Int J Ayu Pharm Chem
ISSN 2350-0204
www.ijapc.com

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Efficacy of Sapsciatin Soft Gel Capsules in Alleviating Sciatica: A Clinical and Pharmacological Analysis

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ABSTRACT

Sciatica is a common neurological condition characterized by radiating pain along the sciatic nerve, significantly impairing quality of life and occupational productivity. This study aims to evaluate the clinical efficacy and pharmacological profile of Sapsciatin, a proprietary Ayurvedic formulation. A randomized, open-label clinical trial involving 30 patients was conducted, utilizing the Oswestry Disability Index (ODI) and Visual Analog Scale (VAS) to assess therapeutic outcomes. Sapsciatin treatment yielded a marked reduction in disability scores, with the ODI mean score improving from 30.0 to 17.0. Pharmacological analysis through High-Performance Chromatography (HPLC), High Performance Thin Layer Chromatography (HPTLC) and Gas Chromatography-Mass Spectrometry (GC-MS) revealed bioactive compounds such as Guggulusterone E and Z, Longifolene, and Asarone, all exhibiting anti-inflammatory and analgesic properties. Comprehensive quality control and microbial assessments confirmed the formulation's safety and standardization. The findings underscore Sapsciatin's potential as an effective Ayurvedic intervention for sciatica and associated spinal disorders.

Key Words *Sciatica, Sapsciatin, Clinical trial, GC-MS, Anti-inflammatory*

Received 16th May 2025 Accepted 27th June 2025 Published 10th July 2025

INTRODUCTION

Sciatica is a complex neuropathic disorder that presents a significant burden on global public health systems and has notable socioeconomic consequences[1]. The condition is typically characterized by radiating pain along the sciatic nerve, often resulting from nerve root compression due to lumbar disc herniation, spinal stenosis, or degenerative disc disease[2]. Clinically, sciatica manifests as lower back pain radiating to the posterior thigh and leg, often accompanied by sensory disturbances, muscle weakness, and impaired mobility[3].

Epidemiological data suggest that sciatica affects approximately 1% to 5% of the global population on an annual basis, with lifetime prevalence estimates ranging from 13% to 40% depending on population subgroups and occupational risk

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factors[4]. The condition predominantly affects individuals during their most productive working years, leading to substantial losses in workforce productivity and imposing significant direct and indirect healthcare costs. In fact, lower back pain, including sciatica, is ranked among the leading causes of disability-adjusted life years globally[5].

In the Indian context, sciatica has become increasingly prevalent due to a combination of modern lifestyle patterns and occupational hazards. The shift toward sedentary occupations in urban areas has resulted in higher incidences of musculoskeletal disorders linked to poor ergonomics and prolonged sitting[6]. Simultaneously, workers in labour-intensive sectors such as agriculture, construction, and transportation remain at heightened risk due to repetitive strain, heavy lifting, and exposure to continuous vibration. The limited accessibility and affordability of advanced orthopedic and neurological care, particularly in rural and semi-urban regions, have further intensified the demand for complementary therapies[7].

Ayurveda, India's traditional system of medicine, has long provided culturally rooted and cost-effective solutions for managing musculoskeletal and neuropathic disorders[8]. Among such interventions is Sapsciatin, a proprietary polyherbal formulation developed by Sitaram Ayurveda Private Limited. The formulation is specifically designed to address inflammation and pain associated with sciatica and related spinal pathologies. Each 1g soft gel capsule of Sapsciatin contains a synergistic blend of botanicals, including Aragwada (*Cassia fistula*), Gokshura (*Tribulus terrestris*), Devadaru (*Cedrus deodara*), Eranda Moola (*Ricinus communis*), Nirgundi (*Vitex negundo*), Guggulu (*Commiphora mukul*), and Ativisha (*Aconitum heterophyllum*), all of which have been traditionally recognized for their anti-inflammatory, analgesic, and detoxifying properties[9,10].

The therapeutic rationale for Sapsciatin lies in its ability to nourish the synovial fluid, thereby promoting joint lubrication, enhancing vertebral flexibility, and modulating inflammatory pathways involved in nerve compression syndromes. Modern pharmacological investigations have highlighted the bioactive constituents within these botanicals—such as Guggulusterone, Longifolene, and Asarone—which exhibit anti-inflammatory, analgesic, and neuroprotective effects[11].

