



Antiinflammatory Activity of Polyherbal Gel Formulation

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ABSTRACT: The present study has been undertaken with the aim to formulate and evaluate the new polyherbal gel formulation containing 0.3 % hydroalcoholic extract from *Trigonellafoenum-graecum* and *Glycyrrhiza glabra* for its topical anti inflammatory activity against carrageenan induced rat paw edema method .The studies were conducted on Wistar rats of either sex (150-180g).The polyherbal gel formulation was designed by using Carbopol 934, Sodium CMC, *Trigonellafoenum-graecum*, *Glycyrrhizaglabra* extract, Ethanol, propylene glycol 400, methyl paraben, propyl paraben, and required amount of distilled water. The skin ph (6.8-7) was maintained by drop wise addition of tri- ethanolamine. The prepared polyherbal gels were evaluated for physical appearance, pH, spreadability, skin irritation to observe side effect. It was inferred from the results that polyherbal gel formulations were good in appearance and homogeneity. The overall result of this research the prepared poly herbal gel formulation shows significant anti-inflammatory activity.

KEYWORDS: Anti inflammatory, Carbopol934, *Glycyrrhizaglabra* and Poly herbal gel, *Trigonellafoenum-graecum*.

INTRODUCTION

Herbal formulations have reached wide spread acceptability as therapeutic agents like Anti-microbial, Anti-diabetic, Anti-ageing, Anti-arthritis, Anti-depressant, Anti-anxiety and Anti-inflammatory, Anti-HIV, treatment of Cirrhosis, Asthma, Migraine, Alzheimer's disease and Memory enhancing activities.

A gel is a solid or semi solid system of at least two constituents, consisting of a condensed mass enclosing and interpenetrated by a liquid. Gels and jellies are composed of small amount of solids dispersed in relatively large amount of liquid, yet they possess more solid-like than liquid-like character.

Topical drug delivery systems are gaining increased in popularity, and several drugs have been successfully delivered by this route for both local and systemic action.^{1,2}

The presence of a network formed by the interlocking of particles of the gelling agent gives rise to the rigidity of a gel. The nature of the particles and the type of form that is responsible for the linkages determine the structure of the network and the property of the gel.³

The available anti-inflammatory drugs (steroidal and non-steroidal) present a wide range of side effects. Therefore, many studies are being directed to find anti-inflammatory agents from natural sources. Fenugreek (*Trigonellafoenum-graecum*) and liquorice (*Glycyrrhizaglabra*) is a plant are used in traditional medicine. Fenugreek act as powerful antioxidant mainly due to the presence of flavonoids and polyphenols.^{4,5} Fenugreek has been reported to possess anti-inflammatory activity mainly due to the presence of flavonoids because flavonoids act as antioxidant and potential inhibitors of cyclooxygenase, lipoxygenase, and nitric oxide synthase.^{6,7}

Even though fenugreek and liquorice has been used for the treatment of inflammation, no report exists on the development of polyherbal gel formulations from hydroalcoholic extract of fenugreek and liquorice. Hence, the present study is aimed at formulating and investigating the effective anti-inflammatory polyherbal gel formulation from the hydroalcoholic extract of Fenugreek and liquorice.

MATERIAL AND METHODS

Collection and Authentication of Plant material: Seeds of *Trigonellafoenum-graecum*(Fenugreek) and root and stolon of *Glycyrrhiza glabra*(Liquorice) were collected from local market and botanical identity was confirmed by Dr.Satish N. Malode. Professor and Head at Govt.Vidarbha Institute of Science and Humanities, Amravati.



In-Vivo Anti Inflammatory Study of Gel Formulation

Procedure

Carrageenan-induced rat paw edema assay in rat

The selected samples of Polyherbal gel(F1 to F9) showing promising activity in vivo anti-inflammatory studies using carrageenan induced rat paw edema animal model. The assay performed as edema was induced on the right hind paw by sub plantar injection of 20 ml carrageenan (1 % w/v) in 0.9 % saline. The formulation was topically applied over the inflamed area, (1 % w/v at a dose of 300 mg/kg) after complete induction of inflammation. A control group received vehicle only and a standard group was treated with Indomethacin (20 mg/kg, p.o.) The volume of injected and of the contra lateral paws was measured 1, 3, 5 ,6 h after induction of inflammation, using a plethysmometer on each day till 11 days in M/s. Vineet Analytical Research Laboratories,Pune. The value was expressed as, the percent reduction in volume with respect to the control group of at different time intervals in each day.^{8,9,10}

RESULTS

Results of carrageenan induced anti-inflammatory activity of Polyherbal Gel formulations containing0.3% hydroalcoholic extract of Fenugreek and Liquorice.

