



International Journal of Pharmacy and Herbal Technology (Online)

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Ayurvedic Arka Formulation- A Synergistic Blend of Tulsi, Pomegranate, and Akkalkarrha

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ABSTRACT

Ayurvedic Arka formulations are traditional distilled herbal preparations that have been used for centuries in India. It is branch of Ayurveda focuses on formulating and utilizing pharmaceutical products for therapeutic purposes. It plays a crucial role in determining appropriate dosage forms. Unlike some other Ayurvedic formulations like kalka, swarasa, and kwath, this branch offers a more pleasant form of medication. These formulations typically appear colorless and are effective even in low doses. They boast better stability, compatibility, and patient compliance. Known as ArkaKalpana, they exhibit heightened potency, facilitate easy absorption, and prompt onset of action. Such advancements pave the way for further exploration and growth opportunities in pharmaceutical and clinical sectors specializing in Arkakalpana.

*This research article explores the formulation, pharmacological properties, and therapeutic benefits of an Ayurvedic Arka made from three potent ingredients: Tulsi (*Ocimum sanctum*), Pomegranate (*Punica granatum*), and Akkalkarrha (*Anacyclus pyrethrum*). This blend harnesses the synergistic effects of these herbs, offering various benefits. The article also delves into the preparation methods, chemical constituents, and potential clinical applications of this unique Arka formulation.*

Keywords: Ayurveda, Arka, Tulsi, Pomegranate, Akkalkarrha, Herbal Medicine, Traditional Medicine, Synergistic Effects, Immunomodulatory, GC-MS Analysis.

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Received on 06 July, 2024, Accepted 15 July, 2024

Please cite this article as: Bugad Jyoti et.al Ayurvedic Arka Formulation- A Synergistic Blend of Tulsi, Pomegranate, and Akkalkarrha.

International Journal of Pharmacy and Herbal Technology 2024.

INTRODUCTION

Ayurvedic studies hold a revered position as an ancient system of medicine across Asia and the Indian subcontinent, boasting a legacy of around 5000 years. Rooted in Vedic culture, Ayurveda harnesses the healing potential of natural components. Over time, it has branched into various disciplines that contribute to life and science, with a primary focus on disease treatment and holistic well-being. Researchers delve into therapeutic agents within Ayurveda, aiming to discover remedies that not only heal but also boost the body's resilience against illnesses. These agents, commonly referred to as drugs, are prescribed in diverse forms based on their availability and the patient's comfort. The formulations in Ayurveda, handed down by venerable Acharyas, encompass five fundamental types known as Kalpana: kwatha, kalka, hima, swarasa, and phanta. Among these, Arka stands out as a distinct form.¹

Arkakalpana denotes the process through which active constituents and volatile oils are extracted from drugs, yielding a substance referred to as Arka. This method holds significance in Ayurvedic practice, contributing to the potency and efficacy of herbal remedies.²

The formulation of Arka involves distillation of herbal materials, leading to a potent extract that captures the essence of the plants used. This study focuses on an Arka formulation comprising Tulsi, Pomegranate, and Akkalkarrha, each known for their distinct medicinal properties. This combination is hypothesized to provide a synergistic effect, enhancing the overall therapeutic potential.³

MATERIAL AND METHODOLOGY

Ingredients

Tulsi (*Ocimum sanctum*) powder

Pomegranate (*Punica granatum*) powder

Akkalkarrha (*Anacyclus pyrethrum*) powder

Procedure

Collection and Preparation of Raw Materials

Marketed tulsi powder.

Marketed Dried Pomegranate peels powder.

Marketed Akkalkarrha roots powder used.⁴

Distillation Process

The prepared raw materials are placed in the distillation apparatus with a sufficient quantity of Ethanol.

The mixture is heated to facilitate the distillation process. Simultaneously magnetic stirrer is used 240 rpm.

The vapors are collected and condensed to obtain the Arka.⁵

Filtration and Storage

The distillate is filtered to remove any impurities.

