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(54) ***CANNABIS* EXTRACTS AND METHODS OF PREPARING AND USING SAME**

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See application file for complete search history.

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(57) **ABSTRACT**

The invention relates to the extraction of pharmaceutically active components from plant materials, and more particularly to the preparation of a botanical drug substance (BDS) for incorporation in to a medicament. It also relates to a BDS, for use in pharmaceutical formulations. In particular it relates to BDS comprising cannabinoids obtained by extraction from *cannabis*.

36 Claims, No Drawings

Exhibit "A"

CANNABIS EXTRACTS AND METHODS OF PREPARING AND USING SAME

RELATED APPLICATIONS

This application claims priority to, and the benefit of U.S. Provisional Application No. 62/066,795 filed on Oct. 21, 2014 and U.S. Provisional Application No. 62/068,278 filed on Oct. 24, 2014, the contents of which are incorporated by reference in their entireties.

FIELD OF THE INVENTION

This invention relates to the extraction of pharmaceutically active components from plant materials, and more particularly to botanical drug substance (BDS) comprising cannabinoids obtained by extraction from *cannabis*. Methods of using the extracts to treat chronic pain, paralysis, neuropathy, Crohn's Disease, IBS, glaucoma, PTSD, anxiety, seizures, epilepsy, autoimmune disorders autism, tumors, and cancer are also included.

BACKGROUND OF THE INVENTION

Cannabis products have been consumed in various forms for thousands of years. The first descriptions of the medical uses date from Chinese herbal texts in the first century A.D. *Cannabis* products were taken orally in an herbal tea concoction and were used for their pain-relieving and sleep-inducing properties.

There presently exists the need to provide more effective and safer *cannabis* extracts for various medical uses, extraction methods that provide unique active compounds that are useful to treat pain and various medical conditions. Additionally, presently known extraction procedures do not provide the desired active ingredient(s) for the particular medical purpose. The present invention overcomes these limitations and provides other related advantages.

SUMMARY OF THE INVENTION

The invention provides an extract comprising a mixture of at least 95% total cannabinoids, and at least one terpene/flavonoid. The extract contains at least 4, 5, 6, 7 or more cannabinoids. The cannabinoids are selected from tetrahydrocannabinolic acid (THCa), cannabidiolic acid (CBDa), cannabinolic acid (CBNa) cannabichromenic acid (CBCa), tetrahydrocannabinol (THC), cannabinol (CBN), cannabidiol (CBD) or cannabichromene (CBC). In some aspect the cannabinoids are THCa and CBDa and at least two cannabinoids selected from CBNa, CBCa, THC, CBN and CBC. In a preferred embodiment the cannabinoids are THC, CBN, CBC and CBD. In another preferred embodiment the cannabinoids are THCa, CBDa, CBNa and CBCa. In yet another preferred embodiment the cannabinoids are THCa, CBDa, THC, CBN, and CBC.

The terpene/flavonoid is for example, d-limonene linalool, 1,8-cineole (eucalyptol), α-pinene, terpineol-4-ol, p-cymene, borneol, Δ-3-carene, β-sitosterol, β-myrcene, or β-caryophyllene.cannflavin A, apigenin, quercetin or pulegone.

Also provided by the invention are formulations containing the extracts according to the invention. For example the formulation contains any of the extracts according to the

Preferably, the pH of the formulation is at least pH 8.0.

In some formulations the concentration of THCa is greater than or equal to 95%; CBDa is less than 1%; CBNa is less than 3%; and CBCa is less than 1%. Optionally the formulation further contains d-limonene, linalool, 1,8-cineole (eucalyptol), α-pinene, terpineol-4-ol, p-cymene, borneol, Δ-3-carene, β-sitosterol, cannflavin A, apigenin, quercetin

In other formulations the concentration of THCa is less than or equal to 35%; CBDa is greater than or equal to 60%; THC is less than 1%; CBN is less than 1%; and CBC is less than 1%. Optionally, the formulation further contains d-limonene, linalool, 1,8-cineole (eucalyptol), α-pinene, terpineol-4-ol, p-cymene, borneol, Δ-3-carene, β-sitosterol, cannflavin A, apigenin, quercetin

In another formulation the concentration of THCa is greater than or equal to 40%; CBDa is greater than or equal to 40%; THC is less than 1%; CBN is less than 1%; and CBC is less than 1%. Optionally, the formulation further contains β-myrcene, ρ-caryophyllene, pulegone, α-terpineol, β-sitosterol, cannflavin A, apigenin, quercetin

In yet another formulation the concentration of THC is less than or equal to 9%; CBD is greater than or equal to 40%; CBN is greater than or equal to 40%; and CBS is less than 1%. Optionally, the formulation further contains 3-myrcene, β-caryophyllene, pulegone, α-terpineol, β-sitosterol, cannflavin A, apigenin, quercetin.

