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Research Article

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The effect of aqueous extract of *Inula viscosa* plant on arthritic rats

Soltani A.*[1], Meddah B.[1,2], Tir Touil A.[1] and Sonnet P.[3]

[1]*Bioconversion Laboratory, Engineering Microbiology and Food Safety, SNV Faculty, University of Mascara, Algeria*
[2]*LRSBG Laboratory, Faculty SNV, University of Mascara, Algeria*
[3]*Laboratore of glucides- Team Thera.- FRE-CNRS 3517, Faculty of Pharmacy, University of Picardie, Amiens, France*

ABSTRACT

The objective of this study was to study the anti-rheumatic effect of the aqueous extract of Inula viscosa in arthritic rats. Male albino Wistar rats (40) weighing 180 to 190 g were selected and divided into five groups, maintained eight rats in each group. Groups 1 and 2 were served as normal and arthritic control. Group 3 was treated with standard drug as B-métasone 0.30 mg/kg body weight, whereas groups 4 and 5 were administered extract of 100 and 200 mg/kg body weight, respectively. arthritic was induced by using vitamin A in rats. Treatment was carried out for 6 months and the fasting serum phosphatase alkaline, CRP, calcium and urinary pyridinolines were measured. Data was collected and analysed statically using one-way analysis of variance (ANOVA) followed by Student's t-test. The statistical data indicated the significant decrease in the fasting serum pyridinolines level. In arthritic rats, phosphatase alkaline, CRP and calcium of arthritic rats also decreased. The aqueous extract of Inula viscosa has shown anti-rheumatic effect in vitamin A induced arthritic rats.

Key words: Arthritic, Inula viscosa, B-métasone, pyridinolines.

INTRODUCTION

African flora in general and Algeria in particular, offers a large pool of aromatic and medicinal expanse characters. Thus, medicinal plants play an important role in the African pharmacopoeia. Even today, they play an important role in the treatment of certain tropical diseases like malaria, jaundice, gonorrhea, bilharzia. The impressive reserve of plants around the world, only 10% has been studied for their pharmacological properties [1]. The essential oils of the plants have been of great interest for their potential uses as alternative remedies for the treatment of many infectious diseases and pharmaceutical alternative medicine and natural therapies.

Inula viscosa (L.) Aiton (syn. Cupularia viscosa G. et G., Dittrichia viscosa Greuter) (Compositae) (common name "sticky fleabane") is a perennial weed, native to the Mediterranean Basin. It grows on hillslopes, damp habitats, and roadsides. In folklore medicine, this plant is used for therapeutic purposes, such as a diuretic, topical anti-inflammatic, and haemostatic [2], [4].

Several studies on the biological activity of the essential oil of I. viscosa have been previously reported, (3). However, almost all of these published essential oil compositions were different from each other. Therefore, the aim of this study is to determine the biological activity of the essential oil of I. viscosa (L.) growing in Algeria, and to make the comparison with the literature.

EXPERIMENTAL SECTION

Collection of plant

The leaves of Inula viscosa were collected from Mascara mountains. Its was authenticated by the botanist of department of biology.

Preparation of extract

Leaves of Inula viscosa were collected and shade dried avoiding sunlight contact. The leaves were crushed into powder by a mixer. Defatting was carried out by immersing the powdered leaves into petroleum ether for 12 h by regular shaking. Using decoction method, 25 g defatted leaves were added into 500 ml beaker with 025 ml of water and was heated on a water bath for 30 minutes and filtered. The excess of solvent were removed by simple evaporation technique (Saraswati et al, 2011).

Animal

Male albino Wistar rats (40) weighing 190 to 200 g were selected for the experiment. The study was after taking the approval of animal ethical committee of the university.

Acute toxicity study

Acute toxicity is the toxicity produced by a pharmaceutical when it is administered in one or more doses during a period not exceeding 24 hours, Animals should be observed for 14 days after pharmaceutical administration. All mortalities clinical signs, time of onset, duration, and reversibility of toxicity should be recorded. Following several experiments the dose used is fixed at the value of 3000mg/Kg body weight.

Induction of osteoarthritis

Osteoarthritis was induced by intra-articular injection of vitamin A 100 mg/kg body weight, animals showing fasting serum calcium, PAL, CRP and pyridinolines level more than 4.6µmol, 93.9UI/l, 130nmol/l et 800nmol/l respectively were selected for study.

Experimental design

Animals were divided into five groups of eight animals each. Groups 1 and 2 were served as normal control and ostéoarthritic control. Group 3 was treated with standard drug as B-metasone 0.30 mg/Kg body weight, whereas group 4 and 5 were administered with extract of 100 and 200 mg/kg body weight, respectively. Treatment was carried out orally for 21 days and the fasting serum phosphatase alkaline, CRP, calcium and pyridinolines were measured.