The current study seeks to present a robust pharmacological and clinical evaluation of Sapsciatin by integrating modern analytical techniques, including High-Performance Liquid Chromatography (HPLC), High-Performance Thin Layer Chromatography (HPTLC) and Gas Chromatography-Mass Spectrometry (GC-MS), with clinical validation through a randomized trial. By bridging Ayurvedic principles with contemporary scientific methods, this research aims to substantiate the therapeutic efficacy of Sapsciatin in alleviating symptoms of sciatica and improving spinal health.

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MATERIALS AND METHODS

Formulation and Preparation

Sapsciatin was formulated following classical Ayurvedic methodologies, ensuring alignment with traditional pharmacopeial standards[12]. The formulation consists of a polyherbal blend of medicinal plants renowned for their anti-inflammatory and analgesic properties. The herbs were carefully selected and processed using the **Samanya Taila Paaka** method, a standardized technique for therapeutic oil preparation in Ayurveda[13].

The ingredients were extracted using decoction or powdering techniques, depending on the nature of the plant part, and subsequently infused into sesame and castor oil bases. The ingredient list and respective botanical names are presented in Table 1. Following filtration and quality assessment, the medicated oil was encapsulated into 1g soft gel capsules using modern encapsulation technology to enhance bioavailability and patient compliance.

Table 1 Composition of Sapsciatin soft gel capsule

Sl.	Sanskrit Name	Botanical Name	Part	Form	Quantity
1.	Rasna	*Alpinia galanga*	Rt.	Dct.	0.385 g
2.	Guduchi	*Tinospora cordifolia*	St.	Dct.	0.385 g
3.	Aragwadha	*Cassia fistula*	Fr.	Dct.	0.385 g
4.	Devadaru	*Cedrus deodara*	Ht.Wd.	Dct.	0.385 g
5.	Gokshura	*Tribulus terrestris*	Fr.	Dct.	0.385 g
6.	Eranda	*Ricinus communis*	Rt.	Dct.	0.385 g
7.	Punarnava	*Boerhavia diffusa*	Rt.	Dct.	0.385 g
8.	Nimba	*Azadirachta indica*	St.Bk.	Pdr.	0.015 g
9.	Guduchi	*Tinospora cordifolia*	Rt.	Pdr.	0.015 g
10.	Vrusha	*Adhatoda vasica*	Rt.	Pdr.	0.015 g
11.	Patola	*Trichosanthes lobata*	Wh.Pl.	Pdr.	0.015 g
12.	Nidigdhika	*Solanum xathocarpum*	Rt.	Pdr.	0.015 g
13.	Pata	*Cyclea peltata*	Rz.	Pdr.	0.015 g
14.	Vidanga	*Embelia ribes*	Fr.	Pdr.	0.015 g
15.	Devadaru	*Cedrus deodara*	Ht.Wd.	Pdr.	0.015 g
16.	Gajapippali	*Scindapsus officinalis*	Rt.	Pdr.	0.015 g
17.	Nagara	*Zingiber officinale*	Rz.	Pdr.	0.015 g
18.	Nisa	*Curcuma longa*	Rz.	Pdr.	0.015 g
19.	Shatapushpa	*Anethum sowa*	Fr.	Pdr.	0.015 g
20.	Chavya	*Piper mullesua*	Rt.	Pdr.	0.015 g
21.	Kushta	*Saussurea lappa*	Rt.	Pdr.	0.015 g
22.	Jyotishmathi	*Celastrus paniculatus*	Fr.	Pdr.	0.015 g
23.	Maricha	*Piper longum*	Fr.	Pdr.	0.015 g
24.	Kutaja	*Holarrhena antidysenterica*	Fr.	Pdr.	0.015 g
25.	Ajamoda	*Apium graveolens*	Fr.	Pdr.	0.015 g
26.	Agni (Chitraka)	*Plumbago zeylanica*	Rt.	Pdr.	0.015 g
27.	Katurohini	*Picrorhiza kurroa*	Rt.	Pdr.	0.015 g
28.	Ballathaka	*Semicarpus anacardium*	Fr.	Pdr.	0.015 g
29.	Vacha	*Acorus calamus*	Rt.	Pdr.	0.015 g
30.	Pippalimula	*Piper officinale*	Rt.	Pdr.	0.015 g
31.	Rasna	*Alpinia galanga*	Rt.	Pdr.	0.015 g
32.	Manjishta	*Rubia cordifolia*	Rt.	Pdr.	0.015 g
33.	Ativisha	*Aconitum heterophyllum*	Rt.	Pdr.	0.015 g
34.	Jeeraka	*Cuminum cyminum*	Fr.	Pdr.	0.015 g

