



## COMPARISON OF *INVITRO* ANTIARTHRITIC ACTIVITY OF *STEREOSPERMUM COLAIS* & *STEREOSPERMUM SUAVEOLENS*

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### ABSTRACT

*Stereospermum colais* (SC) and *Stereospermum suaveolens* (SS) known as “Patala” are large deciduous tree distributed throughout India. The Ayurvedic literature indicates that the roots are bitter, diuretic, cardiotoxic, anti-inflammatory, antibacterial, and febrifuge also it is one of the ingredients of “Dasamula”. So far no systematic studies have been carried out for the antiarthritic potential of the plants. The present study made an attempt to provide scientific validity for its traditional claim. Roots of SC and SS were extracted successively with various solvents such as Pet. Ether, chloroform, ethylacetate and ethanol. *Invitro* antiarthritic study was carried out by protein denaturation method using Bovine Serum Albumin. The results of *invitro* antiarthritic activity showed that the various extracts of SC and SS has antiarthritic potential in a dose dependent manner when compared with diclofenac sodium. In both the species, the ethanol extract showed maximum activity on comparison with other extracts. The antiarthritic activity was maximum in SC compared to SS.

**Keywords:** *Stereospermum colais*, *Stereospermum suaveolens*, Antiarthritic.

### INTRODUCTION

Arthritis is an chronic, inflammatory, systemic autoimmune disease characterized by pain, swelling and stiffness. In the western countries 1% of the population has been affected by Rheumatoid arthritis (RA). The remedies for RA in the conventional treatments are Non-steroidal Anti-inflammatory drugs (NSAID's), Disease Modifying anti-rheumatoid drugs (DMARD's) and corticosteroids. These drugs are used to reduce the severity of disease and to suppress the immune system with known side effects [1].

Thus search for the potent as well as safer drugs from the natural source for the management of arthritis is always exists. With this an attempt has been made to evaluate the antiarthritic potential of Ayurvedic plant drugs “Patala” which is one of the ingredients of “Dasamula” [2]. The plants *Stereospermum colais* (SC) and *Stereospermum suaveolens* (SS) known as “Patala” are large deciduous trees distributed throughout India (Anonymous; The Wealth of India). The Ayurvedic literature indicates that the roots are bitter, diuretic, cardiotoxic, anti-inflammatory, antibacterial, and febrifuge [3].

### MATERIALS AND METHODS

#### Plant material

The roots of SC and SS were collected from Madurai, Tamilnadu and Tirupati, Andhra Pradesh respectively. The plant specimens were authenticated by Prof. P. Jayaraman, PARC, Tambaram, Chennai. The voucher specimens [PARC/2007/80 and PARC/2012/1080 respectively] were deposited at the Department of Pharmacognosy, Faculty of Pharmacy, Sri Ramachandra University, Chennai.

#### Preparation of extracts

The roots of the plants were dried and made into a coarse powder which is successively extracted with Pet. Ether (PESC, PESS), chloroform (CHSC, CHSS), ethyl acetate (EASC, EASS) and ethanol (EESC, EESS). The extracts were concentrated and stored in dessicator.

#### Evaluation of *Invitro* anti-arthritis activity

##### Inhibition of Protein Denaturation method [4]

The test solution was prepared by taking 0.45ml of Bovine Serum Albumin (BSA - 5%w/v aqueous solution) and 0.05ml of extracts in various concentrations (10 to 1000 µg/ml).

The test control solution was prepared by adding 0.45ml of BSA and 0.05ml of distilled water. Product control consists of 0.45ml of distilled water and 0.05ml of extracts in various concentrations (10 to 1000 µg/ml).

Standard solution consists of 0.45ml of BSA and 0.05ml of diclofenac sodium solution in various concentrations (10 to 1000 µg/ml). The pH of the above solutions were adjusted to 6.3 using 1N Hcl and incubated at 37°C for 20 minutes. Then the resultant solutions were heated at 57°C for 3 minutes. The solutions were cooled,

2.5 ml of phosphate buffer was added and the absorbances of resultant mixtures were read at 660nm.

The percentage inhibition of Protein denaturation was calculated as follows.

$$\text{Percent inhibition} = 100 - \frac{[OD \text{ of test solution} - OD \text{ of product control}]}{OD \text{ of test control}} \times 100$$

The control represents 100% protein denaturation. The results were compared with the standard diclofenac sodium.

## RESULTS

**Table 1. *In vitro* anti-arthritis activity**

Concentration (µg/ml)	Percentage inhibition								
	Diclofenac sodium	<i>S. colais</i>				<i>S. suaveolens</i>			
		PESC	CHSC	EASC	ETSC	PESS	CHSS	EASS	ETSS
10	11.34±1.76	1.56±0.24	3.45±2.78	5.29±0.09	7.82±1.42	0.58±0.01	1.56±0.99	1.45±0.75	3.85±0.99
50	18.38±2.98	2.98±0.83	4.38±1.01	8.56±3.28	11.67±3.64	1.56±0.45	2.96±0.31	3.67±0.87	9.34±5.12
100	25.74±1.98	4.89±0.45	6.39±1.56	11.56±0.89	19.58±2.43	2.08±0.04	4.02±0.87	7.69±1.63	15.66±5.56
200	37.82±2.06	5.99±0.73	8.82±1.45	19.34±2.87	27.56±1.72	3.97±0.38	5.89±1.67	10.59±2.81	21.26±8.47
400	51.36±1.84	7.04±0.86	10.42±1.03	22.57±3.29	35.97±2.98	5.49±0.39	9.86±3.92	13.82±3.85	30.82±3.71
800	63.29±3.16	10.21±1.65	12.39±4.23	28.48±2.76	47.39±2.67	7.45±1.38	12.56±2.87	19.56±2.59	41.00±1.42
1000	79.42±2.64	11.05±1.56	19.56±2.95	35.65±3.27	59.89±0.86	9.67±0.37	14±4.82	27±3.51	49.40±10.27

Values are expressed as Mean ± SD of three experiments

## DISCUSSION & CONCLUSION

Denaturation of tissue proteins is one of the known causes of inflammatory and arthritic diseases. And also the production of auto antigens may be due to denaturation of proteins in vivo [5]. So substances which have the ability to prevent protein denaturation could be a useful antiarthritic drug. The roots of SC reported to have flavonoids, steroids, glycosides, phenols, tannins, and SS reports the presence of flavonoids, glycosides, terpenoids, steroids, phenols, anthraquinones and tannins [6]. The results of *in vitro* antiarthritic activity using proprotein denaturation method showed that the various extracts of SC and SS has antiarthritic potential in a dose dependent manner when compared with diclofenac sodium. In both the species, the ethanol extract showed maximum activity on comparison with other extracts. Phytoconstituents such

as steroids, terpenoids, flavonoids, phenols and tannins are explored as anti-inflammatory and antiarthritic agents from various medicinal plants. The existence of such compounds in ethanolic extract may perhaps the maximum activity compared with other extracts. The antiarthritic activity was highest in SC compared to SS. Comparative quantitative phytochemical analysis is needed to explore the reason behind the potency.

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