



NOTE

Study on Antiinflammatory Effects of *Ailanthus altissima* Leaves Extract

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This study involves the antiinflammatory effects of *Ailanthus altissima* leaves extract. The inflammation models of xylene-induced mice ear swelling and foot swelling in mice resulting from 10 % of fresh egg white plus physiological saline solution has been established. Compared with the model groups, the high-dose group of *Ailanthus altissima* extract could against the foot swelling in mice resulted from 10 % of fresh egg white plus saline well and there had certain antiinflammatory effect on xylene-induced mouse ear swelling, but the result was not so significant. *Ailanthus altissima* extract had certain antiinflammatory effect.

Key Words: *Ailanthus altissima* Leaves, Extract, Foot swelling, Ear swelling, Antiinflammatory.

Ailanthus altissima (Mill.) swingle is a deciduous arbor, which is a member of Simaroubaceae family. It is mainly distributed in the southeast of Asian. In China, it is mainly distributed in Guang Dong, Guang Xi, Yun Nan, the south of Liao Ning Province and many other places.

Ailanthus altissima leaves contain many active substances such as sterol, triterpene, tetracyclic triterpene, diterpenoid and alkaloid, etc.¹. According to the previous record, *Ailanthus altissima* leaves have the function of antiinflammation, detoxification, disinfestations of pests. Besides, they can be used to treat enteritis, dysentery, furuncle, carbuncle, rhus dermatitis and tinea tonsure². In present work, on the antiinflammatory effects of *Ailanthus altissima* leaves was conducted so as to provide the theoretical evidence for the reasonable application of *Ailanthus altissima* leaves^{3,4}.

Seventy male Kunming mice of clean grade with the weight between 20-22 g were provided by Animal Experiment Center, Beijing Academy Military of Medical Sciences (number of license SCXK-2002-001). The *Ailanthus altissima* leaves were picked from Herb Garden, Biochemical Engineering College, Beijing Union University, prednisone acetate tablets and physiological saline solution were provided by School Infirmary, Biochemical Engineering College, Xylene(CP grade) was supplied by The Second Beijing Reagent Factory.

***Ailanthus altissima* leaves extraction:** *Ailanthus altissima* leaves extract was prepared as the following steps. In the first place, taking 2.5 kg *Ailanthus altissima* leaves, which have

been dried to constant weight, grinding them and adding 10 L of distilled water. In the second place, after 2 h of heating, refluxing and extracting, the water was concentrated into 50 % of the original one. The concentrated liquid was reserved with cryopreservation. The high concentration of *Ailanthus altissima* leaves extract could be obtained by concentrating 1 L of the low concentration extract into 50 % of itself.

Effects of *Ailanthus altissima* leaves extract: The anti-foot swelling in mice testing of the antiinflammatory effects of *Ailanthus altissima* is as follows. Forty mice, half male and half female with the body weight 18-22 g. The right rear footplates of all the mice were injected with 0.1 mL 10 % of fresh egg white plus physiological saline solution (CFA) under the skin in order to induce foot swelling in mice. After finishing the inflammation models, the mice were divided randomly and equally into the following four groups; model group, low-dose group, high-dose group and positive control group. At the 14th day of the inflammation induced by CFA, the mice groups were given drug by stomach perfusion (Table-1). The drug is delivered once a day for 7 days. At the 12th day of the inflammation, the swelling degree of the right rear foot induced by inflammation was measured every other day. The swelling degree is the difference in pre and past degree of the foot swelling in mice.

Anti-xylene-induced mice ear swelling: The testing of the antiinflammatory effects on ear swelling mice is as follows. Thirty male mice with the body weight 18-22 g were divided

TABLE-1
TEST DESIGN

Groups	Drug name	Dosage mL/kg
Model group	Physiological saline solution	10.0
Low-dose group	<i>Ailanthus altissima</i> leaves extract	3.2
High-dose group	<i>Ailanthus altissima</i> leaves extract	4.6
Positive control group	Prednisone acetate	12.8

randomly and equally into the following three groups; model group, high-dose group and positive control group. Each group was given drug for 6 days (Table-1). After 1 h of the last drug delivery, each mouse was smeared with 0.02 mL xylene in both the front and the back sides of the right ear. After another 1 h, the mice were sacrificed by the pulling of their cervical vertebrae. By using the puncher with diameter of 8 mm, the round pieces from the ears at the same part of these mice removed and measuring the weight of the ear pieces by balance scale. The difference of the weight between the left and the right ear is the swelling degree. Based on the measured results, the swelling suppressive rate can also be calculated. The formulation is as follows. The swelling suppressive rate = (the degree of ear swelling in the model group - the degree of ear swelling in the drug delivery group) / the degree of ear swelling in the model group \times 100 %.