Statistical analysis

All result were expressed as the mean ± standard error of mean (SEM). The statistical significance was evaluated using one-way analysis of variance (ANOVA), followed by student's t-test using SPSS 20 version software.

RESULTS

Acute toxicity study

The various observation showed the normal behavior of the treated animal animals and no toxic effects. Hence, there was no lethal effect found.

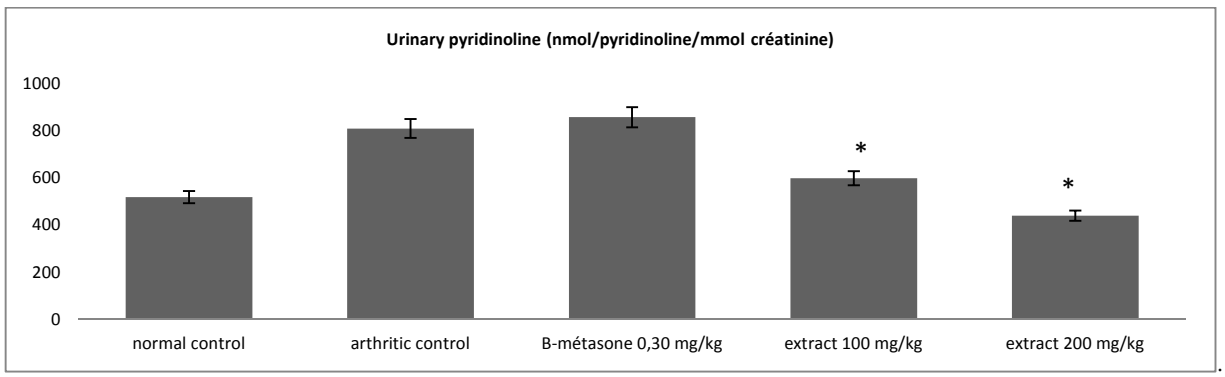

Figure 1 : Effect of extracts on urinary pyridinoline in arthritic rats. Urinary pyridinoline is the ratio of pyridinoline (nM) to creatinine (mM) in rat urine. The p value using Student's t test Values are mean ± SE

Effect of the extracts on pyridinolines

This study showed that at the end of 180 days of treatment, there was a significant decrease ($p<0.05$) of fasting urinary pyridinolines level in group 4 (598.11 ± 5.10) and 5 (439.44 ± 7.81); the extract had shown a dose dependent, significant decrease of pyridinoline level versus arthritic rats of group 2 as indicated in Figure 1. There was not a significant fall (857.05 ± 10.72) of the pyridinoline level in standard drug treated group which is comparable with the highest dose of the extract. Thus, the study shows that the extract exhibited significant effect on pyridinolines in arthritic animals.

Effect of the extracts on calcium and PAL

Both calcium and PAL level (figure 2 & 3) were found to reduced significantly in extract treated groups IV (2.75 ± 0.64), V (2.12 ± 0.14) and (74.10 ± 496) , (60.14 ± 2.63); as compared to arthritic group (4.71 ± 0.32), (93.60 ± 1.94), respectively

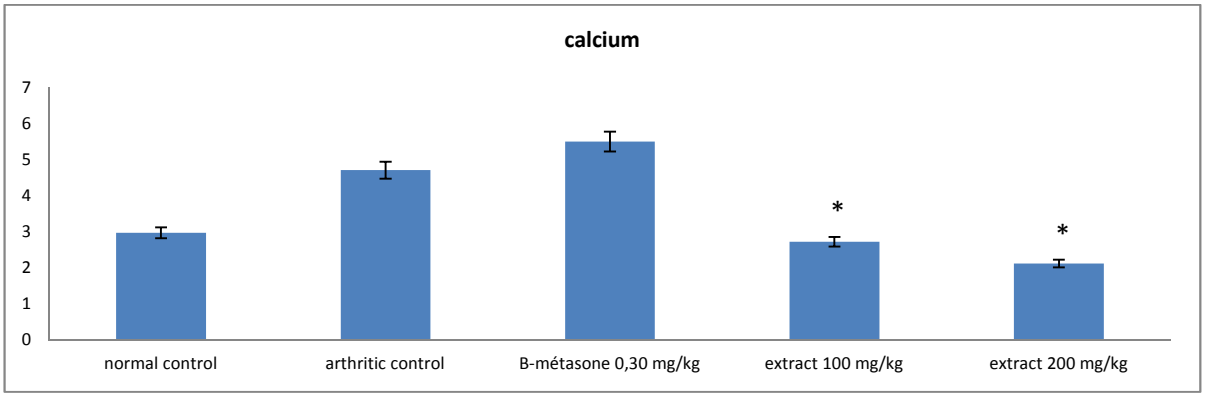

Figure 2 calcium level. Each value is mean±SEM of 8 rats in each group. p<0.05 by comparison with arthritic control