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35.	Guggulu	*Commiphora mukul*	Exd.	Pdr.	0.015 g
36.	Yava ksharam	Ash of *Hordeum Vulagre*	As Such		0.015 g
37.	Sarjika ksharam	Ash of *Caroxylon griffithii*	As Such		0.015 g
38.	Eranda Thailam	*Ricinus communis*	As Such		0.450 g
39.	Thila Thailam	Sesame oil	As Such		0.450 g
40.	Nirgundi	*Vitex negundo*	Lf.	Jce.	0.450 ml

Quality Control (QC) Assessment

QC parameters evaluated included organoleptic properties, refractive index, acid value, moisture content, saponification value, iodine value, specific gravity, and rancidity checks. Capsules were assessed for average weight, net oil content per capsule, disintegration time, moisture content, and microbial safety.

Analytical Techniques

- **HPLC Analysis:** Conducted on methanol extracts to separate and quantify E- and Z-Guggulsterone isomers in the herbal extract
- **HPTLC Analysis:** Methanolic extracts of Sapsciatin were analyzed to quantify Guggulusterone, using silica gel 60 F254 TLC plates and densitometry at 254 nm. R_f values were compared against authenticated reference standards.
- **GC-MS Analysis:** GC-MS analysis was conducted using a DB-5MS column (30 m x 0.25 mm, 0.25 µm film thickness) on an Agilent 7890A GC with a 5975C mass-selective detector. The carrier gas was helium (99.9995%) at a flow rate of 1 mL/min. The temperature program involved an initial hold at 100°C, ramping to 300°C. Compounds were identified by comparing mass spectra with the NIST-08 spectral library.

Clinical Study Design

A randomized, open-label, non-comparative clinical trial was conducted on 30 patients diagnosed with clinically confirmed sciatica. The trial took place at Sitaram Ayurveda Specialty Hospital, a recognized institution for Ayurvedic clinical research.

Inclusion Criteria:

- Adults aged 18-60 years diagnosed with sciatica based on clinical symptoms and radiographic findings.
- Willingness to provide informed consent.

Exclusion Criteria:

- Patients with severe systemic illnesses or history of lumbar spine surgery.
- Pregnant and lactating women.

Dosing Protocol:

- 22 patients were administered two capsules twice daily.
- 8 patients received two capsules thrice daily, based on symptom severity.
- The treatment duration varied between 4-8 weeks according to clinical presentation.

Outcome Measures:

- **Primary outcome:** Change in Oswestry Disability Index (ODI) scores.
- **Secondary outcome:** Change in Visual Analog Scale (VAS) scores for pain intensity.

The study protocol adhered to the ethical principles of the Declaration of Helsinki and was approved by the Institutional Ethics Committee (IEC/2024/03 dated 05/08/24).

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Table 2 Column Oven Temperature Program

Oven	Rate °C/min	Value °C/min	Hold Time
Initial		100	1
Ramp 1	10	200	0
Ramp 2	20	300	10

RESULTS

Physicochemical Analysis

Table 3 Physicochemical analysis of Sapsciatin oil

Sl. No.	Parameter	Specification	Result
1.	Colour	—	Brown
2.	Acid Value	NMT 10	5.69
3.	Refractive Index	1.464 - 1.469	1.468
4.	Moisture (%)	NMT 05%	0.39
5.	Saponification Value	NMT 250	200.705
6.	Iodine Value	90 - 120	119.01
7.	Specific Gravity	0.910 - 0.930	0.919
8.	Rancidity	Should be negative	-ve

Table 4 Physicochemical analysis of Soft gel capsule

Sl.no.	Parameter	Specification	Result
1.	Shell Colour	—	Brown
2.	Net Weight of Oil/Capsule	925 - 1075 mg	995 mg
3.	Odour	Characteristic	Characteristic
4.	Taste	Bitter	Bitter
5.	Average Weight of Capsule	1440 ± 7.5% mg	1338.9 mg
6.	No. of Drops	23 ± 2	24
7.	Disintegration Time	NMT 30 min	15 min
8.	Moisture (%)	NMT 0.5%	0.45%