The final product is stored in amber-colored bottles to protect it from light and ensure stability.⁶

EXPERIMENTAL WORK

The preparation of Arka involves a meticulous process of distillation, capturing the volatile and ethanol-soluble constituents of the herbs. The following sections describe the detailed methodology for preparing Tulsi, Pomegranate, and Akkalkarrha Arka.⁷

Mixture of three powders -20 gm Ethanol- 200ml

Under aseptic conditions, Arka was prepared using a 1:10 (drug: Ethanol) ratio. Coarsely powdered ingredients (sieve number 44) consisting of Akkalkarra, Tulsi, and Pomegranate were taken in a 20:20:60 ratio. The coarse powder mixture was placed in a round bottom flask and soaked with 200 ml of Ethanol. An Arkayantra (distillation apparatus) was set up, and heating was initiated, controlled by a temperature gradient. Simultaneously, a magnetic stirrer was used at 240 rpm. The collected Arka was stored in a sterile, airtight glass bottle.⁸

Drug Quantity (gm)	20 gm
Ethanol	200ml
Proportion (drug: ethanol)	1:10
Mixture ration	20:20:60
Temperature gradient	Between 80 ⁰ to 90 ⁰
Start	2.30 pm
End	6.30 pm
Distillate obtained	100 ml

Table No. 1: Composition Table



Figure No.1: Powders of Tulsi, Pomegranate, and Akkalkarra

pH Determination

A PH meter is used for sample with electrodes and calibrated buffer solutions. The electrodes were immersed in the sample, and the reading was recorded.

Refractive Index Determination

Using an Abbe refractometer, the refractive index of the sample was determined. A dropper was used to place the sample on the measurement prism, and adjustments were made to ensure proper illumination before recording the reading.

Viscosity Measurement

A 25ml sample was transferred into a viscometer bulb using a pipette. The liquid flow time from point A to B was measured and recorded. This procedure was repeated for water, and the density of both water and sample was determined using a pycnometer to calculate viscosity.

Volatile oil Estimation

Clavengers apparatus is used.

Determination of Sp. Gravity

The specific gravity was determined by weighing the pycnometer.

Total Suspended Solids Calculation

A 30ml sample was dried in a pre-weighed china dish on a water bath, followed by drying in a hot air oven and placed in desiccator for cooling. The weight of the residue noted to determine total suspended solids.⁹

Each procedure is repeated and values calculated and recorded for accuracy then studied under GC-MS¹⁰



Figure No. 2: Instrument of GC-MS

RESULTS

This section outlines the standardization tests for the Arka formulation comprising Tulsi, Pomegranate, and Akkalkarrha. The tests include organoleptic evaluation, physicochemical analysis, chromatographic analysis. Standardization in Ayurveda involves establishing consistent quality and therapeutic efficacy of herbal formulations. It includes a series of tests and analytical methods to ensure the final product's safety, potency, and efficacy. The standardization of Arka made from Tulsi, Pomegranate, and Akkalkarrha is crucial to ensure reproducible results and patient safety.

Organoleptic Evaluation

Organoleptic characteristics include the sensory attributes of the Arka such as color, odor, taste, and appearance.

Color: Clear, pale yellowish-green

Odor: Characteristic aromatic smell

Taste: Slightly astringent with a sweet aftertaste

Appearance: Transparent liquid

Physicochemical Analysis

Physicochemical parameters provide information on the physical and chemical properties of the Arka.

pH Value: 2.76

Specific Gravity: 0.9778

Total Solids: 0.1

Viscosity :0.0054

Refractive Index:1.35

Phytochemical Screening

Chromatographic Analysis

Chromatographic techniques are used for the identification and quantification of bioactive compounds.

GC-MS study was done at CFC department, shivaji university Kolhapur, Maharashtra

Medicinal plants serve as valuable sources for new drug development, with many modern medicines being derived indirectly from these plants. They provide numerous ingredients that combat various diseases and illnesses. The analysis and extraction of plant materials are crucial for the development, modernization, and quality control of herbal formulations. Studying medicinal plants also aids in understanding plant toxicity, thereby helping to protect humans and animals from natural poisons.