In various aspects the formulation of the invention are formulated for r oral, sublingual, buccal, or topical administration. The sublingual formulation further contains a sweetener such as a *stevia* extract. Optionally, the sublingual formulation further contains lemon oil, orange oil or both.

In other aspects the invention provides a method of preparing a *cannabis* extract providing fresh or live *cannabis* plant material; extracting the cannabinoids from the plant material to produce a first extract; winterizing and purging the winterized extract. Optionally, the method further includes decarboxylating the phytocannabinoids prior to extraction. The decarboxylation is accomplished for example, by heating the dried plant material at a temperature of about 221° F. for at least 15 minutes followed by heating at about 284° F. for at least 45 minutes. In some aspects the winterized extract is heated at 284° F. for at about 45-74 minutes followed by heating at about 293° F. for at least about 55-90 minutes.

Extraction is for example by hydrocarbon extraction. Winterizing includes adding cold ethanol to the first extract or storing the first extract at a temperature of about −20° to about −75° F. for about 48 hours to produce a waxy precipitate and removing the waxy precipitate by filtration. Optionally, the winterized extract is filtered through activated charcoal.

The *cannabis* plant material consists of flowers or flowers and leaves. In some aspects the *cannabis* plant material is frozen at a temperature between at least −10° F. to −50° F. for at least 36 hours prior to being extracted. Preferably, the *cannabis* plant material has been propagated from a single seed source or a tissue culture with specific ratios of cannabinoids. In some aspects the *cannabis* plant material is derived from a *cannabis* strain having a minimum of 15% THC and less that 1% CBD. In others aspect the *cannabis* plant material is derived from Sour Tsunami×Catatonic Sour Tsunami×Sour Tsunami, Sour Tsunami, Harlequin, R4 ACDC strains. In yet other as aspects the *cannabis* plant material is derived from CBD1, Sour Pineapple, CBD

Catatonic, Sour Tsunami×Sour Tsunami, Sour Tsunami, Harlequin, R4, Swiss Gold, ACDC, CBD1, Sour Pineapple, or CBD Diesel.

The invention further provides a method for preparing *cannabis* juice by blanching fresh *cannabis* leaves obtained from a *cannabis* plant in the vegetative stage in cold water; juicing the leaves in a cold press juicer or masticating juicer; and filtering the juice through a filter to remove particulates. Optionally, filter juice is freeze dried.

The juicer is for example, a cold press juicer or a masticating juicer. Also included in the invention is juice produced according to the method of the invention. In some embodiments the *cannabis* juice is obtained from *cannabis* flowers, *cannabis* roots or both.

The invention also provides method of relieving symptoms associated with anxiety, post traumatic stress disorder, chronic pain, or opiate dependency, paralysis, neuropathy, Crohns disease, inflammatory bowel disorders, glaucoma, seizures, epilepsy, autism, or cancer comprising administering to a subject in need thereof one or more of the formulations or juice according to the invention. The formulations are administered four times daily. For example the formulation is administered in the morning; afternoon, evening and at bedtime.

In specific embodiments the invention provides a method of treating cancer by administering to a subject a total daily doses of: 20 mg of cannabinoid extract and 50 mg of raw *cannabis* juice for seven days; 40 mg of cannabinoid extract and 50 mg of raw *cannabis* juice for seven days; 80 mg of cannabinoid extract and 50 mg of raw *cannabis* juice for seven days; 120 mg of cannabinoid extract and 50 mg of raw *cannabis* juice for seven days; and 160 mg of cannabinoid extract and 100 mg of raw *cannabis* juice for seven days. In some aspects the method further includes administering a total daily dose of 200 mg cannabinoid extract and 100 mg of raw *cannabis* juice every day thereafter or administering 200 mg of cannabinoid extract and 100 mg of raw *cannabis* juice for seven days; and 400 mg of cannabinoid extract and 100 mg of raw *cannabis* juice every day thereafter.

