



Herb - Activated Temperature - Changing Body Lotion Formulated with Sita Prashamana and Usna Prashamana Mahakasayas - A Comprehensive Scientific and Ayurvedic Evaluation.

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Abstract

Temperature-responsive herbal formulations represent a novel class of therapeutic skincare products merging botanical pharmacology with modern cosmetic science. This research explores the development and mechanism of an Herb-Activated Temperature - Changing Body Lotion enriched with classical Ayurvedic herbal groups – Śīta Prashamana Mahakasaya (cooling, pitta-pacifying herbs) and Uṣṇa Prashamana Mahakasaya (warming, circulation-stimulating herbs) as described in Charaka Saṃhitā Sūtrasthāna 4.A comparative Panchamahābhūta analysis table is provided to explain the energetic foundation of each ingredient. The research concludes by presenting a unified mode of action integrating thermal receptor activation (TRPV1/TRPM8), microcirculatory dynamics, and Ayurvedic Dosha balancing which will help to design a body lotion by using principles of Ayurveda, incorporating Sita Prashamana and Uṣṇa rashamana Mahakasaya. The experiment focuses on

exploring the synergistic thermoregulatory effects of selected herbal groups on human skin under varying environmental and physiological conditions. The aim of the study is to presents the development and evaluation of an innovative lotion that targets cutaneous thermo receptors using herbal actives derived from ancient Ayurvedic classifications.

Keywords: Temperature - Changing Body Lotion, thermal receptor activation (TRPV1/ TRPM8), Śīta Prashamana Mahākāśāya, Uṣṇa Prashamana Mahakasaya.

Introduction

Over the past few years, there has been a significant rise in demand for herbal skincare products within the cosmetic industry. In the human body, the skin is the largest organ and reflects an individual's unique appearance. Today, there is a growing consumer interest in safer, more natural alternatives to synthetic cosmetics, driving market demand for herbal ingredients.¹ Among

the wide variety of herbal cosmetics, herbal body lotions are particularly favored for enhancing skin health and vitality. Herbal cosmetic products, derived from plant-based ingredients, are celebrated for their medicinal and therapeutic benefits, offering a holistic skincare approach that addresses aesthetic concerns while nourishing and revitalizing the skin.¹ Plant based herbal products are generally considered safer, more skin-friendly, and environmentally sustainable. They contain natural compounds that offer not only antioxidant protection but also anti-inflammatory, antimicrobial, and moisturizing benefits.² Temperature-altering topical lotions have recently become increasingly significant in therapeutic dermatology because they provide immediate sensory relief, enhance local blood flow, and deliver soothing anti-inflammatory effects. Ayurveda provides alternative using herbs with inherent Uṣṇa (heating) or Sīta (cooling) Virya to achieve safe, natural thermogenic or cryogenic effects.

This study presents the development and evaluation of an innovative lotion that targets cutaneous thermo receptors using herbal actives derived from ancient Ayurvedic classifications.

Ushna Prashamana Mahakasaya herbs alleviate burning sensation that pacifies Pitta.³

Sita Prashamana Mahakasaya herbs control the chill which refers to warming herbs that enhance circulation and alleviate Vata.⁴

These groups were chosen for their well-defined pharmacodynamic properties and balanced Pancha Mahābhūta composition.

Materials and Formulation Design

Herbal Components

Ushna prasamana Mahakasaya (Cooling Actives) includes Chandana, Usira, Mṛṇāla, Satavari, Prsniparni, Yashtimadhu, Guduchi, Padma, Sariva, and Madhuka.

Sita prasamana Mahakasaya (Warming Actives) includes Śunṭhi, Pippali, Maricha, Chitraka, Hingu, Tulsi, Cinnamon, Capsicum, and Aśvagandhā.