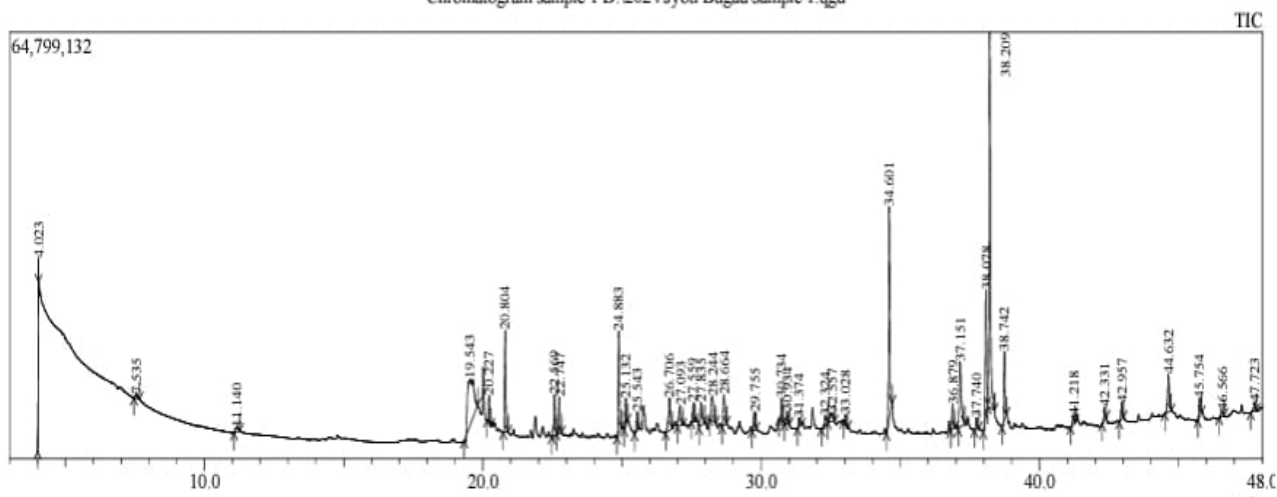
This study was conducted to identify the bioactive compounds in the ethanolic extract of mixture of three ingredients such as akkalkarrha, Tulsi, Pomegranate using Gas Chromatography-Mass Spectroscopy (GC-MS). The active principles, along with their retention time (RT), molecular formula, molecular weight (MW), and concentration (peak area %), are presented in Table 2 and Fig. 1. The results reveal the presence of 8 bioactive phytochemical compounds in the ethanolic extract of mixture compound arka.

The mass spectra of the identified compounds are as followed-

Sr No.	RT (min)	Name of the compound	Molecular formula	Molecular Weight	Peak area %
1	49.916	Squalene	C ₃₀ H ₅₀	410.73g/mol	3.86
2	19.543	3-Allyl-6-methoxyphenol	C ₁₀ H ₁₂ O ₂	164.20g/mol	10.02
3	37.151	Phytol	C ₂₀ H ₄₀ O	296.53	4.58
4	27.835	1-Heptatriacotanol	C ₃₇ H ₇₆ O	537.0	1.59
5	33.028	Hexadecenoic acid methyl ester	C ₁₇ H ₃₄ O	270.45	0.56
6	34.601	Hexadecenoic acid ethyl ester	C ₁₈ H ₃₆ O	284.47	10.21
7	49.439	Tetracontane-1,40-diol	C ₄₀ H ₈₂ O ₂	595.1	0.73
8	47.723	Dotriacontane	C ₃₂ H ₆₆	450.88	0.57

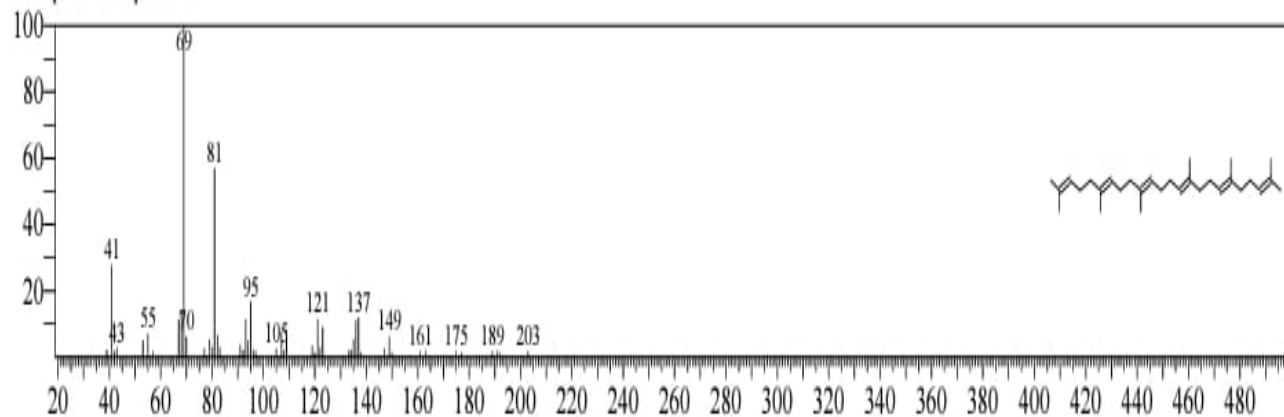
Table No.2: GC-MS Analysis of ayurvedic arka sample

