)and the mixed slurry was then refined through disk refiners. After refining, a base sheet was formed from the refined slurry. The aqueous soluble portion originating from the cannabis plant (also referred to herein as cannabis water solubles) was then mixed with various additives, including aerosol generating agents and/or pigments. The resulting reconstituted hemp material was finally dried into a web, and formed into a cannabis wrapping material :

- Sample A: Coating of 6% by weight of glycerol and approximately 2% by weight of dyes, diluted in extracted cannabis solubles.
- Sample B: Coating of 6% by weight of glycerol, approximately 2% by weight of dyes, and 0.5% by weight of a flavoring, generally referred to as a harshness reducing flavor, diluted in extracted cannabis solubles.
- Sample C: Coating of 6% by weight of glycerol, approximately 2% by weight of dyes, and 0.5% by weight of Herbal flavor, diluted in extracted cannabis solubles.
- Samples A, B, and C were formed into smoking articles manually; empty tubes were filled with each sample individually and smoked by an expert panel of 3 people

[00134] Evaluation : All samples exhibited a homogeneous appearance with a cannabis-like color. When compared to a reference rolling paper made of 100% hemp pulp, Sample A exhibited a slightly less irritating smoke and a less acrid aftertaste. The aroma was neutral to slightly papery.

Compared to Sample A, Sample B exhibited an even lower harshness.

Compared to Sample A, Sample C exhibited a subtle and pleasant herbal aroma.

EXAMPLE 2

[00135] A hemp wrapper was prepared according to the conditions described in Example 1, except that variants were prepared with different types and levels of pigments. The color of the samples was measured according to the CIE Hunter L*a*b scale. The Hunter Lab color scale was created in 1948 by Richard S. Hunter and is described in "The Measurement of Appearance," 2nd Addition, John Wiley and Sons, New York, New York, 1987. It describes all the colors visible to the human eye and was created to serve as a device-independent model to be used as a reference.

[00136] The three coordinates of the Hunter Lab scale represent the lightness of the color (L = 0 yields black and L = 100 indicates diffuse white; specular white may be higher), its position between red/magenta and green (a, negative values indicate green while positive values indicate magenta) and its position between yellow and blue (b, negative values indicate blue and positive values indicate yellow).

[00137] Results are shown hereafter:

Sample	Pigments	L	a	b	Comments
A	Caramel: 5% Chlorophyllin: 0.05%	63.7	1.0	24.6	Beige/Chamois color
B	Caramel: 1% Chlorophyllin: 0.05% FD&C dyes: 0.3%	57.6	-11.9	15.3	Light green color
C	Caramel: 1% Chlorophyllin: 0.05% FD&C dyes: 0.3%	48.8	-0.7	14.0	Deep green color

[00138] The results show that a wide range of color can be achieved with the cannabis wrapping material , and additionally that shade can be adjusted to the desired target using a specific combination of pigments.

EXAMPLE 3

[00139] A cannabis wrapper according to the invention utilizing cannabis fibers was manufactured according to the following method: cannabis leaves and cannabis flowers were blended in a ratio of 1:1 and ground to a particle size of 10mm. The ground cannabis blend was then pulped in water at 70°C for 30 minutes, in a hemp to water ratio of 1:20. The mixture was then processed through a centrifuge so as to separate the soluble portion (cannabis water solubles) from the insoluble portion (insoluble cannabis fiber residue). The insoluble fibrous portion was mixed with bleached hemp pulp, used as web building fibers from hemp, in a ratio of insoluble fibrous portion to hemp pulp of 4:1 (dry weight :dry weight) and the mixed slurry was then refined through disk refiners. After refining, a web or sheet was formed from the refined slurry. The soluble portion originating from the cannabis plant (also referred to herein as cannabis water solubles) was mixed with a solution of glycerol and methylcellulose. The final solution was coated on the web or sheet so that the final amount of methylcellulose included on the dried web or sheet was 2.5% by weight of the final product. The resulting material is finally dried.

[00140] After drying, the sample was tested for seal strength. The cannabis wrapper was licked or wetted with an aqueous solution on one side, and the wetted portion was adhered to a non-wetted portion of the cannabis wrapper to simulate hand-rolling a conventional smoking article. It was unexpectedly discovered that a very efficient seal was produced between the wetted and non-wetted portions of the cannabis wrapper produced according to this example. Thus, the seal formed between the wetted and non-wetted portions of the cannabis wrapper exhibited properties necessary for alternative wrappers or hand-rolled smoking articles.

