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Formulation And Evaluation Of Anti Inflammatory Herbal Spray

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ABSTRACT

The topical herbal formulation Eezpain consisting of natural ingredient that has been clinically provide for its analgesic and anti-inflammatory activities. The present work is to formulate and evaluate thus herbal spray. The alcoholic extract was prepared by using maceration method. After completion of formulation it was evaluated for its physicochemical parameters like color, odor, pH, speradibility, extrudability, and consistency, solubility which shows no change in the irritancy, spread ability and diffusion study.

The thus it could become a media to use the medicinal properties of herbal spray effectively and easily. Designed formulation on application knee, joints wrist, back of neck and shoulder and lower back exhibited signification efficacy. Herbal pain relief spray is a concentrated formula made from seven ayurvedic ingredient and has been specially developed to relax and relive muscles. It has analgesic and anti-inflammatory effects too. A simple application can help to control or reduce the pain.

Key Ingredient-

- ✓Turmeric
- ✓Capsicums
- ✓Ginger
- ✓Camphor
- ✓Eucalyptusoil
- ✓Turpentineoil
- ✓Mentha

INTRODUCTION TO PAIN

fig.no:1 joint pain

Pain is triggered when specialized nerves, called nociceptors, respond to negative chemicals, thermal or mechanical stimulus. Activity can be directly due to trauma or indirectly through biochemical mediators released from damaged tissues and blood circulation. These mediators can further enhance the pain process by lifting 3 pain controls and hiring additional nociceptors around the function. The mediators include, but are not limited to, prostaglandin, bradykinins, histamine, serotonin and arachidonic acid. The severity of acute pain depends on the number of activated receptors, the duration of the recovery and the amount.

1) Acute pain:-

Acute pain means the pain is short in duration (relatively speaking), lasting from minutes to about three months (sometimes up to six months). Acute pain also tends to be related to a soft-tissue injury or a temporary illness, so it typically subsides after the injury heals or the illness subsides. Acute pain from an injury may evolve into chronic pain if the injury doesn't heal correctly or if the pain signals malfunction.

2) **Chronic pain:-**

Chronic pain is longer in duration. It can be constant or intermittent. For example, headaches can be considered chronic pain when they continue over many months or more years – even if the pain isn't always present. Chronic pain is often due to a health condition, like arthritis, fibromyalgia, or a spine condition.

3) Neuropathic pain:-

Neuropathic pain is due to damage to the nerves or other parts of the nervous system. It is often described as shooting, stabbing, or burning pain, or it feels like pins and needles. It can also affect sensitivity to touch and can make someone have difficulty feeling hot or cold sensations. Neuropathic pain is a common type of chronic pain. It may be intermittent (meaning it comes and goes), and it can be so severe that it makes performing everyday tasks difficult. Because the pain can interfere with normal movement, it can also lead to mobility issues.

4) Nociceptive pain:-

Nociceptive pain is a type of pain caused by damage to body tissue. People often describe it as being a sharp, achy, or throbbing pain. It's often caused by an external injury. For example, if you hit your elbow, stubyourtoe, twist your ankle, or fall and scrape up your knee, you may feel nociceptive pain. This type of pain is often experienced in the joints, muscles, skin, tendons, and bones. It can be both acute and chronic.

5) **Radicular pain:-**

Radicular pain is a very specific type of pain can occur when the spinal nerve gets compressed or inflamed. It radiates from the back and hip into the leg by way of the spine and spinal nerve root. People who have radicular pain may experience tingling, numbness, and muscle weakness. Pain that radiates from the back and into the leg is called radiculopathy. It's commonly known as sciatica because the pain is due to the sciatic nerve being affected. This type of pain is often steady, and people can feel it deep in the leg. Walking, sitting, and some other activities can make sciatica worse. It is one of the most common forms of radicular pain.

INTRODUCTION OF SPRAY:-

fig.no:2 Spray Bottle

A spray is dynamic collection of drops dispersed in gas. The process of forming a spray is known as atomization.

