



# DEVELOPMENT OF COMPRESSION BANDAGE FINISHED WITH CARDIOSPERMUM HALICACABUM LINN EXTRACT

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## 1. ABSTRACT

Among the various advantages that plants offer, "health" stands out as one that is most cherished. Many diseases have been treated with organic plant materials over the years. A fairly prevalent health condition that affects your joints is arthritis. Compression bandages with anti-inflammatory and anti-bacterial finishes are required to avoid arthritis. Compression bandages support joints and shield your bones from pain. Your joints will move more easily and painlessly when carrying weights. An extract from *Cardiospermum halicacabum Linn* is anti-inflammatory and antibacterial. Its capacity to relieve joint discomfort is its key health advantage. This research focuses on creating compression bandages for arthritis patients with natural fibres and a herbal extract finish to reduce pain that are both anti-bacterial and anti-inflammatory.

## KEYWORDS

Arthritis, Joint pain relief, Anti-inflammatory, *Cardiospermum halicacabum linn*,

Anti-arthritis, Medical textile

## 2. INTRODUCTION

Technical textile's subset of medical textile, which includes a wide range of items, is quite significant. The word "medical textile" itself refers to all textile products employed in the healthcare system for a variety of functions. One of the markets for technical textiles that is expanding the fastest is medical textile, often known as health textile. The growth rate of technical textiles in this industry is a result of ongoing advancements and breakthroughs in both textile and medical technology. In this field, textile structures are made of yarns, woven,

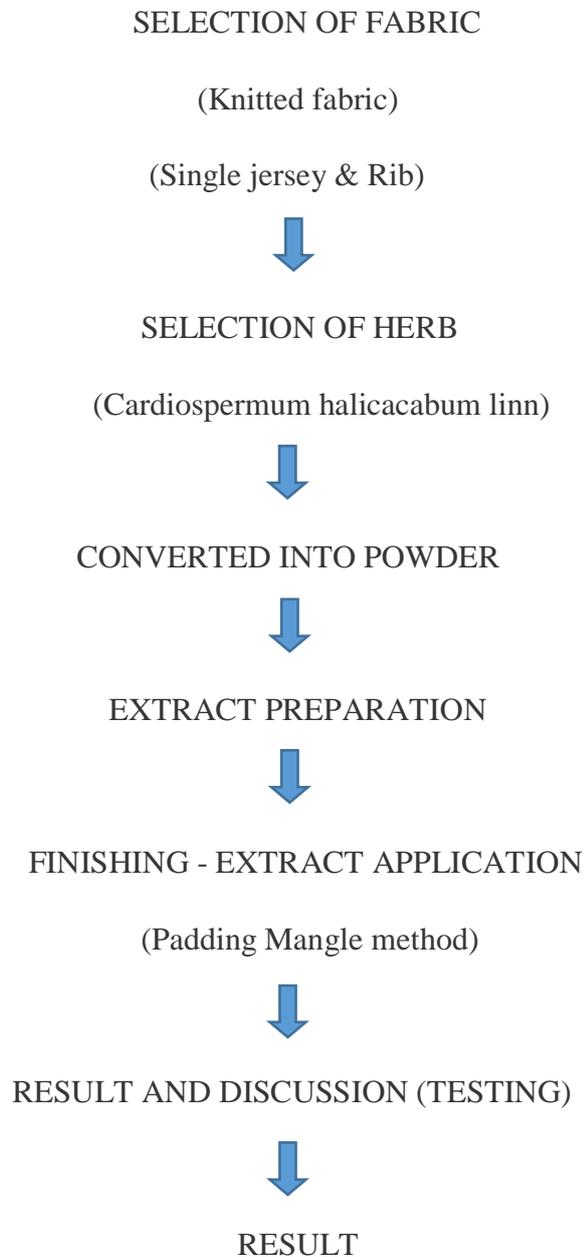
knitted, non-woven, and composite materials reinforced with textiles. Applications range from straightforward surgical sutures to intricate composite structures for replacing bone and tissue, as well as hygienic supplies, operating room safety items, and devices used to heal postoperative wounds. This paper's emphasis on the value of technical textiles for applications in medicine, surgery, and health care will reveal which textiles are currently employed in this industry.

Arthritis is a relatively prevalent health issue that can prevent people from performing their daily activities, participating in social activities and the workforce, and meeting their personal and professional responsibilities. Inflammation, activation of autoimmune cells, and tissue damage in the joints are the hallmarks of arthritis. Joints and organ systems are affected by the chronic, progressive condition known as rheumatoid arthritis. Due to symptoms including deterioration, pain, swelling in the joints, morning impairment, and weariness brought on by joint inflammation, rheumatoid arthritis patients experience loss of function in daily life. Due to their complex roles as mothers, wives, and carers, women with rheumatoid arthritis experience more daily difficulties than males. Living with a chronic illness like rheumatoid arthritis is very challenging.

