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FORMULATION AND EVALUATION OF ANTI-INFLAMMATORY AND ANALGESIC HERBAL OIL

**BOLISETTY P*, RAMA RAO N, YAMUNA K, JAYASRI K, THANUSHA K AND
JAYASRI K**

Chalapathi Institute of Pharmaceutical Sciences, Lam, Guntur, Andhra Pradesh

*Corresponding Author: Dr. Bolisetty Padmavathi: E Mail: padmavathiganeshbabu@gmail.com

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ABSTRACT

Inflammation and pain are the most common symptoms in various diseases as well as injuries. As a treatment strategy many pharmaceutical and herbal formulations have been developed and are in use till now. Our present study contributes one more to that list. Herbs are considered as treasures of medicinal ingredients from days of yore. Oil is the most effective formulation which have highest patient compliance due to its ease of application in pediatrics and geriatrics as well as minimal side effects. People who suffer with pain, inflammation, arthritis, surgery, or other medical ailments are becoming more interested in herbal remedies. Formulation and assessment of a natural analgesic and anti-inflammatory oil are necessary. Pain and inflammation brought on by physical activity, sports, rheumatism, arthritis, surgery, and other medical disorders can all be treated by using a range of herbs and essential oils. The goal of this work is to develop and evaluate herbal oil. Every ingredient used are from a natural source. *Senna occidentalis*, *Vitex negundo*, and *Moringa oleifera* are all well known for their therapeutic uses. Color, odor, density, specific gravity, pH, acid value, and saponification value of the formulation were assessed. Stability studies' results showed that the formulation of herbal oil had not changed chemically or physically and also efficacious.

Keywords: Pain, Inflammation, *Moringa oleifera*, *Vitex negundo*, *Senna occidentalis*, Herbal oil

INTRODUCTION:

One of the traditional medicinal systems of India is the Ayurveda. The main principle of the Ayurveda is to live long healthy life by preventing the unnecessary suffering. Ancient Chinese, Greek, Egyptian and Indians were used the herbal medicines for various therapeutic purpose.

Existence of herbal medicines was recorded worldwide and also have a long-recorded history. According to WHO, 80%of world still depends on traditional medicine for their health care [1].

Because of the absence of the side effects ,the usage of herbal Ayurveda for mutations are popular worldwide .The herbal products have dual role .First role is helps in body care due to presence of photochemical and another role is to improvise the biological functions of the humanbody [2].

Analgesics are derived from the Greek word (An=without; Alogs =pain). Analgesics shows its action by inhibiting coenzymes and shows adverse effects [2].

The best alternative is the use of the ayurvedic formulations. Ex: Analgesic oil [2].

PATHOPHYSIOLOGY OF PAIN:

There are two main categories of pain: Nociceptive and Neurotic. Nociceptive pain includes nociceptors i.e. afferent nerve fibers that are free to discriminate between harmful

and harmless stimuli. Such reside in the subcutaneous, skin, and visceral and body systems. The onset of somatic nociceptive pain occurs mainly due to discomfort from connective tissue, muscle, skin, bone, or joint [3].

Tissue damage is usually the source of this kind of discomfort. Organs that are visceral, such as the pancreas or digestive system, are the source of visceral pain. Visceral pain may originate in the capsule, the organ, or from blockage of a hollow viscus resulting in sporadic, weakly confined pain. Nociceptive somatic discomfort is characterized as pressure, tightness, throbbing, piercing, or agonizing. It's common to characterize visceral nociceptive discomfort as cramping or biting, or if a hole is obstructing the viscus, which might be characterized as throbbing, aching, or acute [3].

Neurotic pain can also called as nerve pain or neuralgia or neuropathic pain. It is caused mainly due to different pathological conditions of nervous system. The pain may be felt in the damaged nerves it is often recognized by scorching, chilling, "pins and needles," numbness, or itchy sensation.

