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(54) **AGENTS FOR MODULATING THE SENSORY IMPACT OF TOBACCO OR HERBAL SMOKE**

MITTEL ZUR MODULATION DER SENSORISCHEN AUSWIRKUNG VON TABAK- ODER PFLANZLICHEM RAUCH

AGENTS DE MODULATION DE L'IMPACT SENSORIEL DE LA FUMÉE DE TABAC OU D'HERBES

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EP 3 515 215 B1

Description

BACKGROUND

[0001] Tobacco smoke is a causal risk factor for cancer (especially but not exclusively lung cancer), cardiovascular disease, and lung dysfunction, including chronic obstructive pulmonary disease (COPD). Despite the recognized and widely known hazards of tobacco smoke, the addictive properties of cigarettes and other tobacco products have been a barrier to smoking cessation or reduction. There are a number of proposed strategies for reducing the harm associated with smoking. One attempted strategy has been to produce cigarettes with low tar and nicotine delivery during smoking, intended to be below the threshold for establishment or maintenance of nicotine addiction. Such "light" cigarettes have had little impact on smoking-related illnesses, in part due to low consumer satisfaction, but also because smokers tend to compensate for low nicotine, tar, and flavor component delivery by increasing the number and volume of puffs per cigarette, to titrate nicotine delivery or airway sensations to a level that provides relief from acute tobacco craving symptoms. Another attempted strategy has been to develop methods for nicotine delivery without combustion of tobacco, including "heat-not-burn" technology that seeks to release nicotine from the tobacco via volatilization or formation of an aerosol without many of the toxicants in combusted tobacco smoke, but which still delivers the highly addictive drug nicotine.

[0002] Smoking remains one of the leading causes of preventable morbidity and mortality throughout the world. The World Health Organization estimates there are around 1.3 billion tobacco users world-wide, and notes that tobacco use causes nearly 6 million deaths per year, with an estimated 8 million deaths a year by 2030, should current trends continue. The Centers for Disease Control and Prevention has stated that smoking is the leading cause of preventable death in the U.S., where there are an estimated 540,000 premature deaths per year due to cigarette smoking, and the economic cost of smoking is estimated to exceed 300 billion per year. In addition to providing smokers with effective smoking cessation treatment options, new approaches are needed to substitute for the rewarding effects of smoking using less harmful alternatives.

[0003] While tobacco is the leading cause of preventable disease and death, nicotine is the fundamental cause of addiction among tobacco users. Even by removing harmful toxins and carcinogens from combusted tobacco smoke, nicotine is well known to have serious side effects across all systems of the body including cardiovascular, respiratory, renal and reproductive systems. The US Surgeon General has concluded that nicotine is as addictive as cocaine or heroin and thus is one of the most addicting agents known. Studies have consistently demonstrated the carcinogenic potential of nicotine. The US Food and Drug Administration (FDA) recently announced its intention to place nicotine at the center of its regulation of tobacco products, believing that reducing nicotine in tobacco products can significantly reduce tobacco-related disease and death. There is a growing acceptance that isolating nicotine use from smoking is only a partial solution and that finding safer alternatives to nicotine should be a priority.

[0004] EP 2 862 454 A1 discloses an invention relating to a liquid composition for an electronic cigarette, comprising a TRP modulator and at least one TRP agonist / activator, wherein the interaction of the modulator and the at least one agonist / activator results in a chemosensory imitation of inhaled cigarette smoke, and wherein the liquid composition does not contain nicotine. The invention further relates to a use of a modulator and at least one TRP agonist / activator in a liquid composition for electronic cigarettes which does not contain nicotine for inhaling cigarette smoke.

[0005] US 2014/271733 A1 discloses pharmaceutical compositions and methods of use therefor for reducing the desire to engage in smoking. More specifically, the pharmaceutical composition utilizes an active ingredient to reduce the side effects of smoking cessation and to limit the molecular feedback caused by nicotine-mediated activation of acetylcholine receptors.

[0006] US 2012/027693 A1 discloses methods and compositions directed to the treatment or amelioration of muscle cramps using a composition that includes one or more TRPV1 channel activators, and/or one or more TRPA1 channel activators, and/or one or more ASIC channel activators

[0007] WO 2015/091792 Aldiscloses a smoking article having an aerosol generating substrate and a mouthpiece. The mouthpiece includes a cavity at least partially filled with a particulate material, such as activated carbon,and contains at least one breakable capsule of a liquid flavourant at least partially surrounded by the particulate material, such that the force required to break the capsule within the mouthpiece to release the liquid flavourant is less than three times the inherent burst strength of the capsule.

[0008] US 2009/277465 A1 discloses an improved delivery of additive materials to cigarettes through the use of one or more capsules containing additive materials, such as flavor components, in the filter section of a cigarette. The sealed capsule or capsules are subjected to an external force, such as squeezing, by a smoker prior to or during smoking of the cigarette in order to release at least a portion of the additive material from the one or more capsules and expose the additive material to mainstream smoke passing through the filter. The sealed capsules provide a barrier between the additive materials and other cigarettes components, such as sorbents or filter materials, in order to reduce additive material migration into the other cigarette components prior to desired use.

