

Herbal Oil and its Anti-arthritic Activity

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ABSTRACT

Inflammation and arthritis are interrelated conditions that are caused by each other. This disorder majorly occurs in elderly patients. It is a major problem in the world that affects the joints and causes inflammation in the joints causing pain and tenderness in the joints. This is mainly triggered by the inflammation caused by the malfunctioning of the immune system of the own body. This disease leads to severe damage to the cartilage of the joints in the body. This will lead to the ankylosing of the joints and resulting in the pain of the joints. There are few other diseases like inflammation of the pleural cavities, scleritis and other lesions that are usually seen in the cutaneous, subcutaneous tissue. Overall, it is a problem in the immune system of the body. The researchers now had concentrated on the utilization of the herbs and medicinal plants to treat arthritis effectively. They are found to be safe and effective compared to the synthetic immune suppressant drugs. They are also the cheapest sources of drugs. So the herbs had been investigated for the production of the newer molecules that treat arthritis effectively and relatively safer with that of the existing drugs. The plant extract of the stem bark of the plant *Berberis orthobotrys* was collected and extracted using ethanol. This was used to prepare oil formulation, and this was investigated for the anti-arthritic activity. The oil formulation showed a better activity compared to the extract and compared to the standard.



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by the inflammation caused by the malfunctioning of the immune system of the own body. This disease leads to severe damage to the cartilage of the joints in the body. This will lead to the ankylosing of the joints and resulting in the pain of the joints. There are few other diseases like inflammation of the pleural cavities, scleritis and other lesions that are usually seen in the cutaneous, subcutaneous tissue. Overall, it is a problem in the immune system of the body [1]. Other responsible conditions are responsible for the causation of the disease; they are genetic factors also [2].

INTRODUCTION

Inflammation and arthritis are interrelated conditions that are caused by each other. This disorder majorly occurs in elderly patients. It is a significant problem in the world that affects the joints and causes inflammation in the joints causing pain and tenderness in the joints. This is mainly triggered

Around the world, there are more than 60 million people those are affected by arthritis, and women are more prone to get affected than men. The age group usually are affected by inflammatory arthritis between the age of 35-60. Also, other groups of people were affected who are young aged. This is all due to the irregularities in the immune system func-

tions. So generally, the drugs that are administered are usually immune suppressant drugs. Arthritis patients are usually administered with the immune suppressants [3].

The immune suppressant drugs are the major class of drugs that are affecting the body by lowering the immune system, and they cause side effects like enabling the body prone to many other diseases. The researchers now had concentrated on the utilization of the herbs and medicinal plants to treat arthritis effectively. They are found to be safe and effective compared to the synthetic immune suppressant drugs. They are also the cheapest sources of drugs. So the herbs had been investigated for the production of the newer molecules that treat arthritis effectively and relatively safer with that of the existing drugs [4].

In this research, an anti-arthritic oil was prepared using the extract of *Berberis orthobotrys* [5] which is incorporated into the oil and investigated for the activity against arthritis and comparing with the crude extract and standard drug Indomethacin.

PREPARATION OF HERBAL OIL

The stem bark of the plant *Berberis orthobotrys* collected and extracted using ethanol using maceration. The bark was dried properly for four days and pounded into powder using a mill, and the fine powder was passed through the sieve. This powder was macerated using ethanol for about three days with shaking and mixing in between to allow the solvent mix through the powder. This was then filtered using whatman filter paper. The filtrate was suction evaporated utilizing a pump and then dried under a desiccator. This was weighed, and the percentage was calculated as 20.3%w/w.

100ml of castor oil was taken and warmed up on a water bath. This was added with methanol and dissolved. 1g of the extract was mixed in the oil to make the concentration of 10mg/ml. This was used for the study of the anti-arthritic activity.

Animals grouping

Rats used in this study are of Sprague Dawley type, and they weighed between 135-155gm. They are kept in the lab in the cages and are allowed to drink water and have food pellets freely, and the experiment was all according to the guidelines by the animal ethics committee.

Activity

The activity was tested in Freund's adjuvant method [6]. The animals used in the study were grouped into 5 animals in groups; these animals were then clustered into 5 groups. The study

protocol was as follows.

GroupI: Normal Group-given with only CMC at 1% solution.