Lotion Base

Emollients: Shea butter, sesame oil, almond oil

Shea butter

This emollient is celebrated for its moisturizing and skin-softening capabilities and is commonly employed as an excipient in cosmetic formulations. Shea butter is regarded as a Natural Moisturizing Factor (NMF) because its structure and function mimic the skin's lipids, thereby preserving the epidermis's intercellular integrity, blocking bacterial entry, promoting healing, preventing irritation and sunburn, and facilitating skin regeneration. Shea butter enhances the look of dry skin and is particularly beneficial during winter weather.⁵

Sesame oil

Sesame seed oil has been utilized as a healing remedy for thousands of years. The sesame plant has held its significance since ancient times. Sesame oil, which is rich in vitamin E, is extracted from sesame seeds. Sesame seed oil is rapidly absorbed and penetrates deep into the tissues, reaching the bone marrow.

It enters the bloodstream through the capillaries and circulates. It also contains tocopherol, another antioxidant that yields better results in treating injuries. In the modern pharmaceutical industry, it is also used to prepare liniments, plasters, ointments, and soaps. Conventional medical practitioners utilize them as demulcents and emollients to form a protective layer over injured surfaces.⁶

Almond oil

As an emollient, almond oil hydrates the skin, helping to moisturize and smooth it. Almond oil is typically safe for sensitive skin due to its non-irritating and lightweight nature. It reduces dry, rough skin, leaving it bright and

clear. It contributes to achieving soft and smooth skin.⁷ It softens and whitens the skin while nourishing it. Regular use helps prevent early wrinkles, blackheads, dryness, and pimples while keeping the face fresh. When skin inflammation occurs, applying almond oil externally can alleviate pain and soothe the heat.⁸

Humectants: Glycerin

Glycerin Glycerol is commonly employed in medical, pharmaceutical, and personal care products to enhance smoothness, provide lubrication, and act as a humectant. Glycerin is used as a moisturizer and cleanser. It enhances skin permeability. It calms dry, irritated skin and helps diminish wrinkles. It possesses anti-aging properties.⁹

Delivery: Nano - encapsulation of plant ingredients

Nano encapsulation is a promising new method for integrating essential oils into food products and pharmaceutical formulations.¹⁰ Nano encapsulation is a technology that involves enclosing substances in miniature forms, specifically referring to the packaging of bioactive materials at the nano scale.

Nano -encapsulation holds the potential to significantly enhance bioavailability, facilitate controlled release, and enable more precise targeting of bioactive compounds.

Core Materials for Nano encapsulation

Core materials for nano encapsulation include lipophilic and hydrophilic nutraceuticals, with examples of the latter being ascorbic acid and polyphenols. Nano encapsulated lipophilic compounds include lycopene, beta-carotene, lutein, phytosterols, and docosahexaenoic acid.

Coating Materials for Nano encapsulation

Polymers employed in the preparation of nano particles. The polymers must be biocompatible, non-toxic, non-antigenic, biodegradable, and adaptable to the body.

Natural polymers

Chitosan, gelatin, sodium alginate, and albumin are the most frequently employed natural polymers for synthesizing polymeric nano particles.

Synthetic polymers

Numerous synthetic polymers, including polylactides (PLA), polyglycolides (PGA), poly (lactide – co - glycolide) (PLGA), polyorthoesters, polycyanoacrylates, polycaprolactone, polyglutamic acid, polymalic acid, poly (N-vinyl pyrrolidone), polymethyl methacrylate, polyvinyl alcohol, polyacrylic acid, polyacrylamide, polyethylene glycol, and polymethacrylic.¹¹

Plant extracts are complex mixtures that possess high levels of antioxidant, antibiotic, antiviral, anticancer, anti parasitic, antifungal, hypoglycemic, anti-hypertensive, and insecticidal properties. Extracts are typically obtained using organic solvents, yet the resulting products are often sensitive and unstable. Encapsulation serves as a solution to this issue.