[0009] US 2006/144412 A1 discloses an iimproved delivery of additives through encapsulation. The encap-

sulated additives can be formed by encapsulating additives using co-ionic cross-linking, in-situ overcoating, and/or step-growth overcoating. By encapsulating additives, additives can be made heat and moisture stable and migration and/or loss of the additives within a cigarette, such as an activated carbon containing cigarette, can be reduced.

[0010] GB 1 284 151 A discloses minute capsules of 50-500 microns diameter containing a volatile flavouring material, for incorporation in tobacco compositions (see Division A2), have rigid walls which are heat rupturable with a crackling sound and may be made from gelatine-gum arabic or gelatinecarrageenan complexes, phased out succinylated gelatines, or ethyl cellulose. In the examples, a synthetic clove oil is encapsulated in a gelatine-gum arabic complex by first dispersing the oil in a hot solution of gelatine or gum arabic and then stirring in a hot solution of gum arabic or gelatine respectively and cooling the mixture with continued stirring, or by adding the oil to a hot stirred mixture of precipitated gelatine in gum arabic solution (produced by mixing hot solutions of each) and subsequently cooling with continued stirring. Glutyraldehyde is added in some of the examples to harden the formed capsules, and in one example sodium benzoate is also added

US 5 383 478 A discloses a low tar cigarette product and method of use which enhances the sensory impact of low tar and low nicotine cigarettes in order to increase their acceptability and reduce the likelihood that smokers will exhibit compensatory smoking during use thereof. The novel cigarette utilizes an irritant selected from the group consisting of one or more constituents from black and/or red pepper, capsaicinoids, and mixtures of the foregoing in the tobacco thereof. Subsequent to igniting the tobacco and inhaling from the cigarette, the irritant creates respiratory tract sensations in a user substantively similar to those obtained by inhalation of tobacco smoke from a conventional cigarette.

[0011] US 2013/152956 A1 discloses a device for simulating a chemosensation of smoking including an outer layer, a porous medium and a chemesthetic agent. The porous medium is disposed within the outer layer. The chemesthetic agent is disposed within the porous medium and activates a TRP channel.

BRIEF SUMMARY

[0012] According to the invention, a device includes a wrapper, tobacco disposed in the wrapper, and a first agent that activates a TRPA1 channel disposed in the wrapper.

[0013] The first agent includes at least one of grains of paradise (Aframomum melegueta), galangal and 6-paradol.

[0014] The device may be at least partially combustible.

[0015] The device may include a filter disposed toward an end of the device and coupled to the wrapper.

[0016] The device may include a capsule operable to be broken by finger pressure.

[0017] The first agent is disposed in the tobacco, and a second agent that activates at least one of a TRPM8 channel, a TRPV3 channel, and a TRPV1 channel is disposed in the capsule.

[0018] The second agent may activate the TRPM8 channel and be operable to provide a cooling sensation.

[0019] The second agent may include at least one of menthol, physcool (monomenthyl succinate), icilin, geraniol, linalool, hydroxycitronellal, WS-3, WS-23, PMD38, Cool-actP, FrescolatMGA, FrescolatMA and PMD38.

[0020] The second agent may activate the TRPV3 channel and be operable to provide a warming sensation.

[0021] The device may include a second agent that activates a TRPV3 channel and is operable to provide a warming sensation.

[0022] The device may include a second agent that activates the TRPV1 channel.

[0023] The tobacco may be a low nicotine tobacco.

[0024] The device may include at least one of herb and tea leaves.

[0025] In another example, a device includes a wrapper, at least one of herb and tea leaves disposed in the wrapper, and a first agent that activates a TRPA1 channel disposed in the wrapper.

[0026] The first agent includes at least one of grains of paradise (Aframomum melegueta), galangal and 6-paradol.

[0027] The device may include a capsule operable to be broken by finger pressure. The first agent may be disposed in the at least one of herb and tea leaves. A second agent that activates at least one of a TRPM8 channel, a TRPV3 channel, and a TRPV1 channel is disposed in the capsule.

[0028] The second agent may activate the TRPM8 channel and be operable to provide a cooling sensation.

[0029] The second agent may activates the TRPV3 channel and be operable to provide a warming sensation.

[0030] The second agent may activate the TRPV1 channel.

BRIEF DESCRIPTION OF THE DRAWINGS

[0031]

Figure 1 is a perspective view of an exemplary device for delivering compositions of the present disclosure.
Figure 2 is an exploded schematic side view of an exemplary embodiment of the device of Figure 1.
Figure 3 is a schematic side view of an exemplary cellulose acetate tip of the device of Figure 1.