Worldwide, traditional medical systems have used plant-based medications to treat a variety of diseases. Around 80% of the world's population depends on modern medicine. Plant-based products that are environmentally and biologically friendly are increasingly being considered for the prevention and treatment of various human infections, including microbial diseases, around the globe. Employment of plants in traditional medicine is also growing. Nature has endowed us with an exceptionally rich botanical diversity, and numerous various plant species can be found growing throughout the nation.

The annual or occasionally perennial plant *Cardiospermum halicacabum*, also known as Welpenela in Sinhala and balloon vine in English, is very prevalent in Sri Lanka's low country. It is a tiny, smooth, fragile climber, and the entire plant has been used for many years to treat rheumatism, limb stiffness, and snakebites. For bleeding hemorrhoids, a decoction of the root is prescribed. Fresh leaf juice is provided for asthma patients and it can also reduce obesity. The leaves are also one of the ingredients in a medicine used to treat abnormal menstrual period suppression. Various types of tumours and rheumatic pain swellings are treated with leaves that have been cooked in oil, such as castor oil. Numerous studies indicate that the ethanol infusion of leaves has antibacterial and anti-diabetic properties. The different extracts of this plant have been found to contain a variety of fatty acids and volatile esters, as well as phytochemical components like flavones, triterpenoids, glycosides, and others. A Werner-Mathis two-bowl padding mangle with horizontal squeeze-roller design was used for the padding experiments. The trough for pad liquor was formed by the gap between the rollers. Compressed air was used to regulate pressure, which was then used to modify the wet pick up.

### 3. METHODOLOGY



### 4. SELECTION OF FABRIC

#### 4.1. KNITTED FABRIC

Both the chosen Single jersey and Rib knitted fabrics were commercially bought from local knitted industry in Tiruppur.

#### SINGLE JERSEY

- Single jersey fabric is highly breathable and absorbent, preventing perspiration from adhering to the fabric and the skin.
- Both easily accessible and reasonably priced.

- It is used to create bandages because of its excellent stretchability.



Fig 1: Single jersey knitted material with 180 gsm

## RIB

- As it has excellent elasticity, which is used to finish the product, rib knits don't wrinkle and the fabric is very easy to return to its original shape.
- As it has good stretchability, it is used to make a bandage.



Fig 2: Rib knitted material

## 4.2. SELECTION OF HERB

Ayurveda, the Indian system of medicine, Unani medicine, and other ancient systems of medicine all use *Cardiospermum halicacabum* Linn as a key medicinal plant. *C. Halicacabum* Linn is used in Indian medicine to alleviate chronic bronchitis, limb stiffness, and snakebite. It is used as a demulcent in cases of orchitis and dropsy, as well as for the therapy of rheumatism, nervous disorders, and dropsy.

### 4.3. COLLECTION OF HERB

Fresh *Cardiospermum halicacabum* Linn leaves were collected in November 2022 from mature, healthy plants cultivated in Sangampalayam, India, between the hours of 6 a.m and 6:30 a.m.



Fig 3: Freshly Collected *Cardiospermum halicacabum linn*

### 4.4.CONVERTED INTO POWDER

*Cardiospermum halicacabum* Linn leaves (200g) were dried for a week in the shade at room temperature after the plants were gathered. The desiccated leaves were then ground into a coarse powder. Prior to use, the powdery component was sieved and stored in a deep freezer.



Fig. 4: Powder made from desiccated shade leaves

### 4.5. EXTRACT PREPARATION

With the help of a Soxhlet device, 50g of dry powder was combined with 200 ml of ethanol and continuously percolated. The extractions proceeded for a further 72 hours at 50°C. The extract was vacuum-distilled, filtered, and then concentrated to a dry bulk. To make the necessary doses in a 1 ml solution, the extract was



stored in desiccators and then dissolved in distilled water.

Fig 5: *Cardiospermum halicacabum linn* extract

## 4.6. FINISHING - EXTRACT APPLICATION

### 4.6.1. PADDING MANGLE METHOD

Using the two bowl padding mangle technique, extract was finished on the single jersey knit fabric. The cloth is inserted between the rollers that are squeezing at a high pressure. After passing through a guide roller in the trough, the cloth exits through the horizontal nip of two vertical rollers. The cloth was coated with the extract using a padding mangle. This method gives the material a similarly polished finish.

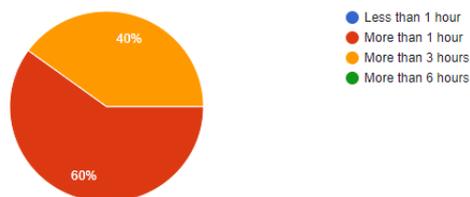
## 5. RESULT AND DISCUSSION

### QUANTITATIVE ANALYSIS

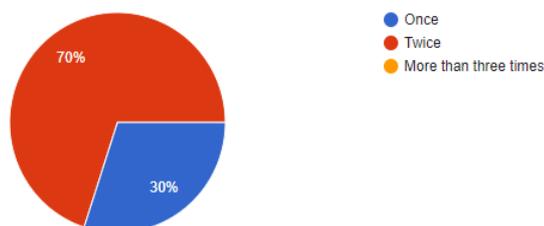
#### 5.1. WEAR TEST

The test is conducted within a small group of users with the help of feedback survey. The survey consists of 10 questions which collect data about wearing duration, consumer behaviours when wearing the product and how consumer reacts on wearing the product.

