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(54) **Title:** HERBAL GEL COMPOSITION AND ITS PROCESS OF PREPARATION

(57) **Abstract:** The present invention relates to topical herbal composition comprising natural herbal extracts as active ingredients and pharmaceutically acceptable excipients or carriers. The present invention also relates to topical herbal gel composition comprising boswellia extract, green coffee bean extract as natural herbal extracts, optionally capsaicin as additional active ingredient and pharmaceutically acceptable excipients or carriers. The present invention also relates to topical herbal gel composition comprising boswellia extract, green coffee bean extract as natural herbal extracts, optionally capsaicin as additional active ingredient and phospholipid as skin penetration enhancer and other pharmaceutically acceptable excipients or carriers for relief of pain in arthritis condition or for relief of musculoskeletal pain. The present invention also relates to process for the preparation of topical herbal gel composition comprising steps of dissolving, mixing, sonicating and packing.

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HERBAL GEL COMPOSITION AND ITS PROCESS OF PREPARATION

FIELD OF THE INVENTION

The present invention relates to topical herbal composition comprising natural herbal extracts as active ingredients and pharmaceutically acceptable excipients or carriers.

The present invention also relates to topical herbal gel composition comprising boswellia extract, green coffee bean extract as natural herbal extracts, optionally capsaicin as additional active ingredient and pharmaceutically acceptable excipients or carriers.

The present invention also relates to topical herbal gel composition comprising boswellia extract, green coffee bean extract as natural herbal extracts, optionally capsaicin as additional active ingredient and phospholipid as skin penetration enhancer and other pharmaceutically acceptable excipients or carriers for relief of pain in arthritis condition or for relief of musculoskeletal pain.

The present invention also relates to process for the preparation of topical herbal gel composition comprising steps of dissolving, mixing, sonicating and packing.

BACKGROUND OF THE INVENTION

Arthritis is a long-term autoimmune disorder that primarily affects joints. A common feature of rheumatic diseases is the involvement of joints and the surrounding tissues such as ligaments, tendons and muscles which results swollen and painful joints. Pain and stiffness often worsen following rest and most commonly, the wrist and hands are involved, with the same joints typically involved on both sides of the body.

Arthritis is generally considered to be due to degradation by extended use of the joints leading to damage of the joint surfaces, which results in pain on movement of the joint, so that the greatest pain is experienced.

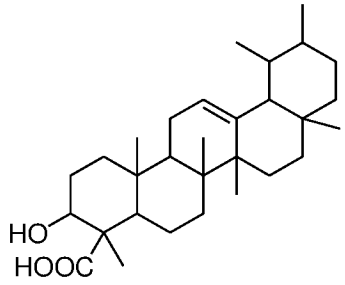
Boswellia serrata

Boswellia serrata is a medium to large branching tree, generally found in dry hilly areas of India, North Africa, and the Middle East, belongs to the family Burseraceae. Boswellia serrata is called Indian olibanum, Indian frankincense or "Dhup", it is also known as Salai guggul, and Sallaki in Sanskrit.

Boswellia serrata, in Sanskrit is known as Gajabhakshya, implying its ingestion by elephants. Charaka, Bhavamisra and others have described it as useful. It possesses anti-inflammatory, anti-arthritic and analgesic activity.

Boswellia serrata plant contains boswellic acid as its major active constituent which is present as α- boswellic acid; β- boswellic acid; 3-acetyl-11-keto β -boswellic acid (AKBA), responsible for anti-arthritic activity. From ancient times Boswellia serrata is being used in the management of rheumatoid arthritis, osteoarthritis solely because of these potent active constituents. Boswellic acid shows its activity by inhibiting the synthesis of pro-inflammatory cytokines and 5-lipoxygenase activity.

The resin extracted from plant has many pharmacological uses. The oleo-gum resin of Boswellia Serrata is a complex mixture of lower and higher Terpenoids and carbohydrates. Higher Terpenoids, collectively called the Boswellic acids are the major fraction of the resin (25-35%), Boswellic acid 65%-85%. The boswellic acid is shown below:



β-Boswellic acid

The resinous part of Boswellia serrata contains, monoterpenes (a-thujene); diterpenes (macrocyclicditerpenoids such as incensole, incensole oxide, iso-incensole oxide, a diterpene alcohol [serratol]); triterpenes (such as a- and ß-amyrins); pentacyclictriterpenic acids (boswellic acids); tetracyclic triterpenic acids (tirucall-8, 24-dien-21-oic acids) used in the treatment of rheumatism, arthritis, relives pain, dysentery, dyspepsia, lung diseases, haemorrhoids, lowers cholesterol, boosts Immunity, relieve asthma urinary disorders, corneal ulcer in unani System, anti-cancer activity, anti-diabetic activity, neuroprotective effects.