DETAILED DESCRIPTION

[0032] Embodiments described herein relate generally to an improved composition to modulate the sensory effects of low nicotine or non-nicotine tobacco or tobacco

substitute products and providing relief from acute nicotine craving symptoms.

[0033] Sensory aspects of smoking contribute to smoking behavior and relief of cigarette craving both through conditioned or learned association with nicotine delivery, but also through direct autonomic and sensory-metabolic reflexes independent of nicotine entry into the brain. In particular, tracheal stimulation (sometimes referred to as "throat scratch," "throat impact" or "throat hit") is reported as a component of smoking satisfaction and relief of cigarette craving. Isolated reduction of throat sensations with local anesthetics reduce the relief of smoking craving induced by nicotine-containing cigarette smoke; conversely, maintenance of throat scratch while disabling olfaction and oral taste sensation with an anesthetic mouthwash can alleviate the negative affect associated with cigarette craving. The "throat scratch" can affect perceived taste qualities and more subtle throat and airway autonomic sensory nerve stimulation, which can have effects beyond taste sensations.

[0034] An understanding of actions of nicotine that permit improvements in mimicry of its subjective and physiological effects in a non-combustible simulated cigarette is that its initial perceived actions are upon sensory receptors in the respiratory tract. Cigarette smoke constituents, including but not limited to nicotine, act on sensory and autonomic afferent nerve terminals sending sensory information to the brain from the mouth, throat and respiratory tract via the vagus, trigeminal and other cranial nerves, and induce autonomic reflexes and effects in the central nervous system that contribute to the subjective experience of cigarette smoking, including "throat scratch," and to relief of craving, and also to subjective reflex-mediated experiences such as "head rush." Cigarette smoking causes EEG changes and corresponding subjective experiences in the brain via sensory reflexes even before nicotine is absorbed and transported to the brain.

[0035] The pharmacological actions of nicotine include actions on nicotinic cholinergic receptors in the central and peripheral nervous systems. A class of sensory receptors distinct from cholinergic receptors can be exploited by compositions and devices of this disclosure to provide mimicry of the sensation of inhalation of cigarette smoke to a degree sufficient to provide satisfaction and attenuation of craving for nicotine-containing cigarettes. Simulation of nicotine's actions on sensory receptors on nerve endings in the respiratory tract is achieved with selected volatile agents acting on the chemesthetic sensory modality mediated by transient receptor potential channels, which are pharmacologically distinct from nicotine-responsive cholinergic or acetylcholine receptors.

[0036] The chemical senses comprise taste, olfaction, and "chemesthesis" (also known as the "common chemical sense," or trigeminal chemosensation). Chemesthesis refers to actions of chemicals, e.g. food constituents, on nerve endings mediating sensations of pain or temperature, including the pungent, hot or cool sensations elicited by specific constituents of many ingested or inhaled substances including hot peppers (capsaicin), black pepper (piperine), menthol, garlic (allicin), horseradish and wasabi (allyl isothiocyanate), camphor, wintergreen, cinnamon (cinnamaldehyde), carbonated beverages (carbon dioxide) and some air pollutants. Such sensations in the oral and nasal cavities are mediated via the trigeminal nerve, and are elements of the somatosensory system, distinguishing them from olfaction and taste, although chemesthesis is an integral component of characteristic sensory information about foods or airborne chemicals.

[0037] In the throat, respiratory tract and lungs, chemesthetic signals are transmitted to the brain via the glossopharyngeal and vagus nerves. Chemesthetic signals can thereby directly affect brain activity in the somatosensory cortex and other brain regions, including appetitive circuits involved in craving for particular foods or other chemesthetic stimuli including tobacco smoke.

[0038] Crossover of chemesthetic signaling provided by compounds of the present disclosure with chemesthetic signaling pathways involved in perception and physiological responses to tobacco smoke contributes to the ability of devices and compositions of the present disclosure to reduce craving or negative affect or mood associated with delay or withdrawal of tobacco smoke.

[0039] During tobacco smoking, chemosensory signals from the respiratory tract inform the brain that smoke, likely containing nicotine based on experience, has been inhaled, thereby triggering alterations of activity in appetitive circuits involved in converting absence of central nicotinic receptor activation into negative affect or dysphoria associated with cigarette craving. Activation of chemosensory neurons that anatomically or functionally overlap with neurons terminating in the airways that respond to nicotine and other smoke constituents provides signals to the brain that similarly trigger neural reflex-mediated relief of nicotine-withdrawal dysphoria without actually delivering nicotine or potentially toxic smoke constituents resulting from combustion of tobacco. Similarly, mimicry of tactile, kinesthetic, organoleptic aspects of cigarette smoking, in addition to chemosensory mimicry, reinforces the ability of devices and compositions of the present disclosure to relieve symptoms of nicotine withdrawal or cigarette craving.