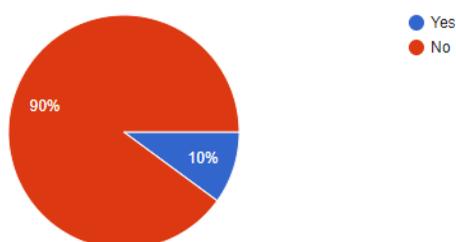
1. How long do you use this compression bandage per day?



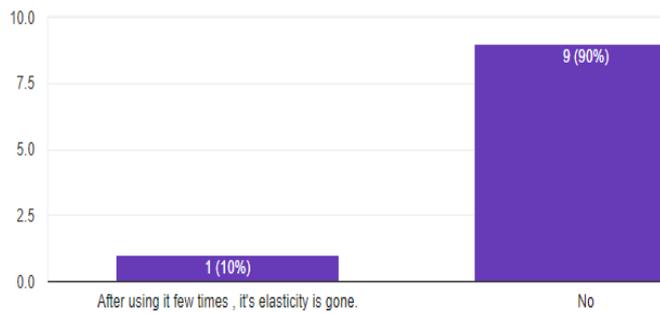
2. How many times you remove and wear this bandage a day?



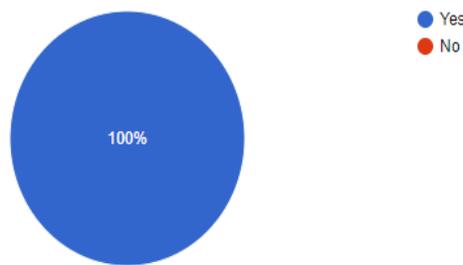
3. Do you feel any discomfort while wearing this compression bandage?



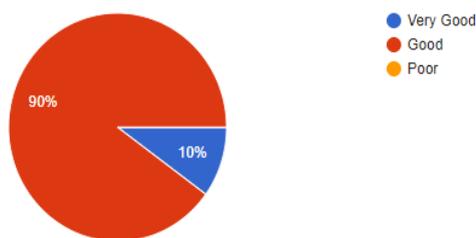
4. If yes, what kind of discomfort you feel?



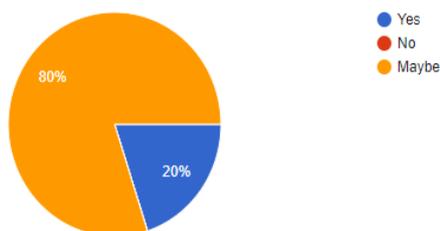
5. Are you able to do your day to day activities while wearing this compression bandage?



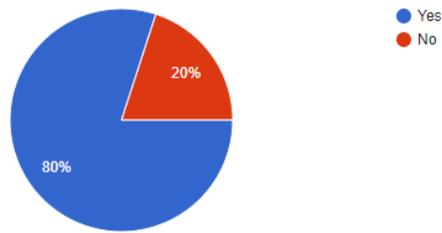
6. How to you rate the fabric quality?



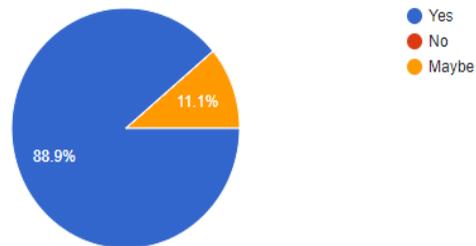
7. Do you feel relieved of your pain after wearing this bandage for more than 7 days?



8. Does this bandage withstand its elasticity when used daily?



9. Will you recommend this product to your friends/family?



10. Please write your feedback/improvements on this compression bandage.

Comfortable to use.

Should improve the elasticity of this product.

Feels good to wearing this.

Relieved pain after using this product.

Satisfied with this product.

Most wanted one.

Relieved knee pain after using this product.

Comfortable for regular use

It helps to control knee pain.

## 6. CONCLUSION

Consequently, the compression bandage has been created. My goal is to help arthritis sufferers feel less pain and swelling. This is classified as a medicinal textile. Joint discomfort from arthritis is lessened by compression bandages. Antibacterial and anti-inflammatory qualities are present in this bandage. Developed compression bandages with *Cardiospermum halicacabum* linn extract completed on single jersey and rib knit fabric. It's entirely organic. Thus, it is both healthy and more affordable for arthritis sufferers.

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