Table 5 Microbial analysis of Sapsciatin oil

	Microbial parameters		
1.	Total Yeast and Mold Count	10^3	API, Part – I, Vol. VI
2.	Total Plate Count for Bacteria	10^5	API, Part – I, Vol. VI
3.	*E.coli*	Absent	API, Part – I, Vol. VI
4.	*Pseudomonas aeruginosa*	Absent	API, Part – I, Vol. VI
5.	*Salmonella spp.*	Absent	API, Part – I, Vol. VI
6.	*Staphylococcus aureus*	Absent	API, Part – I, Vol. VI

The quality control analysis confirmed that Sapsciatin oil and the soft gel capsule met established Ayurvedic Pharmacopoeia standards. Phytochemical analysis reports are shared in Table 3 and 4, while microbial report is shared in Table 5. The absence of rancidity and microbial contamination further validated its safety.

Phytochemical Evaluation

HPLC analysis confirmed the presence of Guggulusterone E (0.018%) and Guggulusterone Z (0.007%), and is showed in Table 6.

Table 6 HPLC analysis of Sapsciatin

Parameters	Unit	Result
Guggulusterone E	%	0.018
Guggulusterone Z	%	0.007

HPTLC analysis of the formulation revealed multiple bands across tracks T1 to T4 under both UV 366 nm and UV 254 nm.

- Under 366 nm, distinct fluorescent bands were observed with R_f values in the range of 0.35 to 0.45, indicating the presence of conjugated compounds.

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- Similarly, under 254 nm, the bands appeared as darker zones due to UV absorption, suggesting non-fluorescent phytoconstituents typical of terpenoids.
- The bands were consistent across all tracks (T1-T4), indicating batch-to-batch uniformity.
- Details are shown in Figure 1.

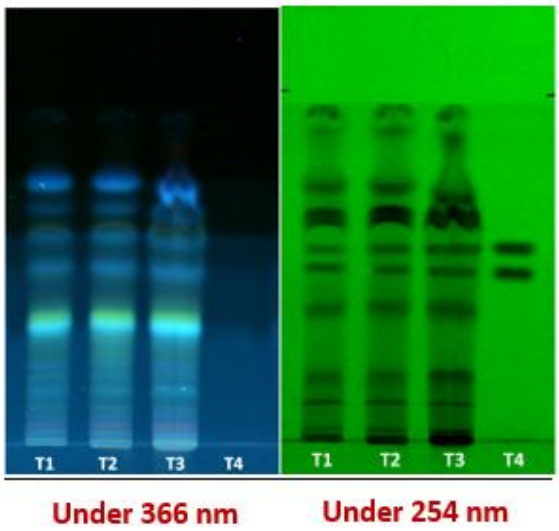

Figure 1 HPTLC result of Sapsciatin

The GC-MS analysis of the herbal extract revealed the presence of 22 major phytochemical compounds, contributing to its therapeutic potential is shown in Figure 2.

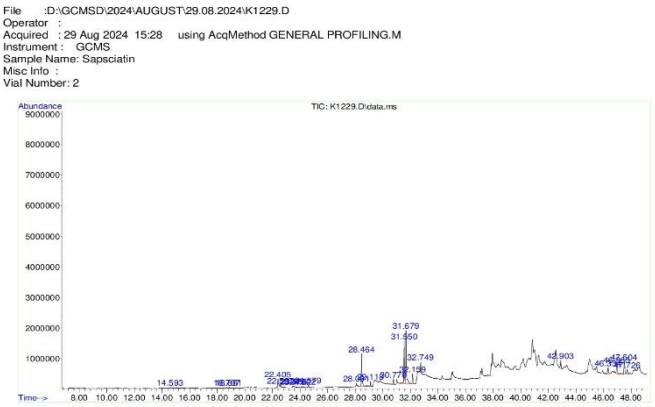

Figure-2 GCMS chromatogram of Sapsciatin

The identified compounds, their respective concentrations (%), and their pharmacological properties are presented in Table 1. Among the detected phytoconstituents, Methyl oleate (23.89%), Methyl linoleate (15.71%), and Methyl palmitate (13.53%) were present in higher concentrations. Significant bioactive compounds such as Squalene (3.91%), β-Tocopherol (2.95%), and Vitamin E (2.41%) were also observed, suggesting antioxidant and anti-inflammatory capabilities.