The present formulated herbal oil mainly aim at treating nociceptive pain.

MATERIALS AND METHODS:

Table 1: Ingredients

S. No.	Name of the ingredients [2]	Image (4, 5, 6, 7)	Botanical Name	Uses
1.	Vavilaku		Vitex negundo	Anti-inflammatory, Anti-microbial
2.	Kasivinda		Senna occidentalis	Anti inflammatory
3.	Munaga		Moringa oleifera	Swelling ,joint pain
4.	Neem		Azadirachta indica	Anti-inflammatory Anti-microbial Anti-oxidant
5.	sesame oil		Sesamum indicum	Anti-inflammatory Anti-oxidant

Table 2: Formulation of herbal anti-inflammatory and analgesic oil

S.no	Ingredients	Formulation (Quantity taken)
1.	Vavilaku leaf juice	100ml
2.	Kasivinda leaf juice	100ml
3.	Munaga leaf juice	100ml
4.	Neem leaf juice	100ml
5.	Sesame oil	250ml

Procedure for preparation of herbal oil:

- Clean the leaves and wash with distilled water or purified water. Triturate them by adding few amounts of water. Collect the juices using muslin cloth.
- Collect the leaf juice of Vavilaku, Kasivinda, Munaga, and Neem each of 100ml respectively.
- Weigh 250ml of sesame oil and pour it in a clean pot boil it, add leaf juice one by one.
- Boil the mixture until the volume becomes half to the initial mixture.
- Collect the oil in a clean bottle.

The following evaluations were carried out on the prepared herbal anti-inflammatory and analgesic oil.

Phytochemical evaluation:

To identify the different plant ingredients such as alkaloids, saponins, glycosides, protein, steroids, carbohydrates, and flavonoids, a qualitative chemical analysis was performed on the prepared herbal pain relief oil. The results of the study are listed in **Table 4**.

Organoleptic evaluation:

The parameters like physical state, color, odor, solubility, texture was observed and recorded² in the **Table 5**.

Physical evaluation:

The physicochemical analysis was performed using normal procedures, taking into account

the acid value, saponification value, ester value, specific gravity, density, and pH.

Acid value:

The acid value is a number that indicates how much potassium hydroxide (in milligrams) is needed to neutralize one gram of free acids of the material.

Procedure: Unless otherwise indicated in the specific monograph, dissolve approximately 10g of the chemical being tested, weighed precisely, in 50 milliliters of an ethanol mixture made of equal parts (95%) and ether, which had already been neutralized using 0.1M KOH to phenolphthalein solution. Should the specimen fail to evaporate in the frigid solvent, attach a reflux condenser to the flask and gradually warm, shaking often, until the sample vanishes. Pour in one milliliter of phenolphthalein. Solution, then use 0.1M potassium hydroxide to titrate. Until, after shaking, the solution is still somewhat pink, for half a minute [1].

Determine the acid value using the given expression Value of acid = $5.61 \frac{n}{w}$

When n is the volume in milliliters of potassium at 0.1M hydroxide (necessary w is the substance's weight in grams).

Specific gravity:

The ratio of a substance's density to that of water at a certain temperature and pressure is known as specific gravity. Weigh the specific

gravity bottle after cleaning and drying it.

Weigh it after adding distilled water to it.

After removing the water and drying it, add the sample and weigh it once again [1].

Saponification value:

The amount of potassium hydroxide milligrams required to neutralize free acids and saponify esters found in 1g of the material is known as the saponification value [1].

Procedure: Unless indicated otherwise in the individual monograph, present roughly 2 grams of the material being examined, precisely weighed, into a 200 ml borosilicate glass flask that is equipped with a condenser for reflux. Incorporate 25.0 ml of 0.5M ethanolic potassium hydroxide, a small amount of pumice powder, and Boil for 30 minutes under reflux in a water bath. Titrate after adding 2 drops of the phenolphthalein solution right away using 0.5M hydrochloric acid (one milliliter) Do a blank titration without adding the chemical being tested (b ml)

Determine the value of saponification based on the following expression

$$\text{Value of saponification} = 28.05 (b-a)/w$$

Where w is the substance's weight in grams.