1. A spray nozzle is the device used to generate a spray. The two main uses of sprays are to distribute material over a cross-section and to generate liquid surface area. There are thousands of applications in which sprays allow material to be used most efficiently spray atomization can be formed by several methods. The most common method is through a spray nozzle which typically has a fluid passage that is acted upon by different mechanical forces that atomize the liquid. In pharmaceutical industry "a spray is a liquid kept.

Under pressure in a can or other container, which you can force out in very small drops.

Spray is a fragrant liquid made from an extract that has been distilled in alcohol and water. Sprays are preparations of drugs in media which may be aqueous, alcoholic or glycerin. They are applied to the mucous membrane of nose or throat with an atomizer. The throat sprays must be sprayed from Special type of atomizer known as 'Nebulizer', which removes large droplets by a baffling system.

Traditionally, spray were made from plant and animal substances and prepared in the form of waters, oil, powders and alcohol. Techniques involved in spray extraction from plant include, solvent extraction, maceration, distillation and effleurage method. These methods to a certain extent, distort the odor of aromatic compounds that are obtained from the raw materials.

• Important things in relation to spray making is that there are three key ingredients you will need produce spray.

- Essential oils- these have been extracted from various plants (organic or inorganic) and when combined give the smell of spray you are trying to produce.
- Pure grain oils
- Water

AIM AND OBJECTIVES

Aim

"Formulation and evaluation of anti-inflammatory herbal spray."

Objectives

- To understand chronic pain, improved analgesia and reduced side effects in patients with chronic pain in a quantitative and predictive manner.
- The success of this work will stimulate the development of the spray/spray industry locally because of available, cheap raw materials.
- This focuses on the production of spray from plant/animal sources as against synthetic chemicals thereby will reduce any side effects resulting from synthetic Chemicals.
- Gaschromatographynotapplicableforroutineclinicalpractice.
- Health care providers, regulator, health insurance agencies, patient organizations, and individual patients, for direct consideration in the clinical setting.

Plan of Work

Phase I: Review of Literature
Phase II: Materials and Equipment's
Phase III: Collection of ingredients
Phase IV: Experimental Work
Phase V: Extraction process Maceration
Phase VI: Evaluation tests

MATERIAL AND METHOD

TableNo.1 List of Equipment's/Instruments

Sr. no	EQUIPMENTS /INSTRUMENTS	SOURCE
1.	Weighing balance	Dolphin ozone genuine, Mumbai
2.	Measuring cylinder	Rajesh chemicals, Mumbai
3.	Glass rod	Dolphin ozone genuine, Mumbai
4.	Beaker	Rajesh chemicals, Mumbai
5.	pH meter	Micro controller pH meter

COLLECTION OF INGREDIENTS

1) TURMERIC:-

Synonym:-Haldi, Indian saffron, Haridra

Vernacular Name:-Halad

Biological Source:-Dried rhizomes of Curcuma longa

Family:-*Zingiberaceae*

Plant parts used:-Rhizomes and bulb

Chemical Constituents:- Curcumin,curcuminoids

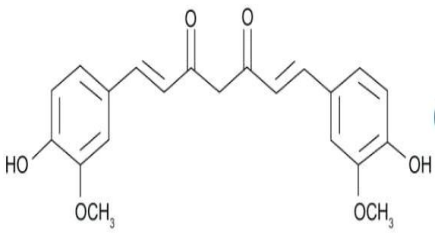
Chemistry:-

Turmeric rhizomes contain about 5% curcuminoids composed of a mixture of compound and its derivatives.The standerdised extracts of curcumin generally consist of curcumin,desmethoxy curcumin and bis desmethoxy curcumin.

Curcumin, Turmeric extract, Food color

E100,diferuloyl methane,1,7-Bis(4-hydroxy-3-methoxyphenyl)-1,6-heptadiene-3,5-dione Chemical Formula:- C21H20O6

Chemical structure:-



Curcumin

Pharmacological action:-

Curcuma longa has been known to Indians since centuries. It has been purported to have anti-inflammatory actions anti-asthmatic property as well as anti-bacterial property. A study from Journal of Alternative and Complementary Medicine confirms that curcumin is safe in several human trials and inhibits a number of pro-inflammatory mediators that play an important role in asthma.