EXAMPLE 4

[00141] A cannabis wrapper according to the invention utilizing cannabis fibers was manufactured according to the following method: cannabis leaves and cannabis flowers were blended in a ratio of 1:1 and ground to a particle size of 10mm. The ground cannabis blend was then pulped in water at 70°C for 30 minutes, in a hemp to water ratio of 1:20. The mixture was then processed through a centrifuge so as to separate the soluble portion (cannabis water solubles) from the insoluble fibrous portion (insoluble cannabis fiber residues. The fibrous portion was mixed with

bleached hemp pulp, used as web building fibers from hemp, in a ratio of insoluble fibrous residue to hemp pulp of 4:1 (dry weight:dry weight) and the mixed slurry was then refined through disk refiners. After refining, a web or sheet was formed from the refined slurry. The soluble portion originating from the cannabis plant (also referred to herein as cannabis water solubles) was further concentrated in an evaporator to reach a Brix of approximately 35%, and then mixed with glycerol to form a solution. The final solution was then coated on the web or sheet to reach a level of solubles of approximately 30% (including 6% glycerol), by weight when dried, based upon the dry weight of the final product..

[00142] Evaluation: The web or sheet before coating with the solution shows a pleasant green color with obvious speckles, thereby exhibiting a very natural appearance. It was unexpectedly exhibited very good burning properties and a slightly noticeable cannabis smell.

[00143] The final material, after coating the web or sheet with the solution, shows a similar natural appearance, but exhibited a more yellow color and a shinier appearance than the web or sheet prior to coating. It was observed that the burning speed was rather slow, but not self-extinguishing, and exhibited a very pleasant cannabis smell when burning.

EXAMPLE 5

[00144] A cannabis wrapper according to the invention utilizing cannabis fibers was manufactured according to the following method: a blend of cannabis fibers and cannabis leaves were ground to a particle size of 0.5mm. The ground cannabis blend was then pulped in water at 70°C for 30 minutes, in a hemp to water ratio of 1:10. The mixture was then processed through a centrifuge so as to separate the soluble portion (cannabis water solubles) from the insoluble fibrous portion (insoluble cannabis fiber residue). The fibrous portion was mixed with bleached hemp pulp, used as web building fibers from hemp, in a ratio of insoluble fibrous portion to hemp of 4:1 (dry weight:dry weight) and the mixed slurry was then refined through disk refiners. After refining, a base web or sheet was formed from the refined slurry. The soluble portion originating from the cannabis plant (also referred to herein as cannabis water solubles) was further concentrated in an evaporator to reach a Brix of approximately 30%, and then mixed with glycerol to form a solution. The final

solution was then coated on the web or sheet to reach a level of solubles of approximately 30% by weight when dried, based upon the dry weight of the final product. (In comparison, Sample A included 3% glycerol and Sample B included 8% glycerol respectively).

[00145] Evaluation: The web or sheet, before coating the web or sheet with the solution, exhibited a pale yellow color, with a very homogeneous distribution of the hemp particles. It was unexpectedly shown to have good burning properties and a pleasant, slightly sweet smell.

[00146] The final material, after coating the web or sheet with the solution, exhibited a similar appearance to the web or sheet prior to coating, but a deeper and shinier yellow shade was observed. It was observed that the burning speed was rather slow, but not self-extinguishing, and that the sample exhibited a gentle and pleasant cannabis smell when burning. While not wishing to be bound by theory, the present inventors believe that application of a higher glycerol level in Sample B provided a more flexible product texture.

[00147] Various different wrapping materials can be made in accordance with the present disclosure. In an embodiment, the wrapping material comprises a web containing extracted cannabis fibers combined with web building fibers. The web can have a basis weight of from about 20 gsm to about 80 gsm and can have a permeability of from about 10 Coresta to about 100 Coresta.

[00148] The web building fibers combined with the extracted cannabis fibers in any of the embodiments described above can vary. In an embodiment, the web building fibers are pulp fibers, such as softwood fibers, hardwood fibers, or mixtures thereof. In an embodiment, the web building fibers contain softwood fibers and hardwood fibers in a ratio of from 1:2 to 2:1. In an embodiment, the web building fibers comprise flax fibers. In an embodiment, the web building fibers are abaca fibers. In an embodiment, the web building fibers are bamboo fibers. In an embodiment, the web building fibers are coconut fibers. In an embodiment, the web building fibers are ramie fibers. In an embodiment, the web building fibers are jute fibers. In an embodiment, the web building fibers are hemp pulp fibers. The hemp pulp fibers can be used alone or in combination with wood pulp fibers, such as softwood fibers, hardwood fibers, or mixtures thereof. In an embodiment, the web building fibers are present in the wrapping material in an amount greater than about 3% by weight. In