Freund's adjuvant is a solution of Difcomycobacterim bacteria which is suspended in liquid paraffin at a concentration of 5mg/ml, and this was administered into the sub plantar region during starting of the study.

GroupII: Freund's adjuvant was administered, and drugs were not given

GroupIII: Freund's adjuvant was administered with Indomethacin the dose was 10mg/kg

GroupIV: Extract at a dose of 200mg/kg along with the induction of arthritis

GroupV: The prepared herbal oil rubbed and massaged into the region of induction of arthritis with Freund's adjuvant.

The animal weights were taken and noted before the starting of the experiments. Animal weights were noted after the conduction of the study too. The paw volumes were taken and noted using the Vernier scale. The increase in the volumes after the study was also noted. The rats were anaesthetized using ether, and blood was withdrawn from the orbital plexus. The blood parameters like RBC count WBC count, ESR and Hb were estimated [7].

RESULTS

The results of the anti-arthritic activity with respect to the paw volumes and other blood parameters were given in the tables 1,2. There was significant weight gain, but it didn't change any values, or it had any influence on the anti-arthritic profile of the plants. The paw volumes that were calculated were tabulated in Table 1. The activity exhibited by the extract was comparable to the standard drug indomethacin. This was significantly better, and when compared to the oil formulation, it was less in terms of lowering of the paw volumes.

The extract at 200mg/kg showed an activity that is less than that of the oil that was massaged into the joint, and the results can be interpreted similarly to the human being values. The percentage of inhibition was also significantly better compared with the standard drug and extract. The oil showed better activity. In Table 2 the blood profile, which contained RBC, WBC, ESR and Hb were noted, which showed an excellent anti-arthritic efficiency of the oil and extract compared the standard.

Table 1: Anti-arthritic Activity of Herbal oil

Group	Starting day	Paw edema Volume			Inhibition%
		7day	15day	21day	
Normal group	0.224±0.1635	0.246±0.0157	0.219±0.0162	0.231±0.0144	—
Negative group	0.248±0.1890	0.832±0.0503**	0.793±0.0271**	0.714±0.0215**	—
Standard group	0.299±0.0283	0.581±0.0624**	0.472±0.0525**	0.510±0.0712**	57.28
Extract-200mg/kg	0.346±0.0482	0.747±0.0301**	0.624±0.0453**	0.569±0.0426**	43.63
Herbal oil	0.271±0.0324	0.82±0.0195**	0.567±0.0648**	0.501±0.0274**	46.25

Table 2: Effect of Herbal oil on the Blood Profile of the Rats

Group	RBC-106 cells/mm ³	WBC-103 cells/mm ³	Hb-gm %	ESR-mm/hr
Normal group	8.05± 0.094	9.12 0.063	17.03+ 0.052	5.41±0.115
Negative group	9.21±0.651**	11.34±0.072**	12.45±0.084**	8.13±0.167**
Standard group	8.14±0.073**	10.05±0.144**	15.7±0.123**	6.26±0.109**
Extract-200mg/kg	7.38±0.082**	11.49±0.131**	13.24±0.090**	7.12±0.153**
Herbal oil	9.07±0.115**	10.16±0.087**	14.09±0.215**	6.28±0.074**

DISCUSSION

The elevation of the paw volumes was significant with the induction of bacteria into the joint. This was due to the induction of inflammation into the joint and accumulation of the cellular and immunity debris that got accumulated in the site of arthritis [8]. This also caused a joint deformity which was visible from the outside skin. The elevation of the cellular constituents like RBC and WBC is also indicative of the formation of inflammation in the joint area [9].

This was significantly lowered by the oil and extracts when compared to the extract. These biomarkers helped us to confirm the induction of the inflammation was due to the synthesis of Interleukins like INF and cytokinin [10]. The extract successfully lowered the inflammation due to the mechanism that is believed to be the inhibition of the interleukins [11]. There is also another mechanism that was attributed to the oil, which is the inhibition of lysosomal proteases which cause the generation of the Prostaglandins [12].

CONCLUSION

The plant extract of the stem bark of the plant *Berberis orthobotrys* was collected and extracted using ethanol. This was used to prepare oil formula-

tion, and this was investigated for the anti-arthritic activity. The oil formulation showed a better activity compared to the extract and compared to the standard.

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Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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