Key anti-inflammatory constituents included Caryophyllene (0.24%), Asarone (5.79%), Turmerone (0.81%), Ar-Turmerone (0.73%), and Curlone (0.62%), well-known for their combined anti-inflammatory, analgesic, and antioxidant properties. The phytochemical profile also exhibited compounds like Geranylgeraniol (4.10%) and Stigmastan-3,5-diene (5.35%), both associated with antinociceptive and anticancer activities, respectively.

Overall, the phytochemical spectrum demonstrates a diverse range of bioactive molecules that contribute to the therapeutic utility of the herbal formulation, particularly in inflammation, pain management, and oxidative stress mitigation, as shown in Table 7.

Table 7 GC-MS result of Sapsciatin

Sl. No	Parameters	Result (in %)	Chemical name	Primary Properties	Secondary Properties
1.	Carvol	0.630	$C_{10}H_{14}O$	Antispasmodic[14]	Antimicrobial[15]
2.	Longifolene	0.165	$C_{15}H_{24}$	Anti-inflammatory[16]	Antioxidant[17]

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3.	Carophylene	0.244	$C_{15}H_{24}$	Anti-inflammatory & Analgesic[18]	Antioxidant & Antimicrobial[19]
4.	Asarone	5.792	$C_{12}H_{16}O_3$	Anti-inflammatory & Neuroprotective[20]	Antioxidant[21]
5.	Apiol	0.635	$C_{12}H_{14}O_4$	Anti-inflammatory and Antimicrobial[22]	Antispasmodic[23]
6.	Ar-Tumerone	0.734	$C_{15}H_{20}O$	Anti-inflammatory[24]	Anti-cancer & Antioxidant[25]
7.	Tumerone	0.818	$C_{15}H_{22}O$	Anti-inflammatory[26]	Anti-cancer & Antioxidant[27]
8.	Curlone	0.624	$C_{15}H_{22}O$	Anti-inflammatory[28]	Antioxidant & Anti-cancer[29]
9.	Methyl tetradecanoate	1.462	$C_{15}H_{30}O_2$	Antioxidant[30]	Anti-inflammatory & Lipid-modulating effect[31]
10.	7,9-DI-tert-butyl-1-oxaspiro (4,5) deca-6,9-diene-2,8-dione	2.294	$C_{17}H_{24}O_3$	Anti-inflammatory[32]	Antioxidant[33]
11.	Hexadecanoic acids, methyl ester	13.534	$C_{17}H_{34}O_2$	Anti-arthritic & Anti-inflammatory[34]	Antioxidant, Anticancer[35]
12.	Verticiol	1.644	$C_{20}H_{34}O$	Anti-bacterial[36]	Anti-inflammatory & Antioxidant[37]
13.	Thunbergol (Isocembrol)	1.911	$C_{20}H_{34}O$	Anti-inflammatory[38]	Antioxidant & Nephroprotective[39]
14.	9,12-Octadecadienoic acid (z,z)-,Methyl ester [linoleic acid]	15.713	$C_{19}H_{34}O_2$	Anti-inflammatory[40]	Anticancer activity[41]
15.	11-octadecenoic acid, methyl ester	23.891	$C_{19}H_{36}O$	Anti-cholesterolemic[42]	Anti-carcinogenic[43]
16.	Octadecanoic acid, methyl ester	3.572	$C_{19}H_{34}O$	Anti-inflammatory[44]	Antioxidant[45]
17.	Geranylgeraniol	4.108	$C_{20}H_{34}O$	Antinociceptive[46]	Anti-inflammatory[47]
18.	Squalene	3.915	$C_{30}H_{50}$	Anti-inflammatory[48]	Cardioprotective & Detoxifying[49]
19.	β-tocopherol	2.954	$C_{28}H_{48}O_2$	Antioxidant[50]	Neuroprotective & Cardioprotective[51]
20.	Stigmastan-3,5- diene	5.353	$C_{29}H_{48}$	Antimicrobial activity[52]	Anticancer Activity[53]
21.	Cholestrol	7.587	$C_{27}H_{46}O$	Precursor for Vitamin D synthesis[54]	Membrane Fluidity Regulator[54]
22.	Vit E	2.417	$C_{29}H_{50}O_2$	Analgesic[55]	Antioxidant, Repair damaged tissue, Boosts immune system[56]

Clinical Outcomes

The clinical evaluation of Sapsciatin demonstrated a significant therapeutic effect in improving patient functionality and reducing pain severity. The mean Oswestry Disability Index (ODI) score exhibited a substantial reduction from 30.0 before treatment, indicative of moderate disability, to 17.0 after treatment, corresponding to mild disability (Table 8 & 9).