In another embodiment the invention provides method of treating opioid dependency by reducing the amount of opiates used per day by at least 10% and administering to a subject a total daily doses of: 31 mg of cannabinoid extract and 50 mg of raw *cannabis* for fourteen days; 56 mg of cannabinoid extract and 50 mg of raw *cannabis* for fourteen days; 84 mg of cannabinoid extract and 50 mg of raw *cannabis* juice for fourteen days; 104 mg of cannabinoid extract and 50 mg of raw *cannabis* for fourteen days; 89 mg of cannabinoid extract and 50 mg of raw *cannabis* for fourteen days; 69 mg of cannabinoid extract and 50 mg of raw *cannabis* for fourteen days; 49 mg of cannabinoid extract and 50 mg of raw *cannabis* for fourteen days; and 41 mg of cannabinoid extract and 50 mg of raw *cannabis* for fourteen days.

Optionally, the method further includes administering a total daily dose of 36 mg cannabinoid extract and 25 mg of raw *cannabis* every day thereafter and a single dose of 50 mg raw *cannabis* every three days.

In another embodiment, the invention provides a method of treating anxiety/PTSD by administering to a subject a total daily doses of about 28 mg to 42 mg of cannabinoid extract.

In a further embodiment, the invention includes a method

The formulations are administered four times daily. For example, the formulation is administered in the morning; afternoon, evening and at bedtime.

Other features and advantages of the invention will be apparent from and are encompassed by the following detailed description and claims.

DETAILED DESCRIPTION

The present invention is based in part upon extraction procedures and delivery approaches that allow selective utilization of various cannabinoid molecules and terpenes from the whole *cannabis sativa* plant. These various cannabinoid compounds are designed to selectively affect various cannabinoid receptors in the nervous system, immune system and other tissues. The extract is an oil-based whole plant product that contains inactive and active compounds contained in the *cannabis* plant such as cannabinoids, terpenes and/or flavonoids. Compositions of the invention and methods of extraction disclosed herein provide an extract with specific physiological properties that are mediated through separate pathways and receptors, which provide numerous benefits and advantages.

The extracts and/or delivery methods of the invention allows a wide range of prevention, treatment and management options for patients. In some aspects the delivery methods of the invention employs micro-dosing with a stacking method of cannabinoid administration week by week until a certain saturation point that is based on response, weight, and monthly-quarterly test results.

Surprisingly, it was discovered that the age or the *cannabis* plant material, the temperature in which it is stored and processed is critical and the ratio of the specific cannabinoids extract is critical to effectiveness of the final formulation. Importantly, for an extract to maintain non-psychoactive properties the *cannabis* plant material is never heated above 160° F. Preferably, the non-psychoactive extracts according to the invention are formulated at 110° F. or below.

Cannabis is a genus of flowering plants that includes three different species, *Cannabis sativa, Cannabis indica* and *Cannabis ruderalis*. The term "*Cannabis* plant(s)" encompasses wild type *Cannabis* and also variants thereof, including *cannabis* chemovars which naturally contain different amounts of the individual cannabinoids. For example, some *Cannabis* strains have been bred to produce minimal levels of THC, the principal psychoactive constituent responsible for the high associated with it and other strains have been selectively bred to produce high levels of THC and other psychoactive cannabinoids.

Cannabis plants produce a unique family of terpenophenolic compounds called cannabinoids, which produce the "high" one experiences from consuming marijuana. There are 483 identifiable chemical constituents known to exist in the *cannabis* plant, and at least 85 different cannabinoids have been isolated from the plant. The two cannabinoids usually produced in greatest abundance are cannabidiol (CBD) and/or Δ9-tetrahydrocannabinol (THC), but only THC is psychoactive. *Cannabis* plants are categorized by their chemical phenotype or "chemotype," based on the overall amount of THC produced, and on the ratio of THC to CBD. Although overall cannabinoid production is influenced by environmental factors, the THC/CBD ratio is genetically determined and remains fixed throughout the life of a plant. Non-drug plants produce relatively low levels of

The best studied cannabinoids include tetrahydrocannabinol (THC), cannabidiol (CBD) and cannabinol (CBN). Other cannabinoids include for example, cannabichromene (CBC), cannabigerol (CBG) cannabinidiol (CBND), Cannabicyclol (CBL), Cannabivarin (CBV), Tetrahydrocannabivarin (THCV), Cannabidivarin (CBDV), Cannabichromevarin (CBCV) Cannabigerovarin (CBGV), Cannabigerol Monomethyl Ether (CBGM).