Chromatogram sample 1 D:\2024\Jyoti Bugad\sample 1.qgd



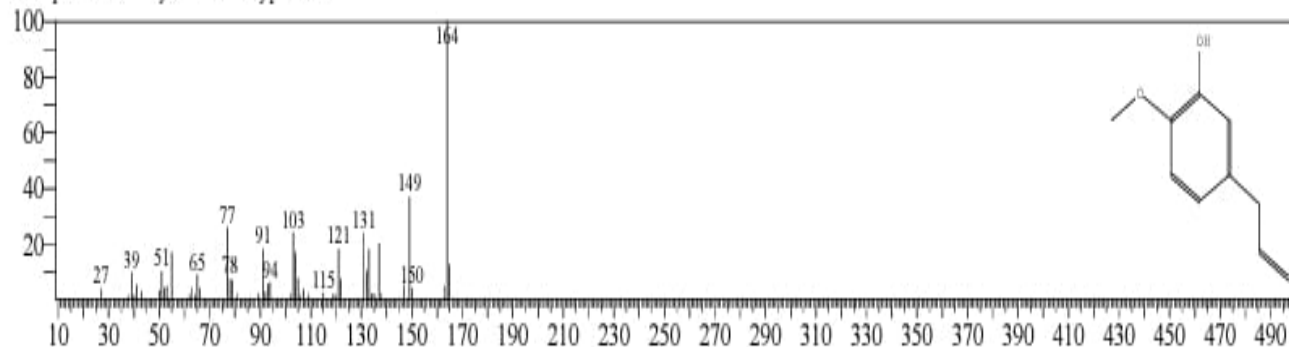
Graph No.1: GCMS Analysis Report of Arka Sample

CompName:Squalene



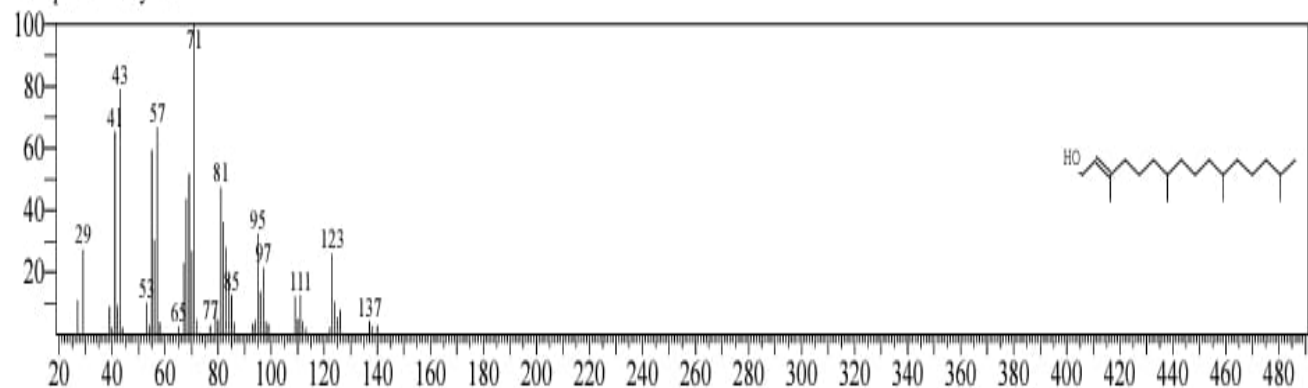
Graph No.2: Squalene peak in analysis

CompName:3-Allyl-6-methoxyphenol



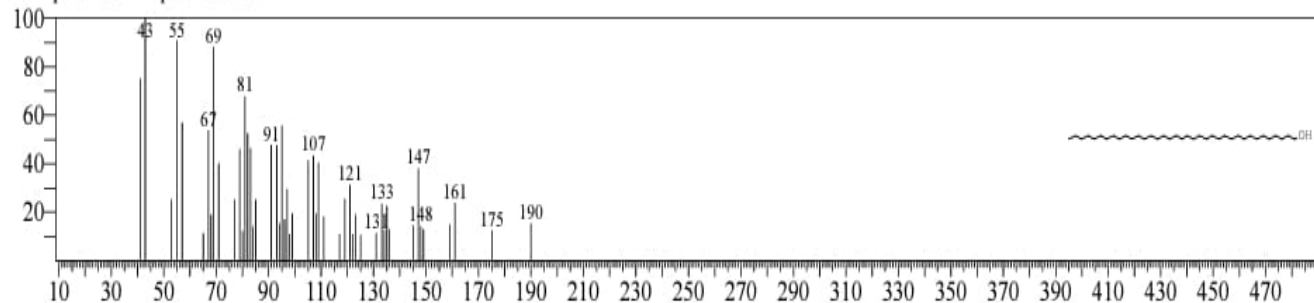
Graph No.3: 3-Allyl-6-methoxyphenol peak in analysis