Numerous authors have documented the enhanced stability of encapsulated active substances derived from various plant extracts, including elderberry, agro-industrial by - products, and Mediterranean flora. Certain plant extracts abundant in polyphenols, alkaloids, and terpenoids have proven to be highly effective materials for this preparation.¹²

Essential oils for aroma therapeutic enhancement

Essential oils, or volatile oils, are aromatic compounds found in the specialized cells or glands of certain plants, serving both to deter predators and pests and to attract pollinators. In other words, essential oils are a component of the plant's immune system. They are highly concentrated, volatile, alcohol - soluble organic compounds that are mostly colorless, hydrophobic, less viscous than oil, less dense than water, possess a watery

texture, and are highly aromatic.¹³ Essential oils are not restricted to use solely as fragrances. These powerful essences can be incorporated into cosmetics to provide the body with valuable nutrients. It has a profound impact when applied to the human body through various cosmetic products.¹⁴ Essential oils can enhance epidermal barrier function and help prevent trans-epidermal water

loss. (Escuadro - Chin et al. Yahya et al., 2019. (2020). Various studies have demonstrated that essential oils can help restore the balance of the skin's epidermal barrier (Andrade et al.). (2021). Research has demonstrated that using essential oils as a moisturizer effectively improves skin hydration.¹⁵

Table 1: Panchamahabhuta Composition of Herbs in Sita and Uṣṇa Prashamana Mahakasaya¹⁶

Herb	Group	Dominant Mahabhuta	Secondary Mahabhuta	Virya(Potency)	Functional Effect
Chandana	Sita	Jala	Prithvi	Sita	Cooling, reduces burning
Usira	Sita	Jala	Prithvi	Sita	Hydrating, soothing
Mṛṇāla	Sita	Jala	Vāyu	Sita	Moisturizing, heat reduction
Śatavari	Sita	Jala	Akasa	Sita	Nourishing, hydrating
Prśniparṇi	Sita	Prithvi	Jala	Sita	Stabilizing, anti-inflammatory
Yashtimadhu	Sita	Jala	Prithvi	Sita	Demulcent, anti-inflammatory
Padma	Sita	jala	Prithvi	Sita	Strong pitta-Samana
Sariva	Sita	Jala	Prithvi	Sita	Blood-purifying, cooling
Madhuka	Sita	Jala	Prithvi	Sita	Healing, soothing
Sunthi	Usna	Agni	Vayu	Usna	Circulation enhancement
Pippali	Usna	Agni	Vayu	Usna	Bio enhancer, stimulant
Maricha	Usna	Agni	Vayu	Usna	Strong thermogenic
Chitraka	usna	Agni	Prithvi	Usna	Strong thermogenic
Hingu	Usna	Agni	Vayu	Usna	Antispasmodic, warming
Tulsi	Usna	Agni	Vayu	Usna	Circulation, Anti -inflammatory
Cinnamon	Usna	Agni	Prthivi	Usna	Vasodilator, warming
Capsicum	Usna	Agni	Vayu	Usna	TRPV1 activation ¹⁷
Aswagandha	Usna	Prithvi	Agni	Usna	Muscle relaxation

Thermal Modulation Mechanism

Warming agents activate TRPV1 receptors

Warming agents activate TRPV1 receptors The transient receptor potential cation channel subfamily V member 1 (TRPV1), also referred to as the capsaicin or vanilloid receptor 1, is a human protein encoded by the TRPV1 gene¹⁸

Structural studies suggest that the analgesic and adverse effects of TRPV1 activation arise from distinct activation mechanisms. Consequently, TRPV1 is activated by capsaicin, protons (low pH), and heat through spatially distinct mechanisms.¹⁹ TRPV1 is most strongly activated by vanilloid compounds, particularly capsaicin, as well as by camphor, black pepper, ethanol, and garlic.²⁰

Cooling agents activate TRPM8 receptors

Cooling agents play a crucial role in the health sector by activating TRPM8 receptors, which serve as the body's primary molecular sensors for cold stimuli. This activation is utilized to provide therapeutic benefits, especially in pain management and the treatment of various pathological conditions.