Density:

Mass of a substance divided by its volume is its density. Once the specific gravity bottle has been cleaned and dried and

Weigh it. After adding the sample, weigh it once again. Table 6 presents the findings made during the physical examinations. The results indicate that the formulation's values are all within the standard limits [2].

pH:

Make a 1% w/v sample solution in distilled water and thoroughly mix it. Using a pH meter, measure the pH at 27°C ± 2°C. Once the temperature and pH reading are stable, read the pH, continuously displayed [3].

Accelerated Stability studies:

A stability test was performed on the prepared herbal oil to see if any deterioration or color change occurred. In addition to showing no signs of microbial contamination, the stability testing reveals no physical or chemical changes over a 90-day period [3].

Table 3: Nutrient agar medium preparation:

Name of the Ingredient	Quantity for 1000ml	Quantity for 100ml
Beef extract	3g	0.3g
Peptone	5g	0.5g
Sodium chloride	5g	0.5g
Agar	15g	1.5g
Distilled water	1000ml	100ml

RESULTS AND DISCUSSION:

Table 4: Phytochemical Evaluation Of Herbal Oil

S. No.	Constituents	Procedure(8)	Result	Image
1.	Carbohydrates	Take 2 ml of oil in the test tube and add molisch reagent and concentrated sulphuric acid drop wise on the sides of the test tube.	Violet color ring at the junction. (POSITIVE)	
2.	Alkaloids	Take 2 ml of oil in the test tube and add Wagner's reagent.	Formation of Reddish brown precipitate. (POSITIVE)	
3.	Fixed oils	Take 2 ml of oil, add 1ml of 1% copper sulphate and also 10% sodium hydroxide.	Formation of a blue color solution. (POSITIVE)	
4.	Steroids	Take 2 ml of oil, add concentrated sulphuric acid.	Formation of red color. (POSITIVE)	
5.	Saponins	Take 2 ml of oil and add water.	Formation of foam. (POSITIVE)	

Table 5: Organoleptic Evaluation of Herbal Oil

S. No.	PARAMETERS	INITIAL	AFTER 3 MONTHS	AFTER 6 MONTHS
1.	Physical state	Liquid	Liquid	Liquid
2.	Color	Greenish brown	Greenish brown	Greenish brown
3.	Odor	Characteristic	Characteristic	Characteristic
4.	Texture	Greasy	Greasy	Greasy
5.	Solubility	Soluble in non-Polar solvents	Soluble in non-polar solvents	Soluble in non-polar solvents

Table 6: Physical Evaluation of Herbal Oil

S. No.	Parameters	Formulated herbal oil
1.	pH	5.32
2.	Acid value	1.40
3.	Saponification value	182.32
4.	Density	0.94g/cm ³
5.	Specific gravity	0.87

Table 7: Microbiological Evaluation Of Herbal Oil

S. No.	After 1-day	After 45-days	After 90-days
Herbal Oil	TMC: less than 100	TMC: less than 100	TMC: less than 100



Figure 1: Nutrient agar medium



Figure 2: Microbial plate of herbal oil after 45-days



Figure 3: Microbial plate of herbal oil after 90-days

CONCLUSION:

The results of this study indicated that using herbal oil as an alternative treatment for pain and inflammation is advantageous because it has no negative side effects. The present study reveals physicochemical properties of formulated herbal oil are successfully evaluated by using standard methods. Further investigation, analysis and preclinical studies

of formulated herbal pain oil may reveal the potency, efficacy and chemical constituents responsible for the pharmacological activity.

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Conflict Of Interest:

We declare that there is no conflict of interests regarding the publication of this paper.

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