Cannabinoids are derived from their respective 2-carboxylic acids (2-COOH) by decarboxylation (catalyzed by heat, light, or alkaline conditions). As a general rule, the carboxylic acids form of the cannabinoid have the function of a biosynthetic precursor.

As used herein THC, CBD, CBN, CBC, CBG, CBND, CBL, CBV, THCV, CBDV, CBCV, CBGV and CBGM refer to the decarboxylated form of the cannabinoid. Whereas, THCa, CBDa, CBNa, CBCa, CBGa, CBNDa, CBLa, CBVa, THCVa, CBDVa, CBCVa, CBGVa and CBGM refer to the acid form of the cannabinoid.

Tetrahydrocannabinol (THC) is the primary psychoactive component of the *Cannabis* plant. THC is only psychoactive in is decarboxylated state. The carboxylic acid form (THCa) is non-psychoactive.

Delta-9-tetrahydrocannabinol (Δ9-THC, THC) and delta-8-tetrahydrocannabinol (Δ8-THC), mimic the action of anandamide, a neurotransmitter produced naturally in the body. These two THCs produce the effects associated with *cannabis* by binding to the CB1 cannabinoid receptors in the brain. THC appears to ease moderate pain (analgesic) and to be neuroprotective, while also offering the potential to reduce neuroinflammation and to stimulate neurogenesis. THC has approximately equal affinity for the CB1 and CB2 receptors.

Cannabidiol (CBD) is not psychoactive, and was thought not to affect the psychoactivity of THC. However, recent evidence shows that smokers of *cannabis* with a higher CBD/THC ratio were less likely to experience schizophrenia-like symptoms.[15] This is supported by psychological tests, in which participants experience less intense psychotic-like effects when intravenous THC was co-administered with CBD (as measured with a PANSS test). Cannabidiol has little affinity for CB1 and CB2 receptors but acts as an indirect antagonist of cannabinoid agonists. Recently it was found to be an antagonist at the putative new cannabinoid receptor, GPR55, a GPCR expressed in the caudate nucleus and putamen. Cannabidiol has also been shown to act as a 5-HT1A receptor agonist, an action that is involved in its antidepressant, anxiolytic, and neuroprotective effects.

It appears to relieve convulsion, inflammation, anxiety, and nausea. CBD has a greater affinity for the CB2 receptor than for the CB1 receptor. CBD shares a precursor with THC and is the main cannabinoid in low-THC *Cannabis* strains. CBD apparently plays a role in preventing the short-term memory loss associated with THC in mammals.

Cannabinol (CBN) is the primary product of THC degradation, and there is usually little of it in a fresh plant. CBN content increases as THC degrades in storage, and with exposure to light and air. It is only mildly psychoactive. Its affinity to the CB2 receptor is higher than for the CB1 receptor

Cannabigerol (CBG) is non-psychotomimetic but still affects the overall effects of *Cannabis*. It acts as an α2-adrenergic receptor agonist, 5-HT1A receptor antago-

Tetrahydrocannabivarin (THCV) is prevalent in certain central Asian and southern African strains of *Cannabis*. It is an antagonist of THC at CB1 receptors and attenuates the psychoactive effects of THC.

Cannabidivarin (CBDV) is usually a minor constituent of the cannabinoid profile.

Cannabichromene (CBC) is non-psychoactive and does not affect the psychoactivity of THC. More common in tropical *cannabis* varieties. Effects include anti-inflammatory and analgesic.

In addition to cannabinoids, *cannabis* plants produce terpenes, a diverse group of organic hydrocarbons that are the building blocks of the cannabinoids.

Over 100 different terpenes have been identified in the *cannabis* plant, and every strain tends toward a unique terpene type and composition. The terpenes act synergistically with the cannabinoids to provide a therapeutic effect. Examples of some common terpenes found in *Cannabis* include:

Borneol—menthol, camphor, pine, woody. Can be easily converted into menthol. It is considered a "calming sedative" in Chinese medicine. It is directed for fatigue, recovery from illness and stress.