The gum resins of Boswellia serrata has been used for a variety of therapeutic purposes such as inflammation, arthritis, analgesia, pain, cancer, asthma, colitis, Crohn's diseases and hyperlipidemia.

Green coffee bean extract

Coffee plants belong to the botanical family *Rubiaceae*, which includes approximately 80 species. Green coffee beans are seeds of the fruit (coffee cherry) of the coffee tree, which is oval and approximately 10 mm in size. Green coffee beans surrounded by a thin seed skin known as coffee silverskin, an endocarp layer known as the parchment, a pectic adhesive layer, pulp, and an epicarp (outer skin).

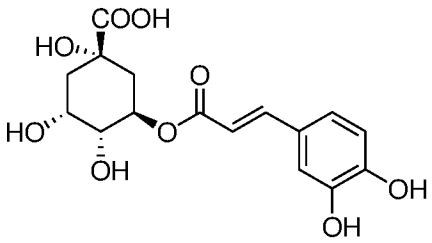
Green coffee beans are simply beans that have not been roasted and in the purest and rawest form. These raw beans are used to make the green coffee extract.

The trees themselves resemble a tall bush, and the coffee beans they produce are in fact the seeds, which known as the coffee 'cherry' fruit.

Green coffee beans are generally produced by purification and thresh processes, which completely remove the outer skin, pulp, pectic adhesive layer, and parchment from the green coffee beans. The remaining part of the green coffee beans are then roasted using dry heat at temperatures between 200° and 300°C with constant agitation to ensure even heating. During roasting, the colour of green coffee beans changes to yellow, then to a suntan-like light brown, and later to a dark, oily brown colour.

Chlorogenic acid was isolated from green coffee beans. It has also been found in the seeds and leaves of many dicotyledonous plants. It is thermally unstable and is readily decomposed to quinic acid and caffeic acid. Chlorogenic acid accounts for 5–10% of coffee beans, which is a much larger amount than caffeine (1–2%). It forms greenish-black compounds in the presence of Fe(III) ion. Due to its radical-capturing ability, an antioxidant activity is expected.

Chlorogenic acid is a phytochemical found in coffee and coffee beans. Chlorogenic acid is a cinnamate ester obtained by formal condensation of the carboxy group of trans-caffeic acid with the 3-hydroxy group of quinic acid. It is an intermediate metabolite in the biosynthesis of lignin.

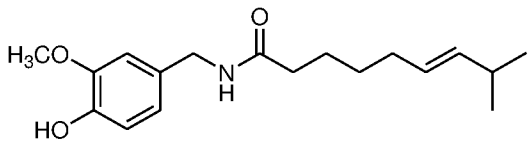


Chlorogenic acid

Capsaicin

Capsaicin is chemically, 8-methyl-N-vanillyl-6-nonenamide is an active component of chilli peppers, belonging to the genus Capsicum. Capsaicin and several related compounds are called capsaicinoids and are produced as secondary metabolites by chilli peppers, probably as deterrents against certain mammals and fungi. Pure capsaicin is a hydrophobic, colorless, highly pungent, and crystalline to waxy solid compound. This compound was first extracted in impure form in 1816 by Christian Friedrich Bucholz.

Capsaicin (trans-8-methyl-N-vanillyl-6-nonenamide) is an active component. Although there are two geometric isomers of capsaicin, only trans-capsaicin occurs naturally. Capsaicin structural formula is as follows:



Capsaicin

Capsaicin is responsible for the hot sensation in the mucous membranes when eating chili peppers. It works by attaching to the nerve receptor known as the transient receptor potential vanillod 1 (TRPV1), which activates cation channels on C nerve fibers and some A delta nerve fibers resulting in neuronal calcium influx and a sudden release of the chemical mediator in sensory nerves called substance P.

Pardhy & Bhattacharyya reported in Ind. J. Chem., 16 b: 1978, pp 176-178, that Boswellia serrata substantially contains the following ingredients: β-boswellic acid, acetyl-β-boswellic acid, acetyl-11-keto-β-boswellic acid, 11-keto-β-boswellic acid and small portions of α- and β-boswellic acid and the tirucallic acids.

The U.S. patent No. 5,888,514 A refers to a composition for treating a mammal having a condition characterized by bone or joint inflammation where extract of

Boswellia serrata is used as one of the ingredients among the other inflammatory agents.

The EP Publication No. 0 552 657 A1 disclose that pure boswellic acid, physiologically acceptable salts thereof, derivatives thereof and salts of the derivatives or a boswellic acid-containing vegetable preparation may combat inflammatory processes caused by an increased leukotriene formation. Therefore, said publications propose that the compounds be used in particular for treating inflammatory arthropathies, epidermal lesions, allergic and chronic asthma, endotoxin shock, inflammatory bowel diseases and chronic hepatitis and also discloses the use of boswellic acid for treating the inflammatory processes alone or in combination with the other herbal medicines.