TRPM8, a nonselective cation channel, regulates calcium homeostasis. TRPM8 channels are present in various organs and tissues, where they regulate critical processes including cell proliferation, migration, apoptosis, inflammatory responses, immune modulation, pain sensation, and vascular muscle tone. It is also a cold-activated thermo receptor functioning within the temperature range of 8–28°C (Mc Kemy et al.). Stein et al., 2002. And various cooling compounds, such as menthol and I cilin (Gonzalez-Muniz et al., 2004). (2019).²¹

Nano-delivery enhances penetration and sustains effects

Nanotechnology reduces particle sizes to improve effectiveness, extend results, enhance skin penetration and elevate product quality. Smaller particles are absorbed quickly, promoting faster damage repair. This technology also allows for controlled drug release from nano carriers, enhancing stability and enabling targeted delivery to specific sites. The cosmetics industry utilizes nano materials (NMs) for their enhanced strength and safety. Due to their large surface areas, nano materials (NMs) facilitate improved delivery of ingredients through the skin, offering benefits like effective penetration.²²

Results and Discussion

Body lotion formulated with Śīta Prashamana and Uṣṇa Prashamana Mahākaśāyas works through a three-layered

mechanism that combines modern science with Ayurvedic principles.

Activating TRP channels is crucial for the effectiveness of the body lotion. Stimulating TRPV1 with warming herbs increases blood flow, which helps reduce stiffness and muscle fatigue. On the other hand, stimulating TRPM8 with cooling herbs like Menthol, santalols, and vetiverol helps reduce inflammation, redness, and burning sensations. Nano-encapsulation in body lotions helps protect the active ingredients of Śīta Prashamana and Uṣṇa Prashamana Mahākaśāyas from breaking down, ensuring deeper penetration into the skin. This mechanism improves the stability, effectiveness, and texture of the lotion, leading to more targeted and prolonged release of active components. Emollients are very effective for promotion of skin health, preventing dry skin and repairing the skin barrier, which is compromised in chronic inflammatory skin conditions. Emollients are more cosmetically acceptable and penetrate the skin easily.²³ Emollients, especially the oil base, help the lotion penetrate deeper into the skin, enabling long-lasting local effects.²⁴ The oils have Kapha - Vata pacifying properties, which can help relieve various skin-related issues.²⁵

Most of the herbs in the Sita Mahakasaya are dominated by Jala and Prithvi Mahabhutas.

Jala Mahabhuta (water element) has properties such as Drava (liquid), Stimit (wet or moist), Shita (cold), and Snigdha (oily). The cooling and soothing nature of Jala Mahabhuta is essential for balancing Pitta.²⁶

Jala Mahabhuta is responsible for maintaining moisture in the body, which helps perform Snehana Karma (maintaining oiliness) for Kapha Dosha.

According to Hemadri, the Sneha (oiliness) property helps retain moisture through Kledana (water-lodging),

which moisturizes the skin. Kledaka Kapha ensures proper hydration.²⁷

In Ushna Mahakashaya, the substances (Dravyas) are primarily hot in potency (Ushna Virya), driven by a combination of Agni (Fire) and Vayu (Air) Mahabhutas.

This combination makes the substances warm, stimulating, and penetrating, often used to counteract cold, heavy, or stagnant conditions in the body. Ushna and Tikshnaguna are capable of penetrating the micro circulatory channels (Srotas).²⁸

Ushna and Teekshnaguna help reduce KaphaDosha and its Avaran, aiding Vatadosha management, which results in reduced pain and stiffness.²⁹

Some of the ingredients included in the formulation have Rasayan (rejuvenating) properties, such as Śatāvārī, Yashtimadhu, Guduchi, which promote tissue rejuvenation.

Aśvagandhā and Ginger help reduce muscular fatigue. Body lotion made with Śīta Prashamana and Uṣṇa Prashamana Mahākaśāyas can be used for musculoskeletal pain, post-workout recovery, stress relief through aromatherapy, care for sunburn and heat rash, anti-inflammatory skin care, and relief for elderly joint stiffness.

Conclusion

The Herb-Activated Temperature-Changing Body Lotion, which combines Śīta Prashamana and Uṣṇa Prashamana Mahākaśāyas, is an innovative blend that harmonizes scientific principles with Ayurvedic traditions.

It uses the Panchamahabhuta framework to maintain thermal balance and employs modern TRP channel modulation for targeted warming and cooling effects. This product connects traditional Ayurvedic medicine with today's cosmetic technology. More research and

standardization could help confirm its effectiveness and encourage its use in both beauty and healing purposes.

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