Caryophyllene—spicy, sweet, woody, clove, camphor, peppery. It binds weakly to CB2 receptor. As a topical it is one of the constituents of an anti-inflammatory and analgesic treatment for toothache. In high amounts, it's a calcium and potassium ion channel blocker. As a result, it impedes the pressure exerted by heart muscles.

Cineole/Eucalyptol—spicy, camphor, refreshing, minty. It is used to increase circulation, pain relief and easily crosses the blood-brain-barrier to trigger fast olfactory reaction.

Delta3Carene—sweet, pine, cedar, woodsy, pungent. In aroma therapy, cypress oil, high in D-3-carene, is used to dry excess fluids, tears, running noses, excess menstrual flow and perspiration.

Limonene—citrus (orange, tangerine, lemon, and grapefruit), rosemary, juniper, peppermint Repulsive to predators. Found in the rinds of many fruits and flowers. With the presence of other certain terpenes, Limonene can be an anti-bacterial, anti-fungal, anti-depressant and anti-carcinogen. It can synergistically promote the absorption of other terpenes by quickly penetrating cell membranes. The result can be increased systolic blood pressure.

Linolool—floral (spring flowers), lily, citrus and candied spice. Possesses anti-anxiety and sedative properties.

Myrcene—clove like, earthy, green-vegetative, citrus, fruity with tropical mango and minty nuances. The most prevalent terpene found in most varieties of marijuana. It's a building block for menthol, citronella, and geraniol. It possesses antimicrobial, antiseptic, analgesic, antioxidant, anti-carcinogen, anti depressant, anti-inflammatory, and muscle relaxing effects. Myrcene affects the permeability of the cell membranes, allowing more THC to reach brain cells.

Pinene—Alpha: pine needles, rosemary Beta: dill, parsley, rosemary, basil, yarrow, rose, hops, the familiar odor associated with pine trees and their resins. Pinene can increase mental focus and energy, as well as act as an expectorant, bronchodilator, and topical antiseptic. It easily crosses the blood-brain barrier where it inhibits activity of acetylcholinesterase, which destroys acetylcholine, an information transfer molecule, resulting in better memory. It may

Pulegone—mint, camphor, rosemary, candy. Pulegone is an acetylcholinesterase inhibitor. That is, it stops the action of the protein that destroys acetylcholine, which is used by the brain to store memories.

In various aspects the invention provides *cannabis* extracts with predefined ratios of cannabinoids. Standard conditions for cannabinoid assays, and methods of calculating cannabinoid content (as %) are well known in the art.

The extracts are mixture of at least 95% total cannabinoids and include terpenes and/or flavonoids. Preferably the extracts contains a mixture of at least cannabinoids four cannabinoid such as tetrahydrocannabinolic acid (THCa), cannabidiolic acid (CBDa), cannabinolic acid (CBNa) cannabichromenic acid (CBCa), tetrahydrocannabinol (THC), cannabinol (CBN), cannabidiol (CBD) and cannabichromene (CBC).

In some embodiments the extract contains THCa and CBDa and at least two cannabinoids selected from CBNa, CBCa, THC, CBN and CBC. In other embodiments the extract includes THC, CBN, CBC and CBD. In further embodiments the extract includes THCa, CBDa, CBNa and CBCa. In other embodiments the extract includes THCa, CBDa, THC, CBN, and CBC.

The terpene and/or flavonoids in the extract include for example, terpene is linalool, 1,8-cineole (eucalyptol), α-pinene, terpineol-4-ol, p-cymene, borneol, Δ-3-carene, β-sitosterol, β-myrcene, β-caryophyllene.d-limonene, cannflavin A, apigenin, quercetin or pulegone.

The extracts of the invention may be formulated with one or more pharmaceutically acceptable carriers, diluents or excipients or deposited on a pharmaceutically acceptable surface for vaporisation in order to produce pharmaceutical formulations containing cannabinoids as the pharmaceutically active agents.

Therefore, in a further aspect the invention provides a method of making a pharmaceutical composition comprising, as an active agent, a substance which is an extract from at least one *cannabis* plant variety.

Separate extracts may be prepared from single *cannabis* plant varieties having differing cannabinoid content (e.g. high THC and high CBD plants) and then mixed or blended together prior to formulation to produce the final pharmaceutical composition. This approach is preferred if, for example, it is desired to achieve a defined ratio by weight of individual cannabinoids in the final formulation. Alternatively, plant material from one or more *cannabis* plant varieties of defined cannabinoid content may be mixed together prior to extraction of a single botanical drug substance having the desired cannabinoid content, which may then be formulated into a final pharmaceutical composition.