Amrita sharma *et al.*, Drug Delivery, 2010, Volume 17(8), pp 587–595 discloses the use of phosphatidyl choline as complexation agent as a strategy for absorption enhancement of boswellic acid.

The US patent No. 7,282,224 B1 discloses the topical pain relief composition comprising capsaicin, a capsaicinoid, a capsaicin analogue and combinations as pain relieving component and Boswellia as inflammation control component.

The US patent No. 7,758,903 B2 discloses composition which comprise at least one ingredient chosen from rosehips, blueberry, blackberry, elderberry, cranberry, rosemary, clove, feverfew, nettle root, artichoke, reishi mushroom, olive extract, green tea extract (epigallocatechin gallate), grape seed extract, resveratrol, viniferin, Aframomum melegueta, boswellia serrata extract, boswellia forte, ipriflavone, tocotrienols, evening primrose oil, INM-176, borage oil, krill oil, at least one type of xanthophyll (e.g., astaxanthin), green coffee extract (chlorogenic acid), and ferulic acid.

The PCT publication No. WO 2008/036932A2 relates to compositions and methods for making compositions derived from Boswellia species (frankincense or olibanum) having uniquely elevated volatile oil, boswellic acids, and polysaccharide compounds, particularly, human oral delivery formulations, and methods for use of such compositions, useful e.g. for treating/preventing arthritis, inflammatory disorders, osteoarthritis, rheumatoid diseases and low back pain.

The US publication No. US 2011/0052738 A1 discloses the Boswellia serrata extract and capsaicin in topical pain composition comprising one or more skin penetrants includes soya lecithin, phosphatidyl choline, propylene glycol, derivatized propylene glycol, diethylene glycol monomethylether, diethylene glycol monoethyl ether, propylene glycol monolaurate, tri-block polyethers, isopropyl myristate, stearic acid, dimethyl sulfoxide, poloxamer 407, and combinations thereof.

Jan Husch et al., Fitoterapia, 2013, volume 84, pages 89–98 discloses the enhancement of use of lecithin delivery in the Phytosome® form of Boswellia extract.

The US publication No. 2014/0134261 A1 discloses pharmaceutical composition comprising ester of capsaicin or its analogue and other agent selected from salicylate, menthol, a boswellic acid, DMSO, methyl sulfonylmethane, an NSAID, a corticosteroid, emu oil, an opioid agonist, an opiod antagonist, an NMDA antagonist, tramadol, an α2δ ligand, santalol, santalyl acetate, amyris alcohol, amyris acetate, aloe vera gel and aloe vera juice.

Pallavi *et al.*, International Journal for Pharmaceutical Research Scholars (IJPRS), 2014, V-3, I-3, pages 242-250 discloses the formulation and evaluation of Herbal Gel of Boswellia Serrata for the Management of Gout and the formulation comprising B. serrata extract, Methyl salicylate, Menthol, Aerosil, BHA, BHT and Sesame oil.

Inventi Impact NDDS Vol. 2015, Issue 4, 202-2012 discloses pharmaceutical Transdermal Drug Delivery System for Arthritis using Boswellic Acid, PMC E6, oleic acid, HPMC E5, Ethylcellulose, PVP K30, PVA, Tween 20, Oleic acid, PEG 400, Glycerol, DMSO, Methanol and chloroform.

The PCT publication No. WO 2018/020512 A1 discloses the composition for slow/sustained/controlled release of at last one active ingredient wherein the active ingredients are selected from natural phytochemicals, phytochemical is selected from all hydrophobic and hydrophilic natural compounds, but not limited to, Lutein, Caffeine, Resveratrol, Berberin, 95% Curcuminoids, Gingerols, Bacosides, Boswellic Acids, Chlorogenic Acids combinations thereof.

All the prior art references related to the use of Boswellia extract in different compositions and process for the preparations of Boswellia extract. Various dosage forms of Boswellia extract available in the market for treating different conditions or diseases. However, topical gel compositions are not available containing boswellia extract, green coffee bean extract as active ingredients, optionally capsaicin as additional active ingredient and phospholipid as skin penetration enhancer and pharmaceutically acceptable excipients or carriers. The inventors of present invention also provides process for the preparation of topical gel composition comprising steps of dissolving, mixing, sonicating and packing.

OBJECTIVE OF INVENTION

The main objective of the present invention is to provide topical herbal composition comprising natural herbal extracts as active ingredients and pharmaceutically acceptable excipients or carriers.

Another objective of the present invention is to provide topical herbal gel composition comprising boswellia extract and green coffee bean extract as natural

herbal extracts, optionally capsaicin as additional active ingredient, phospholipid as skin penetration enhancer and other pharmaceutically acceptable excipients or carriers.

Still another objective of the present invention is to provide process for the preparation of topical herbal gel composition comprising steps of dissolving, mixing, sonicating and packing.