an embodiment, the web building fibers are present in the wrapping material in an amount greater than 5% by weight. In an embodiment, the web building fibers are present in the wrapping material in an amount greater than about 8% by weight. In an embodiment, the web building fibers are present in the wrapping material in an amount greater than about 12% by weight. In an embodiment, the web building fibers are present in the wrapping material in an amount greater than about 18% by weight. In an embodiment, the web building fibers are present in the wrapping material in an amount less than about 50% by weight, such as in an amount less than about 40% by weight.

[00149] The extracted cannabis fibers combined with the web building fibers can be obtained from different sources. In an embodiment, the extracted cannabis fibers comprise cannabis leaves. In an embodiment, the extracted cannabis fibers comprise cannabis stems. In an embodiment, the cannabis fibers comprise cannabis buds. In an embodiment, the cannabis fibers comprise cannabis flowers. In an embodiment, the extracted cannabis fibers comprise cannabis buds and/or cannabis flowers combined with cannabis leaves and/or cannabis stems.

[00150] In an embodiment, the extracted cannabis fibers can be obtained from virgin materials. In an embodiment, the extracted cannabis fibers can be obtained from cannabis extracted byproducts in which the byproducts undergo an additional water soluble extraction to form the extracted cannabis fibers. In an embodiment, the extracted cannabis fibers can be obtained from a mixture of virgin cannabis materials and cannabis extracted byproducts.

[00151] In any of the embodiments described above, the wrapping material can contain a filler. The filler is combined with the extracted cannabis fibers and the web building fibers The filler can be present in an amount from about 1% to about 40% by weight. The filler can comprise calcium carbonate particles. In an embodiment, the filler is magnesium oxide particles. In an embodiment, the filler is a combination of calcium carbonate particles and magnesium oxide particles.

[00152] In an embodiment, the web can be treated with a gum. In an embodiment, the web can be treated with a gum and a humectant.

[00153] In any of the embodiments described above, the wrapping material can also include a plurality of discrete reduced ignition areas spaced along a first direction of the wrapping material. The reduced ignition areas can have a diffusivity

of less than about 0.5 cm/s at 23°C. In an embodiment, the plurality of reduced ignition areas can be formed by applying a reduced ignition composition to the web.

[00154] These and other modifications and variations to the present invention may be practiced by those of ordinary skill in the art, without departing from the spirit and scope of the present invention, which is more particularly set forth in the appended claims. In addition, it should be understood that aspects of the various embodiments may be interchanged both in whole or in part. Furthermore, those of ordinary skill in the art will appreciate that the foregoing description is by way of example only, and is not intended to limit the invention so further described in such appended claims.

What Is Claimed:

1. A wrapping material for a smoking article comprising:
a web comprising (1) extracted cannabis fibers comprising cannabis leaves, cannabis stems, cannabis buds, cannabis flowers, or by-products from cannabis extraction, or mixtures thereof combined with (2) web building fibers, the web having a basis weight of from about 20 gsm to about 80 gsm and having a permeability of from about 10 Coresta to about 100 Coresta.

2. A wrapping material as defined in claim 1, wherein the web building fibers comprise delignified cellulosic fibers.

3. A wrapping material as defined in any of the preceding claims, wherein the extracted cannabis fibers include from about 10% to about 100% by weight extracted cannabis leaves or hurds, from about 10% to about 100% by weight extracted cannabis buds and/or flowers, and wherein the web includes from about 1% by weight to about 70% by weight web building fibers.

4. A wrapping material as defined in claim 3, wherein the web includes from about 1% to about 50% by weight web building fibers.

5. A wrapping material as defined in any of the preceding claims, wherein the web is formed from a cannabis plant material containing less than 0.3% by weight tetrahydrocannabinol.

6. A wrapping material as defined in any of the preceding claims, wherein the extracted cannabis fibers further comprise cannabis stalk.

7. A wrapping material as defined in any of the preceding claims, wherein the web further comprises a filler combined with the extracted cannabis fibers and the web building fibers.

8. A wrapping material as defined in claim 7, wherein the web contains the filler in an amount from about 1% to about 40% by weight, such as in an amount from about 5% to about 20% by weight.

