



## Research Article

### FORMULATION AND EVALUATION OF CINNAMON OIL STICKS, ROLL-ONS FOR ANALGESIC, ANTI- INFLAMMATORY AND ANTI- ARTHRITIS EFFECT

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#### ABSTRACT

In the recent past there was a growing interest in Traditional medicine / Complementary and Alternative Medicine (TCAM) and their relevance to public health both in developed and developing countries because of diversity, flexibility, easy accessibility. Relative low cost, low levels of technological input, relative low side effects and growing economic importance are some of the positive features of traditional medicine (WHO 2002). Pain is a feeling triggered in the nervous system and is a problem faced by people throughout the world on a daily basis. Pain can be acute (as caused through injury) or can be chronic (i.e. lasting for months or years, as is the case with patients suffering from rheumatoid arthritis, gout, or some forms of cancer). Over the counter (OTC) drugs like aspirin or paracetamol can cause gastric ulceration or hepatic damage from prolonged use or over-dosage. In this context, the present work aimed at preparing cinnamon oil sticks, roll-ons for analgesic, anti-inflammatory & anti-arthritis effect. The purpose of developing a dosage forms were, for a very quick onset of action and to minimize the side effects along with the convenience of administration i.e. without the problem of swallowing and using water. The sticks were prepared by using bees wax & paraffin wax as base and roll-ons were prepared by using bentonite as suspending agent. The prepared sticks were evaluated for melting point, breaking point, force of application, surface anomalies and roll-ons were evaluated for pH, Viscosity, drying time, spreadability & skin irritation test.

**Key words:** sticks, roll-ons, cinnamon oil, moulding, extraction, bees wax, Bentonite, evaluation, analgesic, anti-inflammatory and anti-arthritis.

#### INTRODUCTION

Herbal medicines are now in great demand in the developing world for primary health care not because they are inexpensive but also for better cultural acceptability, better compatibility with the human body and minimal side effects.<sup>1</sup> Herbal medicine is still the mainstay of about 75 - 80% of the world population, mainly in the developing countries, for primary health care.<sup>2</sup> Since prehistoric times, humans have used natural products, such as plants, animals, microorganisms, and marine organisms, in medicines to alleviate and treat diseases.<sup>3</sup> According to the World Health Organization (WHO), the use of herbal remedies throughout the world exceeds that of the conventional drugs by two to three times.<sup>4</sup>

Cinnamon is a symbol of sovereignty and respect and was a prestigious gift to Gods and Monarchs in the history, Called as *Darusita* or *Tvak* in Ayurveda. Cinnamon has a long history in Ayurvedic medicine for treating inflammation, analgesia, malaria, diabetes, menopausal problems, headache, bad breath, digestive disorders, impotence, anemia, sinus congestion, dyspepsia, blood circulation, scabies, intestinal infections and gynecological problems (used even as a natural birth-control aid). The essential oil of Cinnamon is obtained from the dried inner bark of the Cinnamon tree, scientifically known as *Cinnamomum zeylanicum* (now called as *Cinnamomum verum*) by steam distillation method. The major active ingredients in cinnamon essential oil responsible for its beneficial effects include: eugenol, cinnamaldehyde, phellandrene and methyleugenol. The main beneficial component of cinnamon oil is believed to be

cinnamaldehyde, which comprises about 60 percent of the substance.<sup>5</sup>

There is always increasing demand for patient convenience and compliance related research. Among the various routes, the topical route is most popular route for the administration of therapeutic agents because of the low cost of therapy and ease of administration lead to high levels of patient compliance.<sup>6</sup> Topical drug delivery systems involve the introduction of a drug to the surface of the body, in a formulation which can be absorbed. These systems are often very easy for patients to use and are painless, which is why many pharmaceuticals come in the form of topical dosage forms.<sup>7</sup>

Pain is a feeling triggered in the nervous system and is a problem faced by people throughout the world on a daily basis. Pain can be acute (as caused through injury) or can be chronic (i.e. lasting for months or years, as is the case with patients suffering from rheumatoid arthritis, gout, or some forms of cancer). Over the counter (OTC) drugs like aspirin or paracetamol can cause gastric ulceration or hepatic damage from prolonged use or over-dosage. Overall, the clinical evidence indicates that topical route is a safe and effective treatment option. In this context, we had been selected the cinnamon oils for possible analgesic, anti-inflammatory and anti-arthritis effect and formulated into new topical dosage forms like sticks and roll-ons.