Yet another objective of the present invention is to provide relief of pain in arthritis conditions or relief of musculoskeletal pain by topical application of herbal gel composition of boswellia extract, green coffee bean extract and optionally capsaicin as additional active ingredient and other pharmaceutically acceptable excipients or carriers.

SUMMARY OF INVENTION

One embodiment of the present invention provides topical composition comprising natural herbal extracts as active ingredients and pharmaceutically acceptable excipients or carriers.

Another embodiment of the present invention provides a topical herbal gel composition comprising boswellia extract, green coffee bean extract as natural herbal extracts and optionally, capsaicin as additional active ingredient and pharmaceutically acceptable excipients or carriers.

Another embodiment of the present invention provides a topical herbal gel composition comprising boswellia extract, green coffee bean extract as natural herbal extracts, and optionally, capsaicin as additional active ingredient, phospholipid as skin penetration enhancer and pharmaceutically acceptable excipients or carriers.

Another embodiment of the present invention provides topical herbal gel composition comprising boswellia extract, green coffee bean extract as natural herbal

extracts and optionally, capsaicin as additional active ingredient and phospholipid as skin penetration enhancer, solvents, humectants, surfactants, additional penetration enhancer, anti-foaming agents and other pharmaceutically acceptable excipients.

Another embodiment of the present invention provides a topical herbal gel composition comprising boswellia extract, green coffee bean extract as natural herbal extracts and optionally, capsaicin as additional active ingredient and phospholipid as skin penetration enhancer, solvents, humectants, surfactants, additional penetration enhancer, anti-foaming agents and other pharmaceutically acceptable excipients for relief of pain in arthritis condition or for relief of musculoskeletal pain.

In yet another embodiment, the present invention provides a topical herbal gel composition comprising:

0.1% to 10% (w/w) of one or more natural herbal extracts as active ingredients,
0.01% to 0.1% (w/w) of optionally additional active ingredient,
0.1% to 10% (w/w) of penetration enhancer,
1% to 10 % (w/w) of additional penetration enhancer,
1% to 15% (w/w) of humectant,
10% to 70 % (w/w) of surfactant,
0.5% to 20 % (w/w) of solvent,
0.01% to 0.1% (w/w) of anti-foaming agent, and
0.1% to 20% of other pharmaceutically acceptable excipients.

In yet another embodiment, the present invention provides a topical herbal gel composition comprising:

0.1% to 10% (w/w) of one or more natural herbal extracts as active ingredients,
0.01% to 0.1% (w/w) of optionally additional active ingredient,
0.1% to 10% (w/w) of phospholipid as penetration enhancer,
1% to 10 % (w/w) of additional penetration enhancer,
1% to 15% (w/w) of humectant,

10% to 70% (w/w) of surfactant,

0.5% to 20 % (w/w) of solvent,

0.01% to 0.1% (w/w) of anti-foaming agent, and

0.1% to 20% of other pharmaceutically acceptable excipients.

In yet another embodiment, the present invention provides a topical herbal gel composition comprising:

0.1% to 0.5% (w/w) of boswellia extract,

0.1% to 1% (w/w) of green coffee bean extract,

0.01% to 0.1% (w/w) of capsaicin optionally,

0.1 to 10% (w/w) of phosphotidyl choline,

1 to 10 % (w/w) of isopropyl myristate,

10 to 70 % (w/w) of polyethylene glycol 1500,

0.5 to 20 % (w/w) of ethyl alcohol,

0.01% to 0.1% (w/w) of simethicone, and

0.1 to 20% of other pharmaceutically acceptable excipients.

In yet another embodiment of the present invention is to provide process for the preparation of topical herbal gel composition comprising boswellia extract, green coffee bean extract as natural herbal extracts and optionally, capsaicin as additional active ingredient, phospholipid as skin penetration enhancer, solvents, humectants, surfactants, additional penetration enhancer, anti-foaming agents and other pharmaceutically acceptable excipients comprising steps of dissolving, mixing, sonicating and packing.

In yet another embodiment of the present invention provides a process for preparing topical herbal gel composition comprising steps of:

a. adding the natural herbal extracts, optionally additional active ingredient and phospholipid, additional penetration enhancer, surfactant, solvent, humectant, and anti-foaming agent,

b. mixing the above mixture by sonication process using Hiescher Ultra sound sonicator for ninety seconds at a time and resting for thirty seconds alternatively till a total power of 50,000 watts energy is used to obtain clear gel preparation.

In yet another embodiment of the present invention provides a process for preparing gel composition of Boswellia extract, coffee bean extract and optionally capsaicin the process comprising steps of :

a. adding the boswellia extract and green coffee bean extract and optionally capsaicin, phosphotidylcholine and polyethylene glycol 1500, glycerine, ethyl alcohol, isopropyl myristate and simethicone,
b. mixing the above mixture by sonication process using Hiescher Ultra sound sonicator for ninety seconds at a time and resting for thirty seconds alternatively till a total power of 50,000 watts energy is used to obtain clear gel preparation.