9. A wrapping material as defined in claim 7 or 8, wherein the filler comprises calcium carbonate particles, titanium dioxide particles, magnesium oxide particles, kaolin particles, talc particles, barium sulfate particles, bentonite particles, zeolite particles, silicate particles or mixtures thereof.

10. A wrapping material as defined in any of claims 7 through 9, wherein the filler contained in the wrapper has an average particle size of from about 0.1 micron to about 10 microns.

11. A wrapping material as defined in any of the preceding claims, wherein the web has a permeability of from about 30 Coresta to about 80 Coresta, such as from about 40 Coresta to about 60 Coresta.

12. A wrapping material as defined in any of the preceding claims, wherein the web has a basis weight of from about 30 gsm to about 50 gsm.

13. A wrapping material as defined in any of the preceding claims, wherein the web contains the web building fibers in an amount sufficient for the web to have a tensile strength of greater than about 1000 cN/15 mm, such as greater than about 1250 cN/15mm, such as greater than about 1500 cN/15mm, and less than about 4000 cN/15mm when tested according to ASTM Test D828-97.

14. A wrapping material as defined in any of the preceding claims, wherein the web has been calendered.

15. A wrapping material as defined in any of the preceding claims, wherein the extracted cannabis fibers comprise cannabis extracted byproducts that have undergone an additional water soluble extraction.

16. A wrapping material as defined in any of the preceding claims, further comprising an aerosol delivery composition applied to the web, the aerosol delivery composition containing an aerosol delivery agent.

17. A wrapping material as defined in claim 16, wherein the aerosol delivery agent comprises a drug or a flavorant.

18. A wrapping material as defined in claim 16, wherein the aerosol delivery composition comprises an oil.

19. A wrapping material as defined in claim 16, wherein the aerosol delivery composition comprises a solid.

20. A wrapping material as defined in claim 16, wherein the aerosol delivery agent comprises nicotine.

21. A wrapping material as defined in claim 16, wherein the aerosol delivery agent comprises a cannabinoid.

22. A wrapping material as defined in claim 15, wherein the aerosol delivery agent comprises tetrahydrocannabinol.

23. A wrapping material as defined in claim 16, wherein the aerosol delivery agent comprises cannabidiol.

24. A wrapping material as defined in claim 16, wherein the aerosol delivery agent comprises a sugar, a licorice extract, honey, a coffee extract, maple syrup, a tea extract, a plant extract, a botanical extract, a tobacco extract, or a fruit extract.

25. A wrapping material as defined in claim 16, wherein the aerosol delivery composition contains a blend of terpenes.

26. A wrapping material as defined in claim 16, wherein the aerosol delivery composition is present on the web in an amount greater than about 1% by weight, such as greater than about 3% by weight, such as greater than about 5% by weight, such as greater than about 10% by weight, such as greater than about 15% by weight, such as greater than about 20% by weight, such as greater than about 25% by weight, such as greater than about 30% by weight, such as greater than about 35% by weight, such as greater than about 40% by weight, and less than about 50% by weight.

27. A wrapping material as defined in any of the preceding claims, wherein the web contains water soluble cannabis components in an amount less than about 40% by weight.

28. A wrapping material as defined in any of claims 1 through 26, wherein the web contains water soluble cannabis components in an amount less than about 20% by weight.

29. A wrapping material as defined in any of the preceding claims, wherein the web building fibers comprise softwood fibers.

30. A wrapping material as defined in any of the preceding claims, wherein the web building fibers comprise flax fibers, abaca fibers, wood pulp fibers, bamboo fibers, coconut fibers, ramie fibers, jute fibers or mixtures thereof.

31. A wrapping material as defined in any of the preceding claims, wherein the web building fibers comprise hemp pulp fibers.

32. A wrapping material as defined in any of the preceding claims, wherein the web building fibers are present in the web in an amount greater than about 3% by weight, such as in an amount greater than about 10% by weight, such as in an

amount greater than about 20% by weight, and in an amount less than about 40% by weight.

33. A wrapping material as defined in any of the preceding claims, wherein the wrapping material is tobacco-free.

34. A wrapping material as defined in any of the preceding claims, wherein the web has been treated with a burn control agent.

35. A wrapping material as defined in claim 34, wherein the burn control agent comprises a salt of a carboxylic acid, such as a citrate or a succinate, the burn control agent being present in the web in an amount of from about 0.3% by weight to about 3% by weight, such as in an amount from about 1% by weight to about 2% by weight.

36. A wrapping material as defined in any of the preceding claims, wherein the web has been treated with a humectant.

37. A wrapping material as defined in claim 36, wherein the humectant comprises glycerol, propylene glycol or mixtures thereof.