The extract may be formulated with any convenient pharmaceutically acceptable diluents, carriers or excipients to produce a pharmaceutical composition. The choice of diluents, carriers or excipients will depend on the desired dosage form, which may in turn be dependent on the intended route of administration to a patient. Preferred dosage forms include, liquid dosage forms for administration via pump-action or aerosol sprays, tablets, pastilles, gels, capsules, suppositories, powders, etc. and vaporizers. Such dosage forms may be prepared in accordance with standard principles of pharmaceutical formulation, known to those skilled in the art.

Liquid formulations are particularly preferred. A particularly preferred formulation for administration of cannabinoids, though not intended to be limiting to the invention, is MCT suitable for human consumption. The MCT may be composed of any combinations of C-6; C-8; C-10:C12 fatty acids. For example, the MCT is composed of 97%:3% C-8:C10; C-12 fatty acids (e.g., NEOBEE 895). Preferably the pH of the formulation is at least pH 8.0. The formulations are suitable for oral, sublingual, buccal, or topical administration. When used for sublingual administration the formulation optionally comprises a sweetener such as *stevia* extract and or a flavoring such as for example lemon oil, orange oil or both.

A preferred formulation includes a cannabinoid mixture where THCa is greater than or equal to 95%; a CBDa is less than 1%; CBNa is less than 3%; and CBCa is less than 1%. In some aspects the formulation further includes d-limonene, linalool, 1,8-cineole (eucalyptol), α-pinene, terpineol-4-ol, p-cymene, borneol, Δ-3-carene, β-sitosterol, cannflavin A, apigenin, and quercetin. This preferred formulation is referred to herein as PRANA 1.

Another preferred formulation includes a cannabinoid mixture where the THCa is less than or equal to 35%; CBDa is greater than or equal to 60%; THC is less than 1%; CBN is less than 1%; and CBC is less than 1%. In some aspects the formulation further includes d-limonene, linalool, 1,8-cineole (eucalyptol), α-pinene, terpineol-4-ol, p-cymene, borneol, Δ-3-carene, β-sitosterol, cannflavin A, apigenin, and quercetin. This preferred formulation is referred to herein as PRANA 2.

In yet another preferred embodiment the formulation includes a cannabinoid mixture where the THCa is greater than or equal to 40%; CBDa is greater than or equal to 40%; THC is less than 1%; CBN is less than 1%; and CBC is less than 1%. In some aspects the formulation further includes β-myrcene, β-caryophyllene, pulegone, α-terpineol, β-sitosterol, cannflavin A, apigenin, and quercetin. This preferred formulation is referred to herein as PRANA 3.

In a further embodiment the formulation includes a cannabinoid mixture THC is less than or equal to 9%; CBD is greater than or equal to 40%; CBN is greater than or equal to 40%; and CBS is less than 1%. In some aspects the formulation further includes β-myrcene, β-caryophyllene, pulegone, α-terpineol, β-sitosterol, cannflavin A, apigenin, and quercetin. This preferred formulation is referred to herein as PRANA 4.

The extract is formulated for oral use (e.g. capsules) in dosage forms that provide 5 mg, 10 mg, 20 mg, or 50 mg of total cannabinoids per dose. For sublingual use, the extract is formulated to provide 0.5, 1 mg, or 2 mg, per drop.

In some applications, the patient may find it advantageous to activate (i.e., decarboxylate) the inactive (i.e. carboxylic acid form) cannabinoids in the extracts and formulations of the invention. The inactive cannabinoids (e.g., THCa and CBDa) of the extracts and formulation of the invention can be converted to active cannabinoids (THC and CBD) by heating the extracts and formulation at a temperature above 160° F. For example, a vessel containing the extracts and formulations of the invention are placed in boiling water (212° F.) for about 30 minutes.

According the invention further contemplates extracts and formulations thereof having the same ratio of cannabinoids as PRANA 1, PRANA 2 and PRANA3 where the THA and the CBD is in its activated decarboxylated form.

The methods of the invention may be used to prepare a cannabinoid-rich extract from *cannabis* plant material. The method includes providing fresh or live *cannabis* plant material; extracting the cannabinoids from the fresh or live

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