DETAILED DESCRIPTION OF THE INVENTION

The term "comprising", which is synonymous with "including", "containing", or "characterized by" here in defined as being inclusive or open-ended, and does not exclude additional, unrecited elements or method steps, unless the context clearly requires otherwise.

The present invention was aimed to develop topical herbal gel preparation comprising natural herbal extracts as active ingredients and pharmaceutically acceptable excipients or carriers.

The present invention is to provide topical herbal gel composition comprising boswellia extract, green coffee bean extract as natural herbal extracts and optionally capsaicin as additional active ingredient, phospholipid as skin penetration enhancer and pharmaceutically acceptable excipients or carriers.

The present invention is to provide topical herbal gel composition comprising boswellia extract, green coffee bean extract as natural herbal extracts and optionally capsaicin as additional active ingredient, phospholipid as skin penetration enhancer and other pharmaceutically acceptable excipients for relief of pain in arthritis condition or for relief of musculoskeletal pain.

The present invention is to provide an efficient process for the preparation of topical herbal gel composition comprising the steps of dissolving, mixing, sonicating and packing.

The term "active ingredients" of the present invention are used to relieve from pain conditions. Preferably used active ingredients are boswellia extract, green coffee bean extract and optionally, capsaicin as additional active ingredient.

Boswellia serrata plant contains boswellic acid as its major active constituent which is present as α- boswellic acid; β- boswellic acid; 3-acetyl-11-keto β -boswellic acid (AKBA), responsible for anti-arthritic activity.

The resinous part of Boswellia serrata possesses monoterpenes, diterpenes, triterpenes, tetracyclic triterpenic acids and four major pentacyclic triterpenic acids i.e. β-boswellic acid, acetyl-β-boswellic acid, 11-keto-β-boswellic acid and acetyl-11-keto-β-boswellic acid, responsible for inhibition of pro-inflammatory enzymes. Out of these four boswellic acids, acetyl-11-keto-β-boswellic acid is the most potent inhibitor of 5-lipoxygenase, an enzyme responsible for inflammation.

Boswellia serrata has been used for a variety of therapeutic purposes such as cancer, analgesia, asthma, inflammation, arthritis, colitis, Crohn's diseases and hyperlipidemia.

Green coffee bean extract

Green (or raw) coffee is a major source of CGA in nature (5–12 g/100 g). Chlorogenic acids (CGA) are cinnamic acid derivatives with biological effects mostly related to their antioxidant and anti-inflammatory activities.

Chlorogenic acids (CGA) are phenolic compounds formed by the esterification of cinnamic acids, such as caffeic, ferulic, and p-coumaric acids, with (-)-quinic acid.

Capsaicin

Capsaicin and several related compounds are called capsaicinoids and are produced as secondary metabolites by chili peppers, probably as deterrents against certain mammals and fungi. Pure capsaicin is a hydrophobic, colorless, highly pungent, and crystalline to waxy solid compound.

Capsaicin is used as an analgesic in topical ointments and dermal patches to relieve pain, typically in concentrations between 0.025% and 0.1%. It may be applied in cream form for the temporary relief of minor aches and pains of muscles and joints associated with arthritis, backache, strains and sprains, often in compounds with other rubefacients. Capsaicin exhibits anti-inflammatory property by inhibiting IkB-a degradation in LPS-stimulated peritoneal macrophages and it has both analgesic and anti-inflammatory properties.

It is also used to reduce the symptoms of peripheral neuropathy, such as post-herpetic neuralgia caused by shingles. Capsaicin transdermal patch (Qutenza) for the management of this particular therapeutic indication (pain due to post-herpetic neuralgia) was approved as a therapeutic by the U.S. FDA. One of clinical studies having limited quality found that high-dose topical capsaicin (8%) compared with control (0.4% capsaicin) provided moderate to substantial pain relief from post-herpetic neuralgia, HIV-neuropathy, and diabetic neuropathy.

Phosphatidylcholines are a class of phospholipids that incorporate choline as a head group. They are a major component of biological membranes and can be easily obtained from a variety of readily available sources, such as egg yolk or soybeans, from which they are mechanically or chemically extracted using hexane.

Phosphatidylcholine is a chemical contained in eggs, soybeans, mustard, sunflower, and other foods. It is found naturally in the body in all cells. The term "phosphatidylcholine" is sometimes used interchangeably with "lecithin," although the two are different.

Phosphatidylcholine is a major constituent of cell membranes and pulmonary surfactant, and is more commonly found in the exoplasmic or outer leaflet of a cell membrane. It is thought to be transported between membranes within the cell by phosphatidylcholine transfer protein (PCTP). Phosphatidylcholine also plays a role in membrane-mediated cell signaling and PCTP activation of other enzymes.