Antiinflammatory effects of *Ailanthus altissima* extract on foot swelling in mice resulted from CFA: The injection of fresh egg white into the mouse foot will cause the release of histamine, 5-HT and many other inflammatory mediators, which will lead to partial increased vascular permeability, exudation and edema. The mice footpad will show red, swelling, pain and many other early symptoms of acute inflammation. If the drug is able to depress the paw swelling mice in, the antiinflammatory effect of the drug could be presented. After 8 h of the inflammation, the swelling degree of each modeled mouse's right rear foot comes to peak, the skin presents red colour with high temperature. The symptoms will alleviate gradually after the duration of 3 days. But after 8 days, the right rear foot will swell again. When it comes to about the 12th day, the secondary disease will occur, which appears as the swelling of the opposite one of the injected foot, the edema of the forelimb foot, the tubercle of the tail and red patch on eye. The establishment of the models could be indicated as a success if the mice appeared with low sprits, bad appetite, some with low weight and tough action during the testing period. It can be seen from Table-2 that the high-dose group has significant suppressive effect on the primary foot swelling after 0.5-4.0 days after the drug delivery. The suppressive strength of the high-dose group is higher than the model group and the low-dose group. The drug significant also has significant suppressive effect on the secondary right foot swelling after 7 days the drug delivery (the twenty-first day after the inflammation).

TABLE-2
EFFECTS OF *A. altissima* EXTRACT ON FOOT SWELLING IN MICE INDUCED BY CFA

Groups	Swelling degree/mL			
	0.5d	1.0d	2.0d	4.0d
Model group	1.8 \pm 0.48	1.18 \pm 0.39	0.94 \pm 0.43	0.95 \pm 0.39
Low-dose group	0.97 \pm 0.23	1.15 \pm 0.45	0.94 \pm 0.62	0.90 \pm 0.67
High-dose group	0.85 \pm 0.28	0.74 \pm 0.58	0.84 \pm 0.38	0.79 \pm 0.35
Positive control group	0.48 \pm 0.15	0.28 \pm 0.08	0.27 \pm 0.12	0.31 \pm 0.31

($\bar{X} \pm s$, n = 10)

Antiinflammatory effects of *Ailanthus altissima* extract on xylene-induced mouse ear swelling: Table-3 indicates that the high-concentrated *Ailanthus altissima* extract has the suppressive effect on the xylene-induced mouse ear swelling and the suppressive rate is 2%. However, the suppressive rate on the mouse ear swelling of prednisolone acetate in positive control group comes to 50 %, which illustrates that the antiinflammatory effects of *Ailanthus altissima* leaves extract on mouse ear swelling is not so significant.

TABLE-3
EFFECTS OF *A. altissima* EXTRACT ON MOUSE EAR SWELLING INDUCED BY XYLENE

Groups	Left ear (mg)	Right ear (mg)	Swelling degree (mg)	Suppressive rate (%)
Model group	14.05 \pm 2.2	17.55 \pm 2.9	3.50 \pm 0.7	-
Positive control group	12.62 \pm 3.6	14.37 \pm 3.5	1.75 \pm 0.1	50
High-concentration group	10.87 \pm 0.9	14.29 \pm 1.4	3.42 \pm 0.5	2

($\bar{X} \pm s$, n = 10)

Conclusion

This test applied the common models of acute inflammation and chronic inflammation to study the antiinflammatory function of *Ailanthus altissima* leaves extract. The results indicates that the high dose of *Ailanthus altissima* leaves extract can significantly against the primary mouse foot swelling resulted from egg white, meanwhile, it has certain suppressive effect on the mouse ear swelling induced by xylene, but the result is not significant. As regards the composition and antiinflammatory mechanism of the *Ailanthus altissima* leaves extract still needs further study.

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