Figno.3 Turmeric

2) GINGER:-

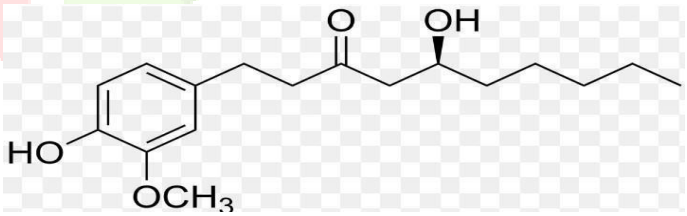
Synonyms:-Zingiber, Zingiberis,Sunthi

Botanical Name:- Zingiber Officinalis

Family:- *Zingiberaceae*

Chemical Constituents:-Gingerol

Chemical Structure:-



Gingerol

Pharmacological action:-

Ginger is rhizomes containing phytoconstituent with agreeable and aromatic odor. It contains not less than 0.8% of total gingerol on a dried basis. Externally, it is buff colored and having pungent taste. Ginger is stomachic, an aromatic and carminative, stimulant and flavouring agent. Gingeroil is used in mouthwashes, ginger beverages and liquors. Ginger powder has been reported to be effective against motion sickness.

figno.4Ginger

3) CAPSICUM:-

Synonyms:-Red chilli,

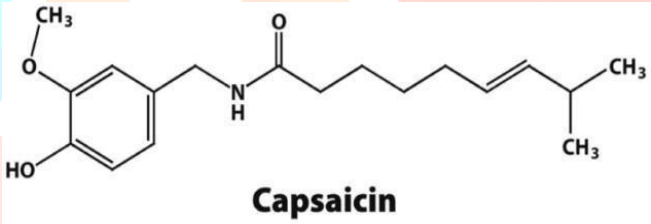
Vernacular Name:-Mirch

Botanical Source:-Capsicum Annum

Family:-*Solanaceae*

Chemical Constituents:-Capsaicin

Chemical Structure:-



Capsaicin

Capsaicin is the pungent alkaloid of capsicum has been found to have pharmacological relevance such as, cardio protective, anti lithogenic effect anti inflammatory and analgesia.
Capsaicinoids may have the potential clinical value for pain relief, cancer prevention and weight loss

Pharmacological action:-

Action of capsaicin has been extensively investigated. Topical application of capsaicin is proved to alleviate pain in arthritis, postoperative neuralgia, diabetic neuropathy, psoriasis etc.

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fig no.5Capsicumannum

4) CAMPHOR:-

Synonym:-Mothball

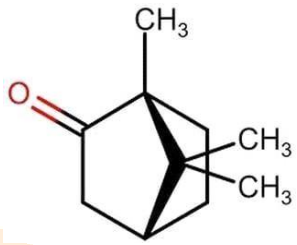
Vernacular name:-Camphor tree

Biological source:- It is a natural substance obtained from the camphor laurel (Cinnamomum camphora), a species of evergreen.

Family:-*Lauraceae*

Chemistry:- It is a bicyclic monoterpine ketone which is found plants like Cinnamomum Camphora. The molecular or chemical formula of Camphor is C10H16O. Camphor is colorless to white waxy crystalline powder. It is flammable and has a strong aroma or mothball-like smell.

Chemical Structure:-



Camphor

Pharmacological action:-

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Camphor exerts an analgesic action when applied topically by producing a warm sensation. It excites and desensitizes sensory nerves by activating heat-sensitive TRP vanilloid subtype 1 (TRPV1) and TRPV3 receptors.

Fig no.6 Camphor

1)EUCALYPTUS OIL:-

Synonym:-Eucalyptus oil, Dinkumoil,

Nilgiri **Botanical name:-** Eucalyptus

globulus **Family:-** *Myrtaceae*

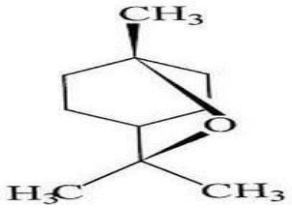
Biological source:-Eucalyptus oil is the essential oil obtained by the distillation of fresh leaves of Eucalyptus globulus and other species like E.polybractea,E.viminalis,and E.smithii.