[0040] Transient receptor potential ion channels ("TRP channels" or, simply "TRP") are a class of receptors on sensory nerves that trigger chemesthetic nerve activation. TRP channels mediate pungent, hot or cool sensations of food or air. TRP activation on sensory nerve endings can induce local effects in addition to sensation per se (e.g. focal vasodilatation via axon reflex) or may trigger sensory-autonomic reflexes (e.g changes in bronchial tone, coughing, sneezing or changes in body temperature regulation, or subjective sensations) mediated through the reflex arcs involving the spinal cord or brain. While TRP activation can provide warning of potentially

noxious environmental or dietary factors, TRP stimulation can also elicit pleasure or satisfaction, as is implied by the examples of common TRP activators above. A feature of TRP activation is that chemesthetic sensations (or TRP sensations), which are generally more sensitive to temperature sensations than to smell sensations provide less inherent discrimination between different agonists than is the case for olfactory sensation. Sensory nerve endings associated with the trigeminal, glossopharyngeal and vagus nerves may contain multiple types of chemosensory receptors, providing a basis for chemesthetic mimicry by chemically diverse agents.

[0041] TRP channels can be activated by concentrations of compounds below those that cause actual physical changes in the respiratory tract, acting as sensitive sentinels of possible irritation or damage. TRP channel activators therefore provide a potential mode of action for volatile constituents to have smoke-mimetic chemosensory or chemesthetic effects without delivery of otherwise bioactive quantities of the sensory agents into the body.

[0042] Referring to Fig. 1, in some embodiments, an exemplary cigarette device 10 may be approximately the size and shape of a conventional cigarette. Volatile constituents are dispersed within a matrix 12 encased within a wrapper 14 resembling the outer wrap of a conventional cigarette. In some embodiments, the wrapper is relatively nonporous, liquid impermeable wrapper 14. The matrix 12 may be provided by a porous material such as cellulose or it may also be provided by tobacco or tobacco substitute product. The end 16 of the device 10 may be constructed to resemble a conventional filter rod in appearance and/or feel. In some embodiments, a filter rod is used at the end 16 of the device 10. The present disclosure is not restricted to cigarette-like devices, but also includes substitute cigars, pipes, e-cigarettes, inhalers, and other devices used to smoke tobacco or mimic smoking.

[0043] Referring to Fig. 2, an exemplary embodiment of a device 10 includes a substrate 122 enclosed in a wrapper 123 resembling the outer wrap of a cigarette. The substrate 122 may include a channel 124. The channel 124 may include a tobacco or substitute tobacco product 126 and a porous substrate 128 to contain constituents described herein. The substrate 128 may also be omitted and the constituents applied directly to the tobacco or tobacco substitute product. The tobacco or substitute tobacco product 126 may be separated from the substrate 128 by a substantially non-porous or liquid impermeable barrier to provide separation between the tobacco or substitute tobacco product and the constituents of the disclosure. This may protect the constituents from the heat of burning the tobacco or substitute tobacco product.

[0044] An untreated region 130 may be included at a second end 132 of the device 10, which is subjected to mouth-applied suction by a user. The untreated region 130 may be untreated cellulose or other filtering material. In some embodiments, the untreated region 130 may be a filter plug. In some embodiments, the untreated region 130 may be a cellulose acetate tip with a micro capsule (discussed in more detail with respect to Fig. 3).

[0045] The region 130 and part of the channel 124 may be covered with a wrap 134. The wrap 134 enhances visual similarity between the device 10 and a cigarette. In some cases, the substrate 128 may be disposed inside the region of the device 10 covered by the wrap 134. A portion 136 of the wrap 134 may include trade dress for identifying the device 10 or the maker thereof.

[0046] In an embodiment, the device 10 may have a length of approximately 100 mm and a diameter of approximately 7.9 mm in diameter. The channel 124 may be approximately 80 mm in length and the region 130 may be approximately 20 mm in length. The substrate 128 may be 10 mm or more in length. The wrap 134 may be approximately 30 mm in length.

[0047] Referring to Fig. 3, the region 130a is an exemplary cellulose acetate tip with a pellet or capsule 140, such as a micro bead, that is stable and does not release the active agents therein until crushed or broken by finger pressure. The micro capsule 140 may be of various sizes such as 3.5-5mm in diameter. The micro capsule 140 may be arranged with its center at approximately 15 mm from the second end 132.

[0048] The present disclosure provides a selection of volatile activators of TRP channels and acid sensitive ion channels which, when incorporated into a low nicotine or non-nicotine combustion or heating device, provide improved chemosensory mimicry of the experience of nicotine delivery versus prior low nicotine or non-nicotine delivery devices. Importantly, the compositions of this disclosure may impart chemosensory activity without also providing undesirable flavors.

[0049] Compositions of the disclosure include ingredients that are co-delivered with tobacco or botanical tobacco substitute smoke, or with vapor from tobacco or botanical tobacco substitute materials. There are two primary methods described in this disclosure: 1) incorporation of sensory agents in the tobacco or tobacco substitutes prior to forming them into cigarettes or heat-not-burn products ; or 2) inclusion of sensory agents into the filter of a cigarette such that they are released into the mainstream smoke during inhalation. In this latter embodiment, filter elements are optionally pellets or capsules that are stable and do not release the active agents until crushed or broken by finger pressure, or by incorporating segmented filter technology to embed a section to co-deliver ingredients.