Roll on & sticks can help you in getting over headache faster particularly when you are travelling or even while driving. It can show its efficacy in relieving headache within 5 minutes. It

immediately acts by penetrating deeper and kicks out your pain and provides instant relief. It fits perfectly in your pocket/handbag and is so easy to use. Roll- on & sticks acts as an instant stress reliever and also provides a cooling effect.<sup>8,9</sup>

## MATERIALS AND METHOD

Cinnamon oil, Bees wax, Paraffin wax, Lemon juice, vanilla essence, Bentonite, Sodium CMC, Glycerin, Alcohol, methyl and propyl paraben are the various materials which are used in a current investigation.

**Selection of herbal ingredient:** The cinnamon barks used in present formulation of cinnamon oil sticks and roll-ons were selected on the basis of literature survey.

**Procurement of materials:** The cinnamon barks were purchased from Nature & nature health care private limited, New Delhi and remaining all ingredients were provided by Hindu college of pharmacy, Guntur.

### Extraction of cinnamon oil

Cinnamon oil was extracted by steam distillation using 100 grams of cinnamon bark powder with 500ml water at 60 °C using Clevenger apparatus. Steam distillation produces high quality essential oil.<sup>10</sup>



Figure 1: Extraction of cinnamon oil by steam distillation

### Formulation of cinnamon oil sticks

The cinnamon oil stick was formulated as per general method of normal lipstick formulation. The ingredients and their quantity used in the formulation of a cinnamon oil stick are given in Table 1.

Table 1: Ingredients with their prescribed quantities for the formulation of cinnamon oil stick

Ingredient	Quantity (gram)	Purpose
Cinnamon oil	4	Analgesic, anti-inflammatory & anti arthritic agent
Bees was	11	Glossy & hardness
Paraffin wax	7	Glossy & hardness
Lemon juice	1	Antioxidant
Vanilla essence	q.s	Preservative

All the ingredients were mixed in a definite ratio by melting paraffin wax and bees wax at a low flame and then molded in a suitable mold (Molding method) to formulate sticks.<sup>11</sup>



Figure 2: prepared cinnamon oil sticks

### Evaluation of Prepared cinnamon oil stick

It is very essential to maintain a uniform standard, keeping this view in mind the formulated stick was evaluated for physical parameters such as color, surface anomalies, melting point, breaking point, force of application etc.<sup>12, 13</sup>

**Surface anomalies-** This was studied by the surface defects, such as no formation crystals on surfaces, no contamination by moulds, fungi etc.

**pH parameter -** The pH of formulated cinnamon oil stick was determined using pH meter.

**Melting point -** Determination of melting point is important as it is an indication of the limit of safe storage.<sup>14</sup> The melting point of formulated stick was determined by capillary tube method. The capillary was filled and kept in the melting apparatus, firstly observed that the product was slowly-slowly melted after sometimes the product was completely melted. The above procedure was done on three sticks and the average melting point was determined

**Breaking point -** Breaking point was done to determine the strength of stick. The stick was held horizontally in a socket ½ inch away from the edge of support. The weight was gradually increased by a specific value (10 gm) at specific interval of 30 second and weight at which breaks was considered as the breaking point.<sup>15</sup>

**Thixotropy character -** It is indication of thixotropic quality and was done by using penetrometer. A standard needle of specific diameter was allowed to penetrate for 5 seconds under a 50-gm load at 25 °C. The depth of penetration was a measurement of the thixotropic structure of stick.<sup>15</sup>

**Force of application-** It is test for comparative measurement of the force to be applied for application. A piece of coarse brown paper can be kept on a shadow graph balance and stick can be applied at 45° angle to cover a 1 sq. inch area until fully covered. The pressure reading is an indication of force of application.<sup>15</sup>

**Skin irritation test -** It is carried out by applying product on the skin for 10 min.<sup>15</sup>

**Ageing stability -**The product was stored at 40°C/1 hour after that various parameters such as bleeding, crystallization of on surface and ease of application were observed.<sup>15</sup>

### Formulation of cinnamon oil roll-ons

Roll-on is in lotion (or) suspension format<sup>9</sup>, so it is prepared according to the general method of lotions by using bentonite as suspending agent, sodium CMC as thickening agent after that the

prepared lotion was filled into roll-on container. The ingredients and their quantity used in the formulation of a cinnamon oil roll-on are given in Table 2.