Chemistry:- The Eucalyptus oil is a complex mixture of a variety of monoterpenes and sesquiterpenes, and aromatic phenols, oxides, ethers, alcohols, esters, aldehydes and ketones such as

1,8-cineole (Eucalyptol), citronellal, citronellol, citronellyl acetate,

p-cymene, eucamalol, limonene, linalool,α-pinene, γ-terpinene

Chemical structure:-



Eucalyptol

Eucalyptus oil is the volatile oil obtained by the distillation or extraction of the fresh or dried the leaves are green in color with aromatic and camphoraceous odor, taste is pungent followed by the sensation of cold. It is soluble in 90% alcohol, fixed oil, and fats and in paraffin, but is insoluble in water. Eucalyptus oil is used as a counter-irritant, an antiseptic and expectorant it is an ingredient of several of our liniments, ointments and sprays.

figno.7Eucalyptusleaves

2) TURPENTINE OIL:-

Synonym:-Gum terpentine, oleoresin, spirit of turpentine

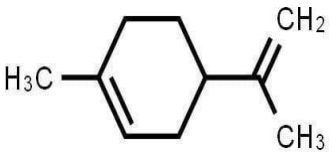
Botanical name:-Pinus longifolia

Biological source:-Turpentine oil is the volatile oil obtained by the distillation of oleoresin from Pinus longifolia Roxb and various species of Pinus, belonging to family Pinaceae.

Family: -*Pinaceae*

Chemistry:-Turpentine is composed of terpenes, primarily the monoterpenes alpha-and beta- pinene, with lesser amounts of carene, camphene, dipentene, and terpinolene.

Chemical structure:-



Terpenes limonene

Turpentine oil is applied to the skin for joint pain, muscle pain, nerve pain, and tooth aches.

People sometimes breathe the vapours of turpentine oil to reduce the chest congestion that goes along with some lung diseases. In foods and beverages, distilled turpentine oil is used as a flavoring.

figno.8Turpentineleaves

1) FRESHMINT:-

Synonyms:-Mentha,Colpermin,Pudina

Botanical name:- Mentha piperita

Family: - *Labiateae*

Aromatic chemicals and essential oils extracted from them in the leaves are often used in cosmetics and

medical industry. Essential oils and menthol extracted from the mint leaves are used in the manufacture of toothpaste and mouthwashes. It is also used in toothpaste, tooth powder, shaving creams, and different pharmaceutical dosage forms. It is soluble in70%alcohol,ether and chloroform and insoluble in water. Several species of menthe are known to contain oil. Many time, these oils are dementholized and used as adulterants to the drug.

figno.9 Fresh mint leaves

EXPERIMENTAL WORK

Extraction process (cold maceration)

"The process in which properly comminuted drug is placed or permitted to soak in a solvent for specific period of time until the cellular structure is softened and penetrated by the solvent and soluble constituents are dissolved and extracted out "In this process all ingredients are placed in a stoppered container with the whole of the solvent and allowed to stand for a period of atleast3 days (3-7 days, at room temperature) with frequent agitation, until soluble matter is dissolved. The mixture is then strained (through sieves/nets), the mare pressed and the combined liquid clarified (cleaned by filtration) or by decantation, after standing