[0050] Agents of the disclosure for simulating or amplifying throat or airway sensations associated with cigarette and herbal smoking or aerosolizing include sensate constituents of aframomum malagueta, including 6-paradol, of galangal root, including galangal acetate and its analogs, of hydroxy-alpha sanshool which is found in extracts of Szechuan peppers, of thymol which is found in extracts of Thyme, and of camphor and its analogs which is found in extracts of rosemary.

[0051] In one embodiment, a sensory agent, which optionally comprises pulverized aframomum melegueta seeds, ethanolic or methanolic extracts of the seeds, or purified, semi-purified or synthetic compounds found in the seeds, including 6-paradol, are applied to, or mixed with, tobacco or botanical tobacco substitute. The treated tobacco or tobacco substitute is then formed into a cigarette by standard manufacturing methods. Similarly, powdered galangal root, or ethanolic galangal extracts or purified or semi-purified chemical constituents are applied to tobacco or tobacco substitute and formed into cigarettes.

[0052] In one embodiment, 6-paradol or galangal is combined in a cigarette, which may include the tobacco or botanical tobacco substitute, with an agent that provides a cooling effect by acting on TRPM8, a transient receptor potential channel mediating a cooling sensation evoked by agonists, including but not limited to menthol, physcool (monomenthyl succinate), icilin, geraniol, linalool, hydroxycitronellal, WS-3, WS-23, PMD38, CoolactP, FrescolatMGA, FrescolatMA and PMD38. The cooling agent is optionally added to the tobacco and is delivered by combustion or volatilization in a heat-not-burn device. In another embodiment the cooling agent is incorporated into the cigarette filter, either by application to the filter itself, or by encapsulation in a crushable pellet or capsule that releases volatile cooling agent into mainstream smoke when broken by finger pressure.

[0053] In one embodiment, 6-paradol or galangal is combined in a cigarette, which may include the tobacco or botanical tobacco substitute, with agents that provide an additional trigeminal sensory effect by acting on TRPA1 and TRPV1, transient receptor potential channels evoked by agonists, including but not limited to hydroxy-alpha sanshool which is found in extracts of Szechuan peppers, isothiocyanates which are found in extracts of Mustard Seed, Yellow Mustard, or combinations thereof. The TRPV1 and TRPA1 agonists are optionally incorporated into the tobacco, as either a purified or semi-purified compound, a semi-purified extract, or as a simple ethanolic or methanolic extract of a botanical material of which the TRPV1 and TRPA1 agent is an endogenous constituent.

[0054] In one embodiment, 6-paradol or galangal is combined in a cigarette, which may include the tobacco or botanical tobacco substitute, with an agent that provides an additional trigeminal sensory effect by acting on TRPV3, a transient receptor potential channel mediating a warming sensation evoked by agonists, including but not limited to carvacrol, thymol, eugenol, eucalyptol, incensol, borneol, camphor, dihydrocarveol or combinations thereof. The TRPV3 agonist is optionally incorporated into the tobacco or herbal cut rag, as either a purified or semi-purified compound, a semi-purified extract, or as a simple ethanolic extract of a botanical material of which the TRPV3 agent is an endogenous constituent.

[0055] In another embodiment, the TRPV1 and/or TRPV3 agents are incorporated into the cigarette filter, either by application to the filter itself, or by encapsulation in a crushable pellet or capsule that releases volatile cooling agent into mainstream smoke when broken by finger pressure. Many TRPV1 and/or TRPV3 agents, such as terpenoid compounds are volatile and therefore advantageous for delivery in the filter, entering mainstream smoke during its passage through the filter. Examples of TRPV1 agents that may be included in the filter and/or capsule include Szechuan pepper, all spice, mustard and rosemary. Examples of TRPV3 agents that may be included in the filter and/or capsule include camphor, carvacrol, thymol, and incensole acetate.

[0056] In one embodiment, a cooling agent and a TRPV3 activating agent are combined in a pellet or capsule in the filter of a cigarette, while a TRPA1 agonist, including but not limited to aframomum malagueta extract (or 6-paradol) or a galangal extract or galangal acetate) is incorporated into tobacco and released into mainstream smoke during combustion.

[0057] In one embodiment, a cooling agent and a TRPV1 activating agent are combined in a pellet or capsule in the filter of a cigarette, while a TRPA1 agonist, including but not limited to aframomum malagueta extract (or 6-paradol) or a galangal extract or galangal acetate) is incorporated into tobacco and released into mainstream smoke during combustion.

[0058] TRPV3 and TRPA1 activating agents may be more expensive and more volatile than TRPV1 activating agents. Therefore, inclusion of the TRPV3 and TRPA1 agents in a pellet or capsule offers advantages in using less of the agent (more cost effective) and improving the shelf life of the product.