One or more skin penetration enhancers selected from the group consisting of soya lecithin, phosphatidyl choline, propylene glycol, derivatized propylene glycol, diethylene glycol monomethylether, diethylene glycol monoethyl ether, propylene glycol monolaurate, tri-block polyethers, isopropyl myristate, stearic acid, dimethyl sulfoxide, poloxamer 407, and combinations thereof. Preferably, skin penetration enhancer is phosphatidyl choline and Preferably, isopropyl myristate is additional skin penetration enhancer.

Penetration enhancer used in the herbal gel composition is in the range of 0.1 to 10 %(w/w), more preferably in the range of 1% to 5% (w/w) of the total weight of the composition. Additional penetration enhancer used in the herbal gel composition is in the range of 1% to 10 % (w/w) of additional penetration enhancer, more preferably in the range of 1% to 5% (w/w) of the total weight of the composition.

In an embodiment, the solvent is selected from a group comprising ethyl alcohol, isopropyl alcohol, glycofurol, polyethylene glycol (PEG 200, 400), glycerol, polypropylene glycol, propylene glycol, N-methyl-2-pyrolidone and ethyl alcohol or mixture thereof. Preferably, the solvent is ethyl alcohol.

Solvent used in the herbal gel composition is in the range of 0.5% to 20% (w/w), more preferably in the range of 5% to 15% (w/w) of the total weight of the composition.

In an embodiment, the preferred surfactant referred above can be polyglutamic acid, Polyethylene glycol, propylene glycol, glycerol, propylene glycol esters, polyglycerol oleate polyvinyl alcohol, non-ethoxylated polymers like Glyceryl Stearate (and) Polyglyceryl-6 Palmitate/Succinate (and) Cetearyl Alcohol and N-(2-Hydroxypropyl) methacrylamide (PHPMA). Preferred polyethylene glycols having a molecular weight range from about 300 to about 1500. More preferred are the polyethylene glycols having a molecular weight range from about 600 to about 1500. Most preferred are the polyethylene glycols having a high molecular weight range from about 1500.

Surfactant used in the herbal gel composition is in the range of 10% to 70% (w/w), more preferably in the range of 30% to 64.5% (w/w) of the total weight of the composition.

Humectants include but are not limited to glycerine, sorbitol, propylene glycol, Butylene Glycol, Aluminum Hydroxide Adjuvant, Ammonium Alginate, Cyclomethicone, Polydextrose, Sodium Hyaluronate, Sodium Lactate, Triacetin, Triethanolamine and Xylitol. Preferably, the humectant is glycerine.

Humectants used in the herbal gel composition is in the range of 1% to 15% (w/w), more preferably in the range of 5% to 10% (w/w) of the total weight of the

composition.

Anti-foam agents and defoamer are often used interchangeably and commonly used in the compositions of the present invention are Simethicone, polydimethylsiloxanes and other silicones, certain alcohols, stearates and glycols, Alkyl poly acrylates, Castor oil, Fatty acids, Fatty acids esters, Fatty acids sulfate, Fatty alcohol, Fatty alcohol esters, Fatty alcohol sulfate, Foot olive oil, Mono & Di Glyceride, Paraffin oil, Paraffin Wax, Poly Propylene Glycol, Silicones Oil, Vegetable & animal fats. More preferably Simethicone is used.

Anti-foam agent and defoamer used in the herbal gel composition is in the range of 0.01 to 0.1% (w/w), more preferably in the range of 0.05 to 0.1% (w/w) of the total weight of the composition.

Other excipients or carriers used in the preparations to the compositions of this invention, the following can be used and there were no limitations: stabilizer, plasticizer, lubricant, reducing agent, buffer agent, base, adsorbent, corrigent, binder, suspending agent, antioxidant, wetting agent, wet modifier, filler, refrigerative agent, coloring matter, flavoring agent, perfume, isotonizing agent, softener, emulsifying agent, foaming agent, pH modifier, anti-frothing agents, flavouring agents, preservatives, dispersing agent, fragrance, desiccant, antiseptics, preservative, solubilizing agent, solubilizer, solvent, superplasticizer, antistatic agent, extender, moisturizing agent and the like.

Manufacturing process for topical herbal gel composition:

a. adding the natural herbal extracts, optionally additional active ingredient and phospholipid as skin penetration enhancer, additional penetration enhancer, surfactant, solvent, humectant, and anti-foaming agent,

b. mixing the above mixture by sonication process using Hiescher Ultra sound sonicator for ninety seconds at a time and resting for thirty seconds alternatively till a total power of 50,000 watts energy is used to obtain clear gel preparation.

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The following examples describes the nature of the invention and are given only for the purpose of illustrating the present invention in more detail and are not limitative and relate to solutions, which have been particularly effective on bench scale.