Generally used solvents-

❖ **Alcohol:-**

Chemical name- Ethanol; Ethyl alcohol; Methyl carbinol

Molecular formula- CH3CH2OH or C2H6O

Molecularweight-46.069g/ml

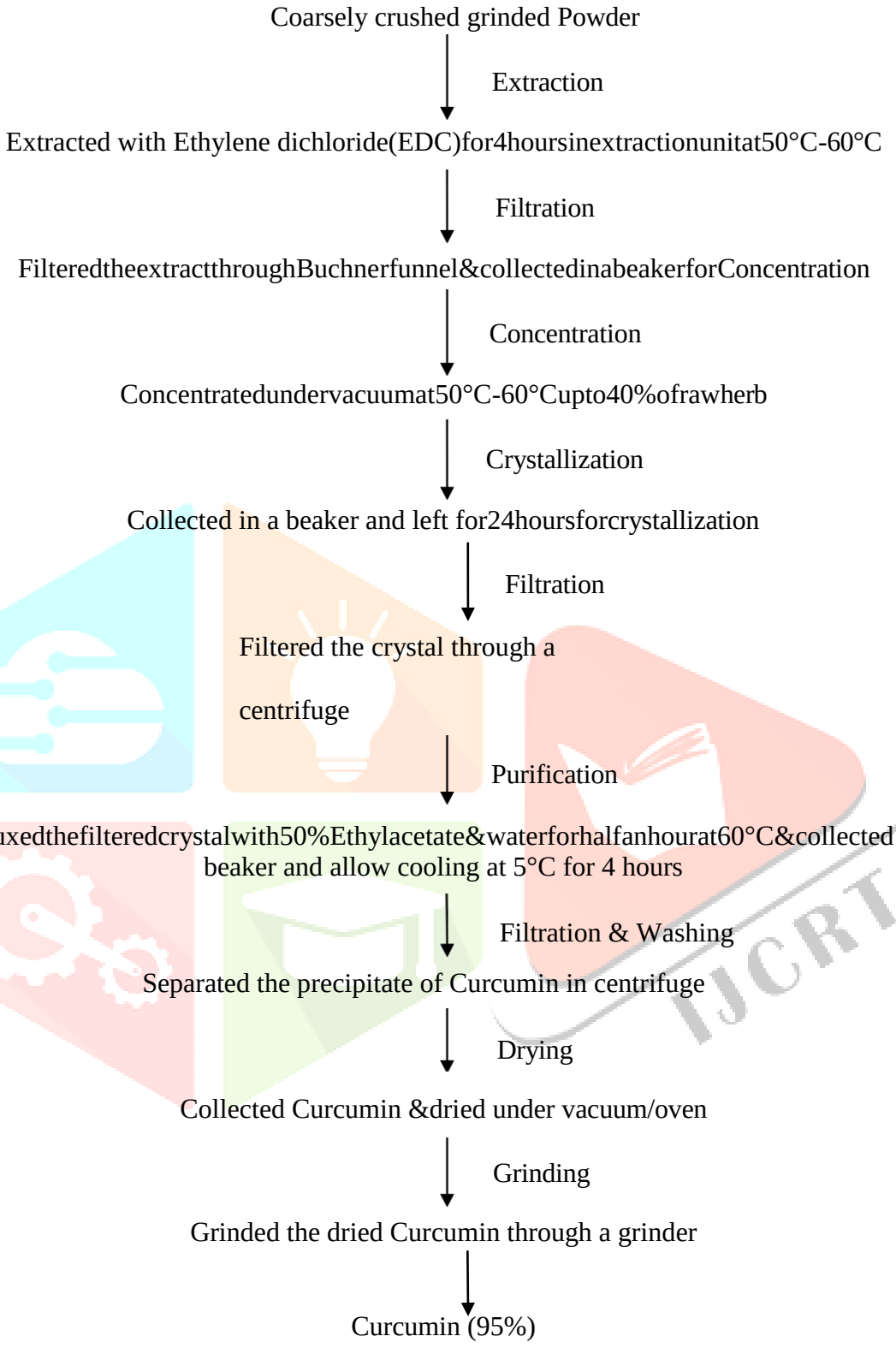
Watersolubility-1000000mg/L(at25°c)

- Miscible with ethyl ether, acetone, chloroform,
- Soluble in Benzene.
- Alcohol is a volatile liquid prepared by fermentation of certain carbohydrates.
- Alcohol act as an central nervous system (CNS) depressant ,antidiuretic, and disinfectant.
- It has bactericidal activity and is used often as a topical disinfectant.
- It is widely used as a solvent and preservative in pharmaceutical preparations.
- Ethanol is a clear colorless liquid with a bitter astringent taste.
- Neutral or slightly acid to litmus.

figno.10 Soxhlet extractor

Extraction process of Curcumin

Curcumin were isolated from Curcuma longa dried rhizomes powder **Process flow chart of Curcumin Extraction:-**



GINGER:-

100g of the fresh ginger root was soaked in 300 ml of absolute ethanol in beaker for 72hours. After 72 hours, the whole mixture was filter the to remove residue.