Table 8: Oswestry disability scoring in patients who took Sapsciatin

Sl. No.	Patients	Before trial		After trial	
		Score	%	Score	%
1.	P1	29	58	12	24
2.	P2	40	80	20	40

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3.	P3	27	60	12	26.6
4.	P4	22	44	11	22
5.	P5	26	52	12	24
6.	P6	27	54	13	26
7.	P7	31	62	15	30
8.	P8	28	56	16	32
9.	P9	28	56	14	28
10.	P10	39	86.6	29	64.4
11.	P11	31	68.8	21	46.6
12.	P12	38	76	20	40
13.	P13	30	60	16	32
14.	P14	30	60	14	28
15.	P15	31	68.8	18	40
16.	P16	31	68.8	18	40
17.	P17	29	58	18	36
18.	P18	32	71.1	24	53.3
19.	P19	25	50	16	32
20.	P20	30	60	25	50
21.	P21	35	70	18	36
22.	P22	26	52	14	28
23.	P23	34	68	20	40
24.	P24	28	56	13	26
25.	P25	30	60	17	34
26.	P26	33	66	19	38
27.	P27	31	62	15	30
28.	P28	29	58	14	28
29.	P29	36	72	22	44
30.	P30	32	64	18	36

Table 9 ODI Before & After values

Sl. No	Parameters	Before trial	After trial
1.	Sum	900	510
2.	Total study subject	30	30
3.	Mean Value	30.0	17.0

This marked improvement highlights the efficacy of Sapsciatin in enhancing mobility and overall physical functionality in patients.

In addition to the improvement in ODI scores, Visual Analog Scale (VAS) scores showed a consistent and clinically meaningful reduction. Individual patient scores decreased by 20% to 40% post-treatment as shown in Table 10, with a majority of patients experiencing significant pain relief. Notably, patients with higher baseline pain scores demonstrated a more pronounced reduction, reinforcing the analgesic potential of Sapsciatin across varying levels of symptom severity.

DISCUSSION

The study outcomes demonstrate that Sapsciatin offers a multifaceted approach to managing sciatica. The HPLC analysis showed measurable quantities of **Guggulsterone E (0.018%)** and **Guggulsterone Z (0.007%)**. The presence of these isomers in the formulation is aligned with their known occurrence in *Commiphora mukul* (Guggul), where they contribute to anti-inflammatory and lipid-lowering properties. The relatively higher concentration of Guggulsterone E compared to Z is typical, as Guggulsterone E is often found in higher amounts in standardized Guggul extracts.

Table 10 VAS scoring in patients who took Sapsciatin

Sl. No	Visual analogue scale score (before)	Visual analogue scale score (after)	% Difference
1.	8	5	30%
2.	8	5	30%
3.	7	4	30%
4.	8	4	40%
5.	8	5	30%
6.	8	5	30%
7.	8	5	30%
8.	7	3	40%
9.	8	5	30%
1(	9	6	10%
1:	8	6	40%
1:	7	4	30%
1:	6	4	20%
1⁴	8	6	20%
1!	7	5	20%
1(	8	5	30%
1:	7	5	20%
1!	6	3	30%

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19	8	6	20%
20	8	6	20%
21	9	6	30%
22	7	4	30%
23	8	5	30%
24	7	5	20%
25	8	5	30%
26	9	6	30%
27	7	4	30%
28	8	6	25%
29	7	5	20%
30	8	5	30%

The HPTLC chromatographic fingerprint under both UV wavelengths is indicative of Guggulsterone and related bioactive compounds. The fluorescent response at **366nm** suggests the presence of steroidal terpenoids, while the absorption at **254nm** corroborates the presence of non-fluorescent, UV-absorbing phytochemicals. The observed R_f values are in agreement with previously reported literature for Guggulsterone E and Z. The consistency across all tracks also highlights the reproducibility of the phytochemical profile in the formulation. Together, the HPTLC and HPLC data suggest that the formulation maintains a consistent and authentic phytochemical profile.