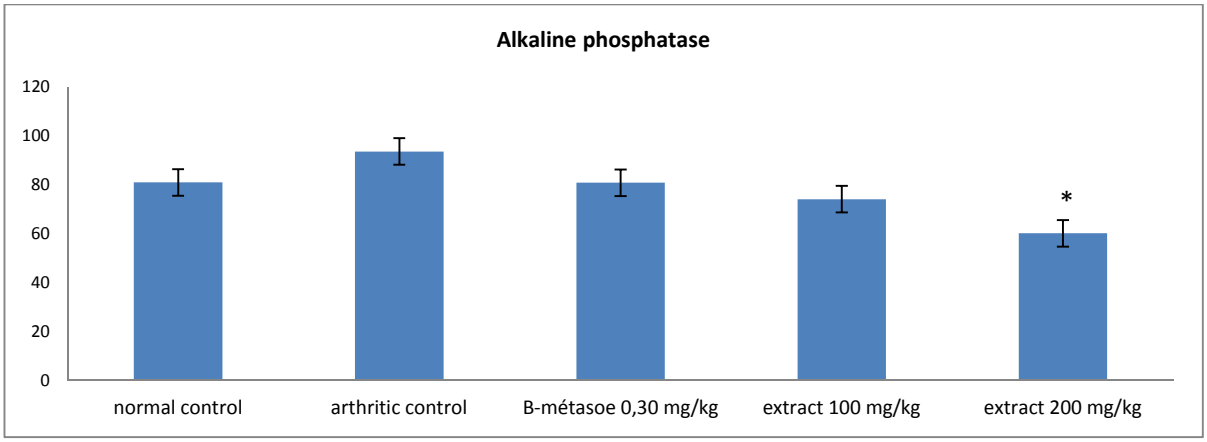

Figure 3 : alkaline phosphatase level. Each value is mean±SEM of 8 rats in each group. p<0.05 by comparison with arthritic control

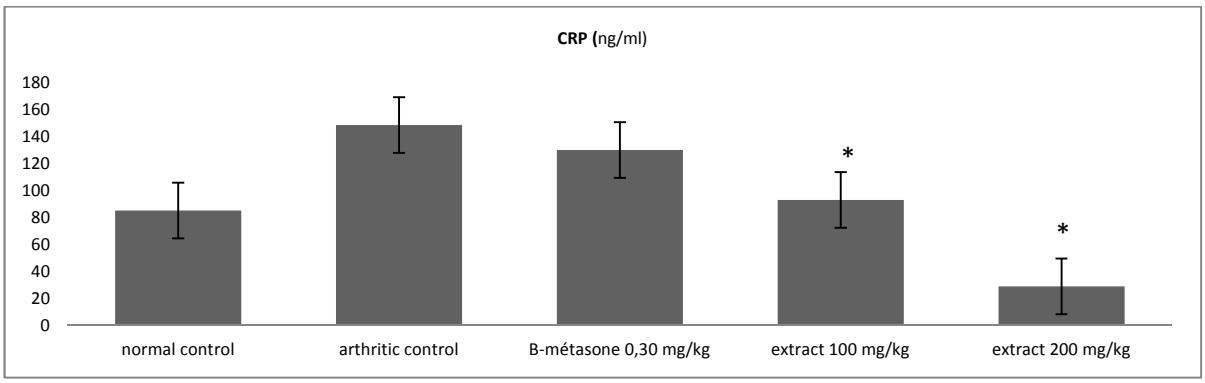

Figure 4. CRP level. Each value is mean±SEM of 8 rats in each group. p<0.05 by comparison with arthritic control

Effect of the extracts on CRP

CRP level in group IV (92.98 ± 4.44) and group V (29.04 ± 8.53) was significantly decreased as compared to diabetic control as shown in figure 4.

DISCUSSION

This study showed significant differences in fasting urinary pyridinolines level between the ostéoarthritic treated group and untreated ostéoarthritic rats. However, the higher dose of extract showed more efficiency of anti-inflammatory activity in ostéoarthritic rats. It may be due to the influence of extract to reduce inflammatory cytokines, such as TNF, IL-1, IL-6, and chemokines; inflammatory enzymes such as COX-2, 5-LOX, and MMP-9. The fall of PAL and calcium may be due to the protective effect of the extracts on the joints

CONCLUSION

Because current treatments for arthritis are inefficient, produce substantial side effects, and tend to be expensive, natural products, which are devoid of such disadvantages, offer a novel treatment opportunities [2], [5].

We conclude that: the extract may be useful in preventing the destruction of joint architecture in rheumatoid arthritis by preventing collagen breakdown.

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