CAPSICUM:-

95%ethanol used for extraction of capsicum from 50 gram capsicum. Raw capsicum is kept for maceration for 72 hrs. Capsicinis obtained attheend.

fig no.11Mechanical stirrer

METHOD OF PREPARATION

1. The required quantity of turmeric extract was taken in a clean beaker.
2. Required amount of alcohol was added beaker.
3. The turmeric was completely dissolved in alcohol.
4. The required quantity of capsicum, ginger, Camphor has taken in different beaker.
5. All ingredients were dissolved in sufficient quantity of alcohol individually.
6. All dissolved ingredients from different beakers were mixed in common beaker.
7. 4.5 ml of eucalyptus oil was added in beaker.
8. Turpentine oil was added as per formula.
9. Lastly required quantity of menthe was added in beaker.

TableNo.2Formulationofspray 50 ml

Sr. No.	MATERIALS	QUANTITY (50 ml)	FUNCTION
1.	Extract of turmeric	1gm	Anti-inflammatory
2.	Ginger	2.5gm	Analgesic
3.	Capsicum	0.5gm	Counterirritant
4.	Camphor	3.5gm	Perfume, Analgesic
5.	Eucalyptus oil	4.5ml	Counterirritant
6.	Turpentine oil	4.5ml	Analgesic
7.	Mentha	2.5gm	Soothing action
8.	Alcohol	qs	Vehicle for spray

EVALUATIONTESTSOFFORMULATION

It is very essential to maintain a uniform standard for Herbal Anti-Inflammatory and Pain Relief Spray, keeping this view in mind the formulated halitosis spray was evaluated on the parameters such as organoleptic characteristics (color, odor,taste), specificity, viscosity, density, pH, etc.

1. ORGANOLEPTICCHARACTERISTICS

Organoleptic properties are the aspects of food, water or other substances that an individual experiences via the senses- including taste, odor, sight, smell and touch

2. SPECIFICITY

It is the ability of the test to correctly identify those without the disease (d) from all individuals free from the disease (b+d).

Specificity=d/ b+d- true negative/disease

3. VISCOSITY

Viscosity can be defined as the measurement of a liquid's resistance to flow.

4. PH

The pH of formulated herbal antiinflammatory spray was determined by using pH meter pH of the dispersion of10% of the product in water is determined by pH meter pH

RESULT AND DISCUSSION

The Herbal Anti-inflammatory and Pain Relief Spray was prepared. The suitable ingredient for the formulation was chosen accordingly. The final formulation was subjected for testing it's quality through evaluation test.

TableNo.3 Evaluation test and Results

Evaluation test	Result
Color	yellow
Odor	Strong aromatic
Foreign particles	No particles observed
pH	7.2
Stability	Stable
Microbial growth	No microbial growth

CONCLUSION

This research provides guidelines on use of natural ingredients in the preparation of anti-inflammatory and herbal spray having minimal and no side effects. The natural ingredients like turmeric, turpentine oil, fresh mint, camphor, eucalyptus oil, capsicum, ginger etc. Curcumin is a polyphenol obtained from the rhizome of curcuma longa. It produces potent antioxidant, anti-inflammatory, and neuroprotective effects. Turpentine oil is applied to the skin for joint pain, muscle pain, nerve pain, and toothaches. Eucalyptus oil has been reported effective in reducing pain, swelling, and inflammation. Ginger is used as a food flavoring and medicine. Ginger contains chemicals that might reduce nausea and swelling. The overall conclusion is that the formulation shows better result for pain relief.

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