CompName:Phytol



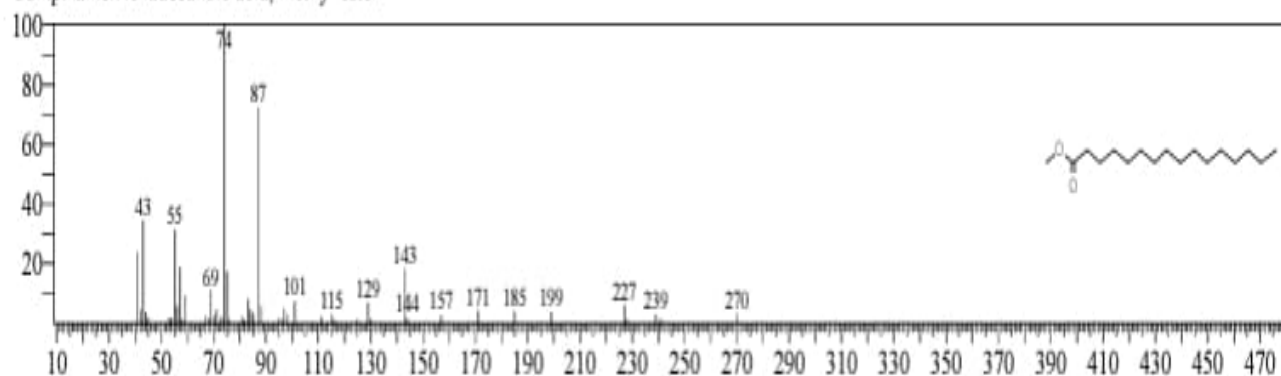
Graph No.4: Phytol peak in analysis

CompName:1-Heptatriacotanol

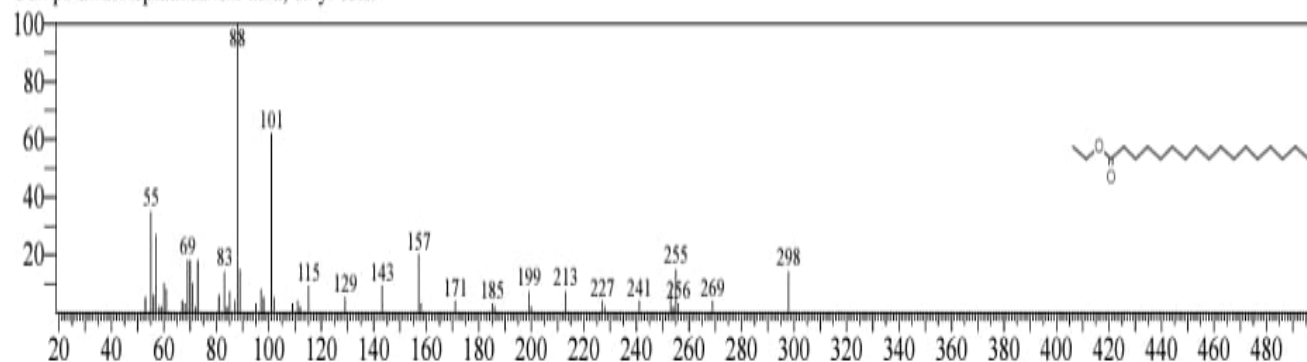


Graph No.5: 1-Heptatriacotanol peak in analysis

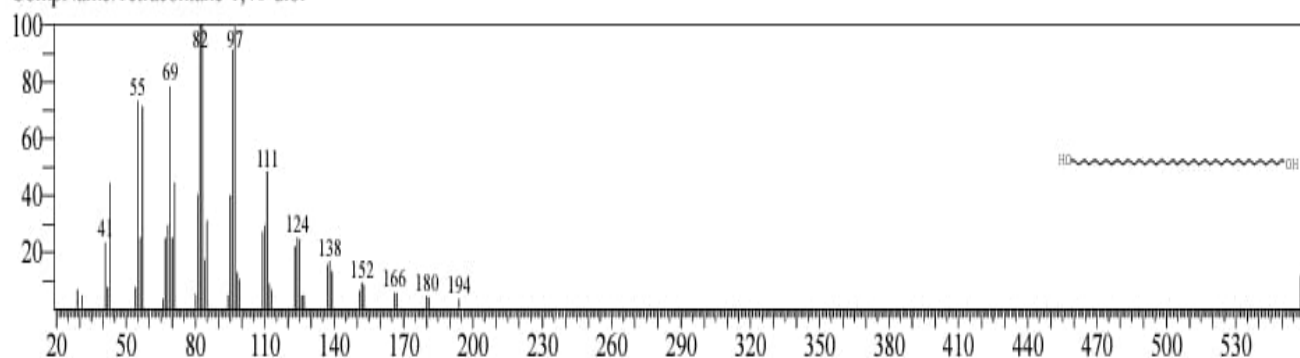
CompName:Hexadecanoic acid, methyl ester

**Graph No. 6: Hexadecanoic Acid, methyl ester peak in analysis**

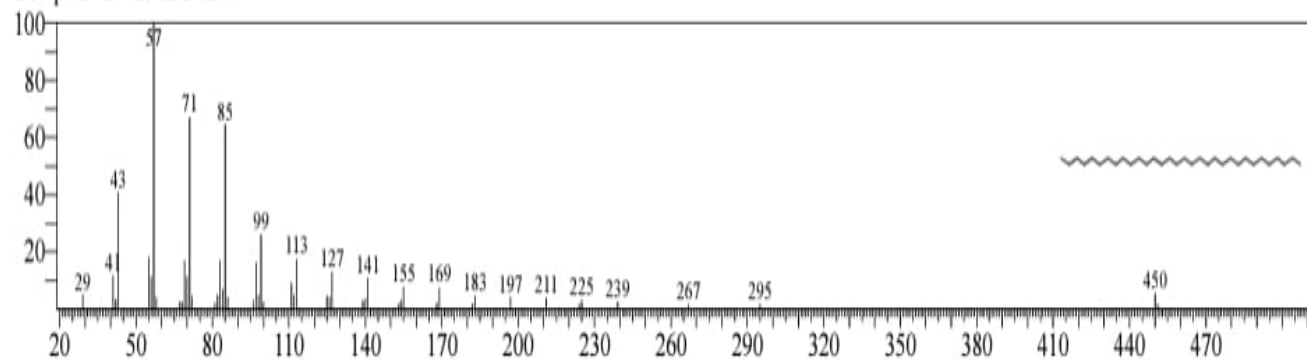
CompName:Heptadecanoic acid, ethyl ester

**Graph No.7: Heptadecanoic acid, ethyl ester peak in analysis**

CompName:Tetracontane-1,40-diol

**Graph No.8: Tetracontane-1,40-diol peak in analysis**

CompName:Dotriacontane

**Graph No.9: Dotriacontane peak in analysis**

DISCUSSION

Among all the identified phytochemicals Squalene 3-Allyl-6-methoxyphenol, Phytol, 1-Heptatriacotanol, Hexadecanoic acid methyl ester, Hexadecanoic acid ethyl ester, Tetracontane-1,40-diol, Dotriacontane have the various properties as immunomodulatory, antioxidant, anti-inflammatory, antibacterial, antiviral, defensive action against pathogen.

Dosage and administration

The recommended dosage should be determined based on clinical trials. Traditional use suggests a dosage of 10-15 ml twice daily for general health benefits.

CONCLUSION

The standardization of Tulsi, Pomegranate, and Akkalkarrha Arka ensures a high-quality product with consistent therapeutic efficacy. Adhering to these standardization protocols will help validate the formulation's safety and effectiveness, promoting its integration into modern medicinal practices.

The Ayurvedic Arka formulation of Tulsi, Pomegranate, and Akkalkarrha presents a promising natural remedy with extensive health benefits. The synergistic effects of these herbs offer a potent combination that addresses oxidative stress, inflammation, immune function, and cognitive health. Further clinical studies are warranted to fully establish its efficacy and safety, paving the way for its integration into modern therapeutic practices.

CONFLICTS OF INTEREST

Nil.

FUNDING

No financial interest.

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