Example 1

[0059] Aframomum melegueta seeds (200 grams), and powdered galangal root, or ethanolic galangal extracts, were pulverized in a coffee grinder and extracted through a heated extraction process with ethanol for 3 hours. The extract was filtered in three separate steps. Using a syringe and needle, 0.1 ml was injected into a light cigarette, withdrawing the needle while dispensing the extract from the syringe down the length of the tobacco column. After being allowed to dry, the cigarette displayed an intensified throat sensation, mimicking a key element of the sensory impact of a stronger cigarette.

Example 2

[0060] Aframomum melegueta seeds (2.4 kg), thyme leaves (7.4 kg), rosemary (6.6 kg), and powdered galangal root (8.1 kg), were pulverized in a coffee grinder and extracted through a heated extraction process with 106 liters of methanol for 3 hours. The extract was filtered in three separate steps. This extract was applied to tea leaves as a tobacco substitute. Application was by fine spray over the non-tobacco herbal cut-rag which was

then mixed and tumbled to coat evenly. The treated cut-rag was dried in a commercial grade oven for 4 hours. Following the drying process, the cut-rag was sprayed with propylene glycol to reach a moisture level of approximately 18%. The non-tobacco herbal cut-rag was manufactured into cigarettes on a Hauni Protos high speed cigarette making line. The cigarettes displayed an intensified throat sensation, mimicking a key element of the sensory impact of a nicotine containing tobacco cigarette.

Example 3

[0061] Aframomum melegueta seeds (200 grams), and powdered galangal root, or ethanolic galangal extracts, were pulverized in a coffee grinder and extracted through a heated extraction process with methanol for 3 hours. The extract was filtered in three separate steps. This extract was applied to a very low nicotine (VLN) tobacco cut-rag with less than 0.04% nicotine. Application was by fine spray over the cut-rag which was then mixed and tumbled to coat evenly. The treated cut-rag was dried in a commercial grade oven for 4 hours. Following the drying process, the cut-rag was sprayed with propylene glycol to reach a moisture level of approximately 18%. The VLN cut-rag was hand-rolled into cigarettes, which displayed an intensified throat sensation, mimicking a key element of the sensory impact of a tobacco cigarette with regular level of nicotine content.

Example 4

[0062] Aframomum melegueta seeds (200 grams), and powdered galangal root, or ethanolic galangal extracts, were pulverized in a coffee grinder and extracted through a heated extraction process with methanol for 3 hours. The extract was filtered in three separate steps. This extract was applied to a blend of herb and tea leaves as a tobacco substitute. Application was by fine spray over the cut-rag which was then mixed and tumbled to coat evenly. The treated cut-rag was dried in a commercial grade oven. Following the drying process, the cut-rag was cut and ground finely and sprayed with vegetable glycerin to reach a moisture level of approximately 18%. The moist cut-rag was then placed into a herbal vaporizer device, which upon heating displayed an intensified throat sensation, mimicking a key element of the sensory impact of a tobacco vaporizer. The composition of Example 4 is particularly advantageous for use in non-combustion heat not burn technology in which the composition is heated to release vapor or aerosol but burning and combustion is not required. The device may be a heat stick, for example a shorter cigarette type device including a tobacco blend. The device may also be a reusable device that accepts any type of cut rag or material in a heating chamber.

[0063] It will be appreciated that the described exemplary constituents are not limiting and the described constituents include equivalents such as synthetic alternatives. It will also be appreciated that description of constituents in compositions as by weight or by volume is merely exemplary and is not limiting. Constituents may be measured using any of a variety of available methods.

[0064] In addition, it will be appreciated that the above described devices and compositions are not limited to cigarette-like rods, but are also applicable to other devices such as inhalers that may be used to deliver the constituent(s). Also, it will be appreciated that the above described devices are applicable to applications beyond smoking substitution and smoking cessation.

Claims

1. A device (10) to mimic the sensation of inhalation of tobacco smoke, comprising:

   a wrapper (14);
   a tobacco substitute (126) disposed in the wrapper (14); and
   a first extract containing an agent that activates a TRPA1 channel;
   wherein the first agent includes at least one of grains of paradise (Aframomum melegueta), galangal and 6-paradol;
   a second extract containing an agent, distinct from the first agent, that activates at least one of a TRPM8 channel, a TRPV3 channel, and a TRPV1 channel,

   wherein the first extract and second extract are each applied to the tobacco substitute as a spray to coat the tobacco substitute (126), and the tobacco substitute is then dried;
   wherein the device (10) releases volatile compounds when heated at a temperature below a combustion point of the tobacco substitute.