**Table 2: Ingredients with their prescribed quantity in the formulation of cinnamon oil roll-ons**

Ingredients	Quantity	Purpose
Cinnamon oil	4ml	Analgesic, anti-inflammatory & anti-arthritis agent
Bentonite	0.5g	Suspending agent
Sodium CMC	0.3g	Thickening agent
Glycerine	1ml	Humectant
Alcohol	1ml	Hastens the drying, cooling effect
Methyl paraben sodium	2g	Preservative
Propyl paraben sodium	0.2g	Preservative
Purified water	q.s to 25 ml	solvent



**Figure 3: Prepared cinnamon oil roll-ons**

**Evaluation of Prepared cinnamon oil roll-ons:** The prepared cinnamon oil roll-ons were evaluated for pH, spreadability, viscosity, drying time and skin irritation test according to the following procedure

**pH parameter:** The pH of formulated cinnamon oil stick was determined using pH meter.

**Viscosity:** The viscosity of prepared cinnamon oil roll-ons was done with a Brookfield viscometer. The lotion was rotated at 50rpm using spindle number 95. At each speed the corresponding dial reading was noted.

**Spreadability:** Spreadability is expressed in terms of time in seconds taken by two slides to slip off from roll-ons and placed in between the slides under the direction of certain load, better the spreadability. It is calculated by using formula

$$S = M.L/T$$

Where, M= Weight tied to upper lid, L= Length of glass slides, T= Time taken to separate the slides

**Drying time:** Solvents from liquid deodorants and anti-perspirants, such as roll-ons should quickly evaporate from the skin surface after application. Slow drying time leads to a sticky feeling and may leave stains on the clothes if users do not wait until the product is completely dried on their skin. Drying time can be measured by evaluating stickiness. This test is usually performed by experts.

**Skin irritation test:** It is carried out by applying product on the skin for 10 min.

**RESULTS AND DISCUSSION**

Cinnamon oil sticks and roll-ons were prepared according to the general formula of cosmetics like lipsticks and roll-ons and cinnamon oil sticks were evaluated for physical parameters such as colour, surface anomalies, melting point, breaking point, force of application etc., whereas cinnamon oil roll-ons were evaluated for colour, pH, viscosity, spreadability, drying time and results (Table 3 & 4).

**Table 3: Evaluation of formulated cinnamon oil stick**

Evaluation parameter	Inference
Colour	Pale yellow
Surface anomalies	No defects
pH	5.6
Melting point	57 <sup>o</sup> c
Breaking point	37 g
Thixotrophy character	7.2 cm
Force of application	Good
Skin irritation test	No
Aging stability	No change in physical parameters

**Table 4: Evaluation of formulated cinnamon oil roll-on**

Evaluation parameter	Inference
Colour	Pale yellow
pH	5.7
Viscosity	4970 cp
spreadability	9.5 cm/ml/sec
Drying time	47 sec
Skin irritation test	No

**DISCUSSION**

The evaluation studies for cinnamon oil sticks revealed that the sticks are having uniform colour, smooth and having uniform surface, stable at room temperature (no melting property, no bleeding), P<sup>H</sup> is almost nearer to skin P<sup>H</sup>. Hence there is no evidence of skin irritation. The stability studies reveal that the products are stable even at higher temperature like 40°C. The evaluation studies for cinnamon oil roll-ons revealed that having good spreadability, faster rate of drying and no evidence of residue on drying, Non-sticky, P<sup>H</sup> is almost nearer to skin P<sup>H</sup>, hence there is no evidence of skin irritation.

**CONCLUSION**

There is always increasing demand for patient convenience and compliance related research. Among the various routes, the topical route is most popular route for the administration of therapeutic agents because of the low cost of therapy and ease of administration lead to high levels of patient compliance. Topical drug delivery systems involve the introduction of a drug to the surface of the body, in a formulation which can be absorbed. These systems are often very easy for patients to use and are painless, which is why many pharmaceuticals come in the form of topical dosage forms. Pain is a feeling triggered in the nervous system and is a problem faced by people throughout the world on a daily basis. Pain can be acute (as caused through injury) or can be chronic (i.e. lasting for months or years, as is the case with patients suffering from rheumatoid arthritis, gout, or some forms of cancer). Over the counter (OTC) drugs like aspirin or paracetamol can cause gastric ulceration or hepatic damage from prolonged use or over-dosage. Overall, the clinical evidence indicates that topical route is a safe and effective treatment option. Hence, the cinnamon oil was successfully formulated into new topical dosage forms sticks & roll-ons and evaluated. Evaluation

studies revealed that the cinnamon oil sticks & roll-ons were stable, safe and effective topical dosage forms to treat analgesia, inflammation and arthritis.

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