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Example 1

S.No.	Ingredients	Concentration (%)
1.	Boswellia serrata extract	0.10% w/w
2.	Capsaicin (Capsicum extract 90%)	0.005% w/w
3.	Chlorogenic acid (Green coffee bean extract)	0.5 % w/w
4.	Phosphotidyl choline	5% w/w
5.	Isopropyl Myristate	5% w/w
6.	Glycerine	10% w/w
7.	Ethyl alcohol	15% w/w
8.	Polyethylene glycol (PEG) 1500	64.40% w/w
9.	Fragrance	Qs
10.	Simethicone	Qs

Example 2

S.No.	Ingredients	Concentration (%)
1.	Boswellia serrata extract	0.15% w/w
2.	Capsaicin (Capsicum extract 90%)	0.005% w/w
3.	Chlorogenic acid (Green coffee bean extract)	0.5 % w/w
4.	Phosphotidyl choline	5% w/w

5.	Isopropyl Myristate	5% w/w
6.	Glycerine	10% w/w
7.	Ethyl alcohol	15% w/w
8.	Polyethylene glycol (PEG) 1500	64.35% w/w
9.	Fragrance	Qs
10.	Simethicone	Qs

Example 3

S.No.	Ingredients	Concentration (%)
1.	Boswellia serrata extract	0.20% w/w
2.	Capsaicin (Capsicum extract 90%)	0.005% w/w
3.	Chlorogenic acid (Green coffee bean extract)	0.5 % w/w
4.	Phosphotidyl choline	5% w/w
5.	Isopropyl Myristate	5% w/w
6.	Glycerine	10% w/w
7.	Ethyl alcohol	15% w/w
8.	Polyethylene glycol (PEG) 1500	64.30% w/w
9.	Fragrance	Qs
10.	Simethicone	Qs

Example 4

S.No.	Ingredients	Concentration (%)
1.	Boswellia serrata extract	0.25% w/w
2.	Capsaicin (Capsicum extract 90%)	0.005% w/w
3.	Chlorogenic acid (Green coffee bean extract)	0.5 % w/w
4.	Phosphotidyl choline	5% w/w
5.	Isopropyl Myristate	5% w/w

6.	Glycerine	10% w/w
7.	Ethyl alcohol	15% w/w
8.	Polyethylene glycol (PEG) 1500	64.25% w/w
9.	Fragrance	Qs
10.	Simethicone	Qs

Manufacturing process:

a. adding the boswellia extract, green coffee bean extract and optionally capsaicin as additional active ingredient and phosphotidyl choline and polyethylene glycol 1500, glycerine, ethyl alcohol, isopropyl myristate and simethicone,

b. mixing the above mixture by sonication process using Hiescher Ultra sound sonicator for ninety seconds at a time and resting for thirty seconds alternatively till a total power of 50,000 watts energy is used to obtain clear gel preparation.

We Claim:

1. A topical herbal gel composition comprising boswellia extract, green coffee bean extract as natural herbal extracts pharmaceutically acceptable excipients or carriers.
2. The topical herbal gel composition as claimed in claim 1, optionally contains capsaicin as additional active ingredient.
3. The topical herbal gel composition as claimed in claims 1 and 2, contain phospholipid as skin penetration enhancer.
4. The topical herbal gel composition as claimed in claims 1 to 3, further contain solvents, humectants, surfactants, additional penetration enhancer, anti-foaming agents and other pharmaceutically acceptable excipients.
5. The topical herbal gel composition as claimed in claim 3, wherein skin penetration enhancer is selected from the group consisting of soya lecithin, phosphatidyl choline, propylene glycol, derivatized propylene glycol, diethylene glycol monomethylether, diethylene glycol monoethyl ether, propylene glycol monolaurate, tri-block polyethers, isopropyl myristate, stearic acid, dimethyl sulfoxide, poloxamer 407 or combinations thereof.
6. The topical herbal gel composition as claimed in claim 4, wherein the additional skin penetration enhancer is selected from the group consisting of soya lecithin, phosphatidyl choline, propylene glycol, derivatized propylene glycol, diethylene glycol monomethylether, diethylene glycol monoethyl ether, propylene glycol monolaurate, tri-block polyethers, isopropyl myristate, stearic acid, dimethyl sulfoxide, poloxamer 407 or combinations thereof.
7. The topical herbal gel composition as claimed in claim 4, wherein the solvent is selected from a group comprising ethyl alcohol, isopropyl alcohol, glycofurol, polyethylene glycol (PEG 200, 400), glycerol, polypropylene glycol, propylene glycol, N-methyl-2-pyrolidone and ethyl alcohol or mixture thereof.
8. The topical herbal gel composition as claimed in claim 4, wherein the surfactant is selected from a group comprising polyglutamic acid, Polyethylene glycol, propylene glycol, glycerol, propylene glycol esters, polyglycerol oleate

polyvinyl alcohol, non-ethoxylated polymers like Glyceryl Stearate (and) Polyglyceryl-6 Palmitate/Succinate (and) cetearyl alcohol and N-(2-hydroxypropyl) methacrylamide (PHPMA), preferred polyethylene glycols having a molecular weight range from about 300 to about 1500.