Table – 1. Observation of all formulations

Name of the samples Herbal Formulation	Dosage (mg/kg)	% (Percent) inhibition of edema volume at different time intervals (1, 2, 3 4, 5 and 6 hrs.)										
		Day1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Day 11
F1	300 mg	9.32	13.65	18.54	24.47	29.35	36.28	38.22	43.45	51.14	54.43	59.87
F2		12.27	16.6	21.49	27.42	32.3	39.23	41.17	46.4	54.09	57.38	62.82
F3	300 mg	12.77	17.1	21.99	27.92	32.8	39.73	41.67	46.9	54.59	57.88	63.32
F4	300 mg	18.58	22.91	27.8	33.73	38.61	45.54	47.48	52.71	60.4	63.69	69.13
F5	300 mg	16.5	20.83	25.72	31.65	36.53	43.46	45.4	50.63	58.32	61.61	67.05
F6	300 mg	14.6	18.93	23.82	29.75	34.63	41.56	43.5	48.73	56.42	59.71	65.15
F7	300 mg	10.55	14.88	19.77	25.7	30.58	37.51	39.45	44.68	52.37	55.66	61.1
F8	300 mg	17.32	21.65	26.54	32.47	37.35	44.28	46.22	51.45	59.14	62.43	67.87
F9	300 mg	15.42	19.75	24.64	30.57	35.45	42.38	44.32	49.55	57.24	60.53	65.97
Positive control	1% w/v	71.79	61.67	62.91	71.37	68.84	70.11	63.37	64.37	71.16	65.76	72.49
Standard indomethacin	20 mg/kg, p.o	19.09	23.42	28.31	34.24	39.12	46.05	47.99	53.22	60.91	64.2	69.64

average of Hrs (1,2, 3 4,5 and 6 hrs.) in each day

* (P < 0.05), ** (P < 0.01) indicates significant decrease in the paw edema volume compared to control value for respective time interval (One Way ANOVA for multiple comparison test followed by dunnet test).

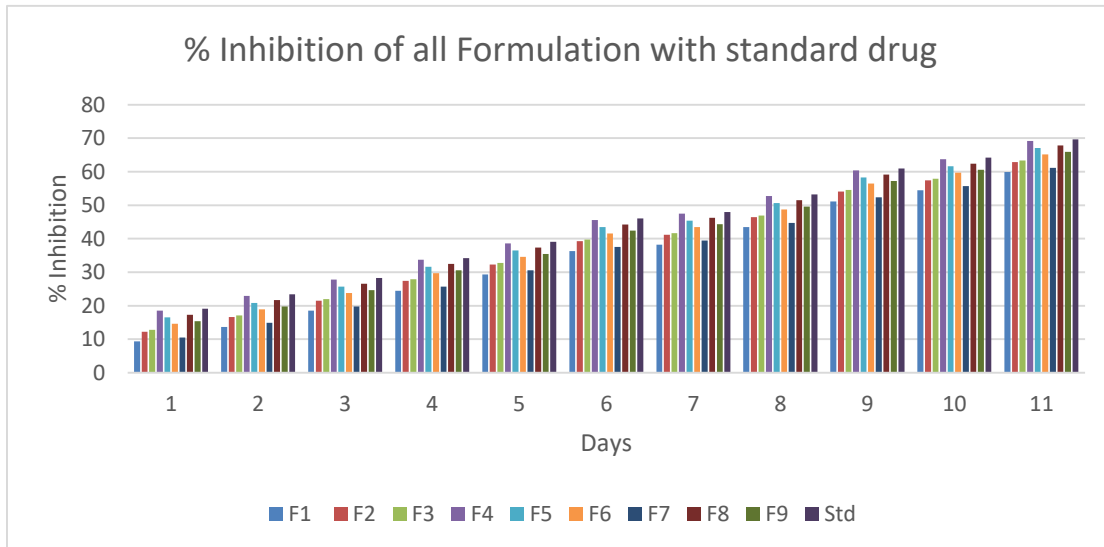


Figure – 1 % Inhibition of all formulations with standard drug

Skin Irritation Study

The skin irritation test was conducted for a period of seven days in M/s. Vineet Analytical Research Laboratories, Pune and the results are shown in following Table -2. The results indicated that the control preparation, test gel, and marketed products did not cause any skin reaction.

Table - 2

Sr no	Treatment	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8
1.	Control	A	A	A	A	A	A	A
2.	Formulation	A	A	A	A	A	A	A
3.	Standard	A	A	A	A	A	A	A

A – No reaction, The skin irritation test was carried out in accordance with the Guidelines of the Committee for the Purpose of Control and Supervision of Experiments on Animals(CPCSEA)

DISCUSSION

Topical route for Trigonellafoenum-graecum and Glycyrrhizaglabra was selected up to avoid GIT irritation and to maximize the drug concentration at the site of action.

The present study has been under taken with the aim to formulate and evaluate the new polyherbal gel formulation containing 0.3 % hydroalcoholic extract from Trigonellafoenum-graecum and Glycyrrhiza glabra for its topical anti inflammatory activity against carrageenan induced rat paw edema method .

All the developed polyherbal gels(F1 to F9) were evaluated for their physicochemical properties like appearance, pH values and spreadability, skin irritation test, stability studies and HPTLC methods. In pharmacological evaluation the anti-inflammatory activity was studied using carrageenan induced rat paw edema method.

F4 gel showed significant anti-inflammatory activity and results obtained are shown in Table 1 .



CONCLUSION

In conclusion, the overall result of this study the prepared polyherbal gel formulation F4 with 0.3 % hydroalcoholic extract from *Trigonella foenum-graecum* and *Glycyrrhiza glabra* showed the best formulation with significant anti-inflammatory activity. It showed significant inhibition in carrageenan induced paw edema in Wistar rat models. The results also showed that the anti-inflammatory effect of the formulation containing polyherbal gel F4 was better than the other gel formulation.

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