2. The device of claim 1 wherein
   the tobacco substitute (126) is comprised of herb and tea leaves.

3. A composition to mimic the sensation of inhalation of tobacco smoke, comprising:

   a tobacco substitute (126);
   a first extract containing an agent that activates a TRPA1 channel;
   wherein the first agent includes at least one of grains of paradise (Aframomum melegueta), galangal and 6-paradol; and
   a second extract containing an agent, distinct from the first agent, that activates at least one of a TRPM8 channel, a TRPV3 channel, and a

TRPV1 channel,

wherein the first extract and second extract are each applied to the tobacco substitute as a spray to coat the tobacco substitute, and the tobacco substitute is then dried;
wherein the composition releases volatile compounds when heated at a temperature below a combustion point of the composition.

4. The device of claim 1, wherein the device is at least partially combustible.

5. The device of claim 1, further comprising a filter disposed toward an end of the device and coupled to the wrapper.

6. The device of claim 1, wherein the

second agent that activates a TRPM8 channel is operable to provide a cooling sensation and optionally or preferably, wherein the second agent includes at least one of menthol, physcool (monomenthyl succinate), icilin, geraniol, linalool, hydroxycitronellal, WS-3, WS- 23, PMD38, Cool-actP, FrescolatMGA, FrescolatMA and PMD38.

7. The device of claim 1, wherein the

second agent that activates a TRPV3 channel is operable to provide a warming sensation; and optionally or preferably, wherein the second agent includes at least one of carvacrol, thymol, eugenol, eucalyptol, incensol, bomeol, camphor, dihydrocarveol.

8. The device of claim 1, wherein the second agent includes at least one of Szechuan pepper, all spice, mustard and rosemary.

Patentansprüche

1. Vorrichtung (10) zum Nachahmen des Gefühls einer Inhalation von Tabakrauch, umfassend:

eine Hülle (14);
einen Tabakersatz (126), der in der Hülle (14) angeordnet ist; und
einen ersten Extrakt, der ein Mittel enthält, das einen TRPA1-Kanal aktiviert;
wobei das erste Mittel mindestens eines von Paradieskörnern (Aframomum melegueta), Galgant und 6-Paradol einschließt;
einen zweiten Extrakt, der ein Mittel enthält, das sich von dem ersten Mittel unterscheidet und mindestens einen von einem TRPM8-Kanal, einem TRPV3-Kanal und einem TRPV1-Kanal aktiviert,

wobei der erste Extrakt und der zweite Extrakt jeweils als ein Spray auf den Tabakersatz aufgetragen werden, um den Tabakersatz (126) zu überziehen, und der Tabakersatz dann getrocknet wird;
wobei die Vorrichtung (10) flüchtige Verbindungen freisetzt, wenn sie auf eine Temperatur unterhalb eines Verbrennungspunkts des Tabakersatzes erhitzt wird.

2. Vorrichtung nach Anspruch 1 wobei der Tabakersatz (126) aus Kräuter- und Teeblättern gebildet ist.

3. Zusammensetzung zum Nachahmen des Gefühls einer Inhalation von Tabakrauch, umfassend:

einen Tabakersatz (126);
einen ersten Extrakt, der ein Mittel enthält, das einen TRPA1-Kanal aktiviert;
wobei das erste Mittel mindestens eines von Paradieskörnern (Aframomum melegueta), Galgant und 6-Paradol einschließt; und
einen zweiten Extrakt, der ein Mittel enthält, das sich von dem ersten Mittel unterscheidet und mindestens einen von einem TRPM8-Kanal, einem TRPV3-Kanal und einem TRPV1-Kanal aktiviert,

wobei der erste Extrakt und der zweite Extrakt jeweils als ein Spray auf den Tabakersatz aufgetragen werden, um den Tabakersatz zu überziehen, und der Tabakersatz dann getrocknet wird;
wobei die Zusammensetzung flüchtige Verbindungen freisetzt, wenn sie auf eine Temperatur unterhalb eines Verbrennungspunkts der Zusammensetzung erhitzt wird.

4. Vorrichtung nach Anspruch 1, wobei die Vorrichtung zumindest teilweise verbrennbar ist.

5. Vorrichtung nach Anspruch 1, weiter umfassend einen Filter, der zu einem Ende der Vorrichtung hin angeordnet ist und mit der Hülle verbunden ist.

6. Vorrichtung nach Anspruch 1, wobei das

zweite Mittel, das einen TRPM8-Kanal aktiviert, so bedienbar ist, dass es ein kühlendes Gefühl bereitstellt und
optional oder vorzugsweise wobei das zweite Mittel mindestens eines von Menthol, Physcool (Monomenthylsuccinat), Icilin, Geraniol, Lina-

lool, Hydroxycitronellal, WS-3, WS-23, PMD38, Cool-actP, FrescolatMGA, FrescolatMA und PMD38 einschließt.

7. Vorrichtung nach Anspruch 1, wobei das

zweite Mittel, das einen TRPV3-Kanal aktiviert, so bedienbar ist, dass es ein wärmendes Gefühl bereitstellt; und
optional oder vorzugsweise wobei das zweite Mittel mindestens eines von Carvacrol, Thymol, Eugenol, Eukalyptol, Incensol, Borneol, Kampfer oder Dihydrocarveol einschließt.