The GCMS phytochemical analysis of the herbal extract demonstrates a promising composition of bioactive molecules that correlate with its traditional use in joint pain and inflammatory disorders. The high content of fatty acid esters such as **Methyl oleate, Methyl linoleate,** and **Methyl palmitate** indicates the extract's role in anti-inflammatory pathways, corroborated by their well-documented effects on reducing cytokine-mediated inflammation and oxidative stress. The presence of **Caryophyllene, Turmerone, Ar-Turmerone,** and **Curlone** further strengthens the anti-inflammatory potential of the formulation, as these sesquiterpenes and turmerones are reported to modulate inflammatory mediators such as COX-2, TNF-α, and IL-6. Notably, **Squalene**, a triterpene with anti-inflammatory and detoxifying properties, was detected in substantial amounts (3.91%) and may contribute to membrane stabilization and lipid regulation.

The detection of **β-Tocopherol** and **Vitamin E** suggests an added antioxidant capacity, important for preventing oxidative damage associated with chronic inflammatory states. Moreover, **Asarone,** recognized for its neuroprotective and anti-inflammatory effects, may offer additional benefits in nerve-related pain associated with joint disorders. Interestingly, **Geranylgeraniol** and **Stigmastan-3,5-diene** were also identified, hinting at potential synergistic mechanisms involving antinociceptive and anticancer pathways. These findings collectively suggest that the herbal extract exhibits a multi-targeted pharmacological profile, which may justify its traditional application in managing joint pain and inflammation.

The observed decline in both ODI and VAS scores following Sapsciatin treatment suggests a significant impact on pain alleviation and functional restoration. The reduction in ODI from 30.0 to 17.0 reflects a meaningful transition from moderate to mild disability, suggesting that Sapsciatin enhances musculoskeletal function and daily activity performance. Furthermore, the

consistent improvement in VAS scores across different patients underscores the analgesic efficacy of Sapsciatin, supporting its role in pain management.

The underlying mechanisms through which Sapsciatin exerts its effects may involve modulation of inflammatory pathways and nociceptive processing, thereby contributing to both pain reduction and functional improvement. These findings align with previous research on analgesic and anti-inflammatory agents that target similar physiological pathways. Moreover, the broad spectrum of improvement observed across patients with varying degrees of disability suggests that Sapsciatin may provide benefits regardless of baseline symptom severity.

CONCLUSION

The present study establishes Sapsciatin as a promising Ayurvedic intervention for the management of sciatica. The formulation's effectiveness is underpinned by its scientifically validated anti-inflammatory, analgesic, and neuroprotective properties. The current phytochemical investigation highlights the presence of several bioactive constituents in the herbal formulation, which support its traditional use as a natural remedy for joint pain and inflammation. The extract is rich in anti-inflammatory agents such as **Caryophyllene, Turmerone, Curlone**, and **Squalene,** along with antioxidant compounds like **β-Tocopherol** and **Vitamin E**. Fatty acid esters such as **Methyl oleate** and **Methyl linoleate** further strengthen its potential for modulating inflammatory and oxidative processes. Collectively, these findings underscore the extract's capability to act as a multi-functional therapeutic agent.

Sapsciatin demonstrated significant clinical efficacy in reducing pain and disability, as evidenced by substantial improvements in ODI and VAS scores. The observed benefits indicate that Sapsciatin effectively enhances functional mobility and provides consistent pain relief across a diverse patient population. By integrating traditional Ayurvedic knowledge with modern analytical techniques, this study contributes to the growing body of evidence supporting phytotherapeutics in musculoskeletal disorders.

ACKNOWLEDGEMENT

The authors sincerely thank Dr. D. Ramanathan (Managing Director), Dr. Vignesh Devaraj (Technical Director), and Smt. Janani Ramanathan (Director) of Sitaram Ayurveda Pvt. Ltd. for their unwavering support and encouragement. We also extend our gratitude to Dr. Adithya P. Panicker (Assistant General Manager – Marketing & Innovations) and Mr. Sandeep V. R. (Chief General Manager – Unit Head) for their valuable guidance throughout the study. Additionally, we acknowledge the contributions of 'CARe Keralam' team members for their assistance in executing the GC-MS study.

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