38. A wrapping material as defined in any of the preceding claims, wherein the web has been treated with a gum.

39. A wrapping material as defined in claim 38, wherein the gum comprises guar gum, alginate, carboxymethyl cellulose, or mixtures thereof.

40. A wrapping material as defined in claim 38 or 39, wherein the gum is present on the web in an amount of from about 0.1% by weight to about 2% by weight.

41. A wrapping material as defined in any of the preceding claims, wherein the wrapping material includes a plurality of discrete reduced ignition areas spaced along a first direction of the wrapping material, the reduced ignition areas having a diffusivity of less than about 0.5 cm/s at 23° C.

42. A wrapping material as defined in claim 41, wherein the plurality of reduced ignition areas have been formed by applying a reduced ignition composition to the web.

43. A wrapping material as defined in any of the preceding claims, wherein, when the wrapping material is incorporated into a smoking article and is tested according to ASTM Test E2187-09, at least 75% of the smoking articles self-extinguish.

44. A smoking article comprising a smokable rod surrounded by the wrapping material of any of the preceding claims.

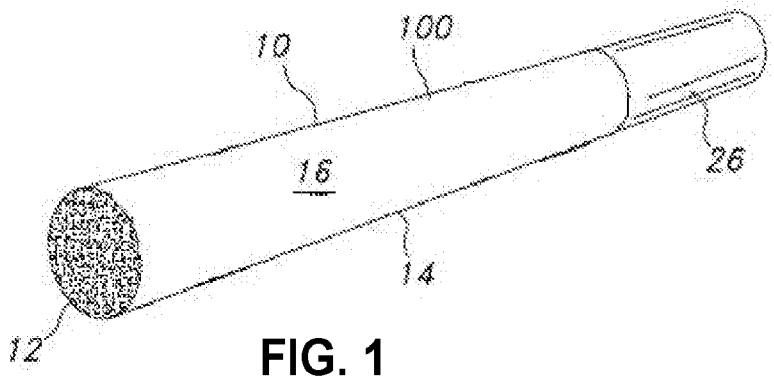


FIG. 1

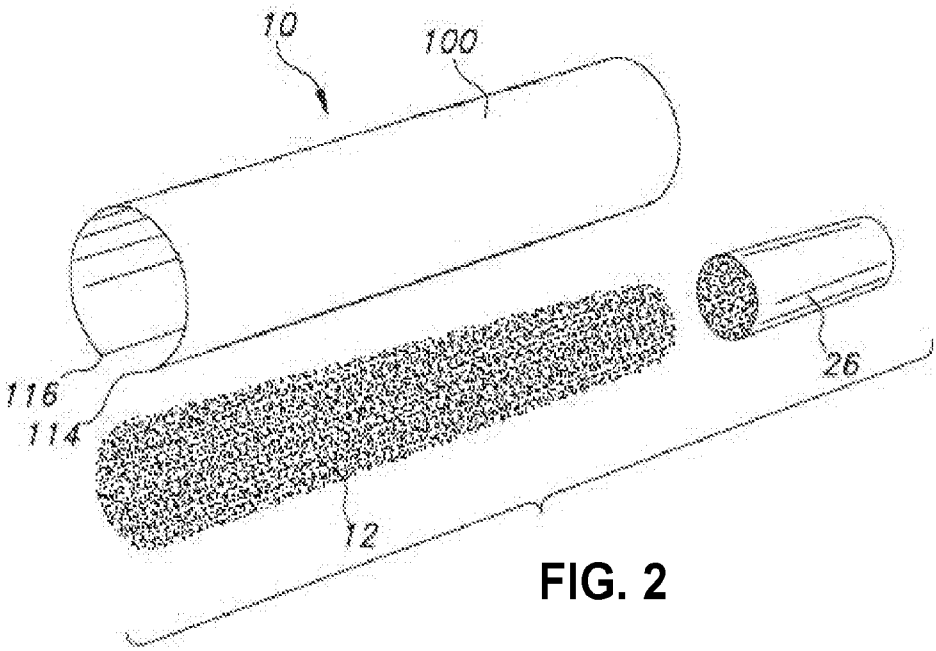


FIG. 2

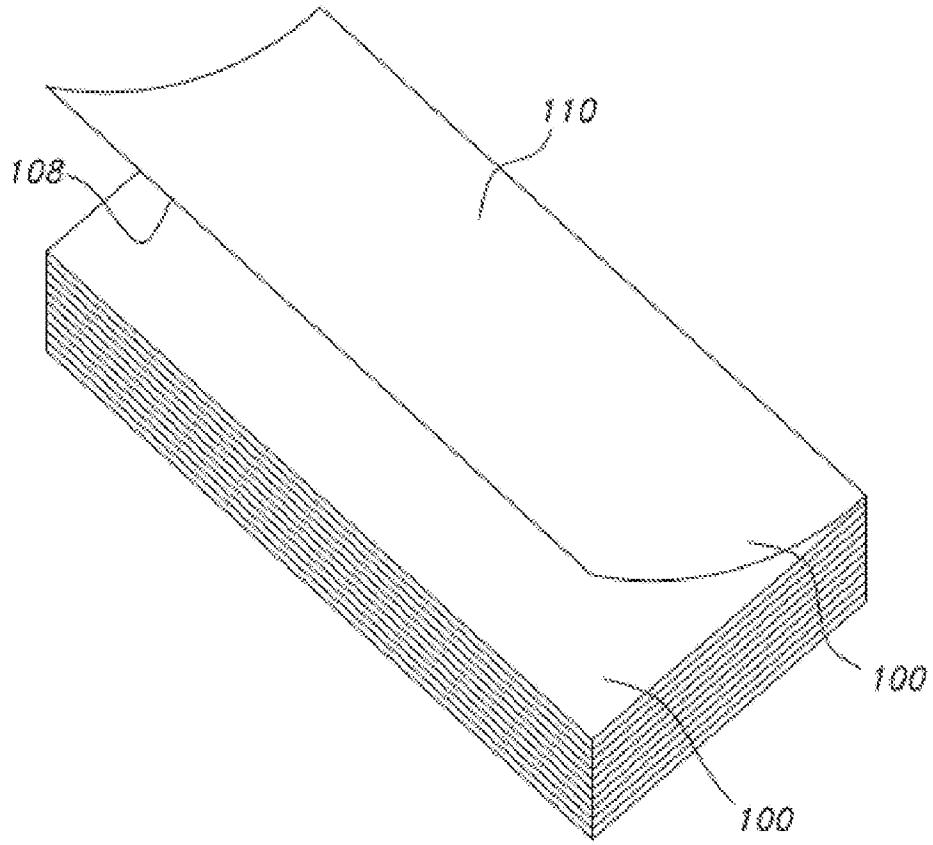


FIG. 3A

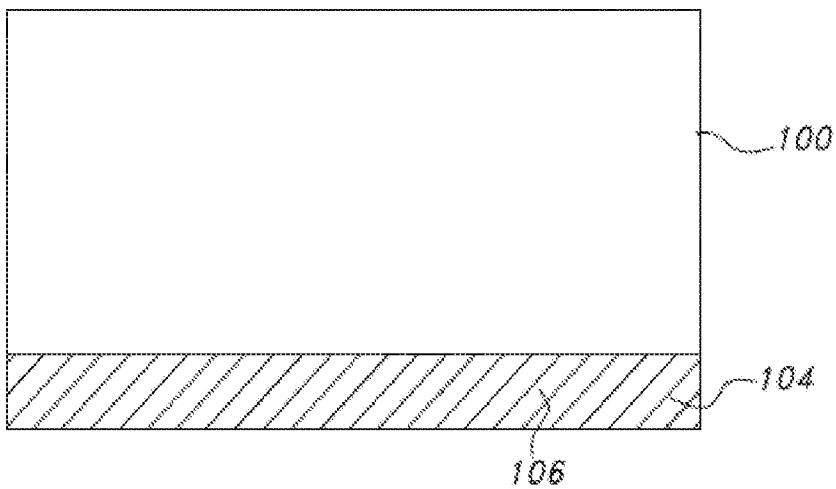


FIG. 3B

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2020/017729

A. CLASSIFICATION OF SUBJECT MATTER
INV. A24D1/02 A24D1/18 A24B15/12 A24B15/16 D21H11/12
D21H17/02 D21H27/00
ADD.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A24D A24F A24B D21H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2004/099280 A1 (STOKES CYNTHIA STEWART [US] ET AL) 27 May 2004 (2004-05-27) the whole document -----	1,2,5,7, 9-12, 14-20, 24,25, 29-44
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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

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Date of the actual completion of the international search	Date of mailing of the international search report
14 May 2020	28/05/2020

Name and mailing address of the ISA/	Authorized officer
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INTERNATIONAL SEARCH REPORT

International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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