8. Vorrichtung nach Anspruch 1, wobei das zweite Mittel mindestens eines von Szechuan-Pfeffer, Piment, Senf und Rosmarin einschließt.

Revendications

1. Dispositif (10) pour imiter la sensation d'inhalation de fumée de tabac, comprenant :

un matériau d'enveloppement (14) ;
un substitut (126) de tabac disposé dans le matériau d'enveloppement (14) ; et
un premier extrait contenant un agent qui active un canal TRPA1 ;
dans lequel le premier agent inclut au moins de grains de paradis (Aframomum melegueta), galanga et 6-paradol ;
un second extrait contenant un agent, distinct du premier agent, qui active au moins un d'un canal TRPM8, un canal TRPV3 et un canal TRPV1,

dans lequel le premier extrait et le second extrait sont chacun appliqués au substitut de tabac sous la forme d'une pulvérisation pour enrober le substitut (126) de tabac, et le substitut de tabac est ensuite séché ;
dans lequel le dispositif (10) libère des composés volatils lorsqu'il est chauffé à une température inférieure à un point de combustion du substitut de tabac.

2. Dispositif selon la revendication 1, dans lequel le substitut (126) de tabac est composé d'herbes et de feuilles de thé.

3. Composition pour imiter la sensation d'inhalation de fumée de tabac, comprenant :

un substitut (126) de tabac ;
un premier extrait contenant un agent qui active un canal TRPA1 ;
dans lequel le premier agent inclut au moins un de grains de paradis (Aframomum melegueta), galanga et 6-paradol ; et
un second extrait contenant un agent, distinct du premier agent, qui active au moins un d'un canal TRPM8, un canal TRPV3 et un canal TRPV1,
dans lequel le premier extrait et le second extrait sont chacun appliqués sur le substitut de tabac sous la forme d'une pulvérisation pour enrober le substitut de tabac, et le substitut de tabac est ensuite séché ;
dans lequel la composition libère des composés volatils lorsqu'elle est chauffée à une température inférieure à un point de combustion de la composition.

4. Dispositif selon la revendication 1, dans lequel le dispositif est au moins partiellement combustible.

5. Dispositif selon la revendication 1, comprenant en outre
un filtre disposé en direction d'une extrémité du dispositif et accouplé au matériau d'enveloppement.

6. Dispositif selon la revendication 1, dans lequel le

second agent qui active un canal TRPM8 peut fournir une sensation de refroidissement et facultativement ou de préférence, dans lequel le second agent inclut au moins un de menthol, physcool (succinate de monomenthyle), iciline, géraniol, linalool, hydroxycitronellal, WS-3, WS-23, PMD38, Cool-actP, FrescolatMGA, FrescolatMA et PMD38.

7. Dispositif selon la revendication 1, dans lequel le

second agent qui active un canal TRPV3 permet de fournir une sensation de réchauffement ; et facultativement ou de préférence, dans lequel le second agent inclut au moins un de carvacrol, thymol, eugénol, eucalyptol, incensol, bornéol, camphre, dihydrocarvéol.

8. Dispositif selon la revendication 1, dans lequel le second agent inclut au moins un de poivre de Sichuan, toutes les épices, moutarde et romarin.

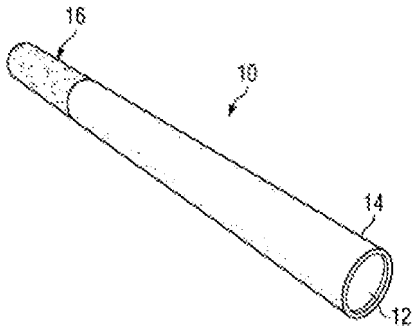

FIG. 1

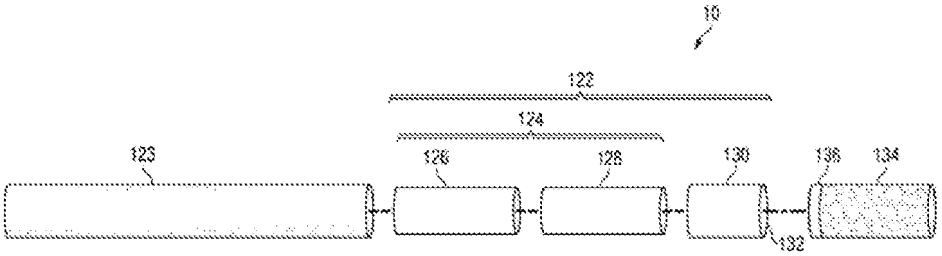

FIG. 2

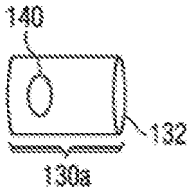

FIG. 3

REFERENCES CITED IN THE DESCRIPTION

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