9. The topical herbal gel composition as claimed in claim 4, wherein the humectants is selected from glycerine, sorbitol, propylene glycol, butylene glycol, aluminum hydroxide adjuvant, ammonium alginate, cyclomethicone, polydextrose, sodium hyaluronate, sodium lactate, triacetin, triethanolamine and xylitol.

10. The topical herbal gel composition as claimed in claim 4, wherein the anti-foam agent and defoamer is selected from simethicone, polydimethylsiloxanes and other silicones, certain alcohols, stearates and glycols, alkyl poly acrylates, castor oil, fatty acids, fatty acids esters, fatty acids sulfate, fatty alcohol, fatty alcohol esters, fatty alcohol sulfate, foot olive oil, mono & di glyceride, paraffin oil, paraffin wax, poly propylene glycol, silicones oil, vegetable and animal fats.

11. The topical herbal gel composition as claimed in claim 4, wherein the other pharmaceutically acceptable excipients or carriers, are selected from stabilizer, plasticizer, lubricant, reducing agent, buffer agent, base, adsorbent, corrigent, binder, suspending agent, antioxidant, wetting agent, wet modifier, filler, refrigerative agent, coloring matter, flavoring agent, perfume, isotonizing agent, softener, emulsifying agent, foaming agent, pH modifier, anti-frothing agents, flavouring agents, preservatives, dispersing agent, fragrance, desiccant, antiseptics, preservative, solubilizing agent, solubilizer, solvent, superplasticizer, antistatic agent, extender, moisturizing agent and the like.

12. The topical herbal gel composition as claimed in claims 1 to 11, wherein the composition specifically comprising:

0.1% to 10% (w/w) of one or more natural herbal extracts as active ingredients,

0.01% to 0.1% (w/w) of optionally additional active ingredient,

0.1% to 10% (w/w) of penetration enhancer,

1% to 10 % (w/w) of additional penetration enhancer,

1% to 15% (w/w) of humectant,

10% to 70 % (w/w) of surfactant,

0.5% to 20 % (w/w) of solvent,

0.01% to 0.1% (w/w) of anti-foaming agent, and

0.1% to 20% of other pharmaceutically acceptable excipients.

13. The topical herbal gel composition as claimed in claims 1 to 12 prepared by a process comprising the steps of:

a. adding the natural herbal extracts, optionally additional active ingredient and phospholipid; additional penetration enhancer, surfactant, solvent, humectant, and anti-foaming agent,

b. mixing the above mixture by sonication process using Hiescher Ultra sound sonicator for ninety seconds at a time and resting for thirty seconds alternatively till a total power of 50,000 watts energy is used to obtain clear gel preparation.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2020/054662

A. CLASSIFICATION OF SUBJECT MATTER
A61K36/00,A61K9/00 Version=2020.01

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)

A61K

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)

Database: TotalPatent One, IPO Internal Database, TKDL
Keywords: Topical gel, Boswellia extract, Green coffee bean extract, Capsaicin

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US7758902B2; (ACCESS BUSINESS GROUP INTERNATIONAL LLC); July 20, 2010 (20-07-2010) *Refer whole document especially abstract and column 8*	1
Y	--do--	2-13
Y	US7282224B1; (GUTHY-RENKER LLC); Oct 16, 2007 (16-10-2007) *Refer whole document especially claim 1 and columns 3 and 5*	2-13
Y	WO2019014380A1; (JAMES BLANCHARD); Jan 17, 2019 (17-01-2019) *Refer whole document especially claims 1, 4 and 7*	2-13
Y	H. Kathpalia and K. K. Shreya; " Topical Nanoemmigel Formulation of Boswellia serrata"; Indian Journal of Pharmaceutical Sciences; Vol 80(2), Pages: 261-267; March 2018 *Refer whole document*	13
A	RS8/696; Sallaki Guna; Knowledge Known Since: 200 Years [retrieved on: 18-08-2020] *Refer whole	

☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
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"D" document cited by the applicant in the international application
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"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
19-08-2020	19-08-2020

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	document*	1-13
A	JA6/741Y; Tila E Filfil Surkh; Knowledge Known Since: 100 Years [retrieved on: 18-08-2020] *Refer whole document*	1-13
A	AH5/2664; Nuskha-E-Qatoor; Knowledge Known Since: 100 Years [retrieved on: 18-08-2020] *Refer whole document*	1-13

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/IB2020/054662

Citation	Pub.Date	Family	Pub.Date
US 7282224 B1	16-10-2007	WO 2007145655 A1	21-12-2007
WO 2019014380 A1	17-01-2019	CN 111065415 A	24-04-2020