THE EFFECT OF ORGANIC AND AQUEOUS EXTRACTS OF SALVIA FRUTICOSA ON INTESTINAL MOTILITY [□]

BY

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ملخـــص

تتناول الدراسة تأثير المستخلصات العضوية والمائية لأوراق نبات الميرمية على حركة الأمعاء الدقيقة للأرنب .

وجد الباحثون بأن المستخلصات العضوية تثبط الحركة المعوية الدقيقة في الأرنب كذلك تثبط عمل مادة الاستيل كولين ولم يلاحظ هذا التأثير على المستخلصات المائية وشملت الدراسة أيضا تأثير مجموعة من المستخلصات العضوية وتأثيرها على حركة الأمعاء .

Abstract

The effect of organic (methanol and ether) extracts , and aqueous (neutral) , acidic and basic) extracts from the leaves of **Salvia fruticosa** , on the spontaneous contractile activity of the rabbit ileum was studied . Both Organic extracts were found to inhibit the spontaneous activity of the rabbit ileum , and inhibit acetylcholine – induced contractions . On the other hand aqueous extracts did not show any effect .

The effects of a series of organic solvent exctracts on the ileum were studied .

Introduction

The herb **Salvia fruticosa** grows wildly on the hills of the West Bank , and has long been used by the local Arab population to releif intestinal pains . Therefore , it was decided to invistigate the effect of organic and aquous extracts of **Salvia fruticosa** on the smooth muscle of the isolated rabbit ileum . Similar studies were

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carried out on other species of the genus **Salvia** have shown marked differences in their pharmacological effects on the intestinal motility[3] .

Materials and Methods

Plant Material :

The herb of **Salvia fruticosa** was collected and identified[1-4] with the help of the botanists in the department and the use of various refenences . Leaves were dried and ground before extraction . Aqueous extracts were prepared by adding the ground leaves to distilled water and continously stirred by using a magnetic stirrer for 6 hours . This was followed by filtration and the filtrate was dried using a freeze drier . For acidic and basic extractions , the pH was adjusted to 4 and 9 by adding HCl and NaOH .

Following the neutral aqueous extraction , the residue was then extracted in methanol , using a Soxhlet apparatus . This was done overnight , and the residue was further extracted in diethylether following the same procedure . Both extracts were dried using a rotary evaporator .

Organ Bath Studies :

Rabbits (1-2kg) were used throughout the study . The animals were sacrificed , bled and the ileum was removed immediately and cleaned with Tyrode buffer . Small pieces (3-4cm) of the ileum were then mounted vertically in a 25ml organ bath containing Tyrode's solution , and maintained at 35 °C and constantly bubbled with O_2 + CO_2 (95:5) . Contractions were recorded on a kymograph using a frontal writing point connected to a lever as described by the staff of the Pharmacology Department at Edinburgh[2] . Tension was usually adjusted to give a suitable baseline and muscle tone .

Drug and Extract Preparations :

Acetylcholine was prepared by dissolving appropriate amounts in buffer . Doses of the drug were added in microliters by using a Hamilton syringe . aqueous extracts were added to the bath after dissolving them in buffer . Organic extracts were then dissolved in water : dimethylsulfoxide (1:1) . This was done since the extracts were not soluble in water and because other organic solvents affected muscle activity when added to the organ bath (see results and discussion) .

Results and Discussion

Initially and during the preparation of organic extract solutions , it was found that these extracts do not dissolve very easily , especially when present in high concentrations . Therefore a series of organic solvents were tested for both their capacity to dissolve the organic extracts and their effect on the rabbit ileum . The organic solvents were : methanol , propanol , acetone , diethylether , chloroform , dichloromethane , dichloroethane , and dimethylsulfoxide . As shown in table 1 , most of the organic solvents produced an inhibitory or excitatory effects on the

Table 1 : The effect of Various Organic Solvents on the Rabbit ileum

Solvent ▲	Mode of Action	Potency	Active concentration (ul/25ml)
Methanol	Excitatory *	+ +	50
Ethanol	Excitatory **	+	500
Propanol	Inhibitory *	+ + +	50
Acetone	Excitatory *	+	50
Chloroform	Excitatory *	+	50
Dichloroethane	Excitatory *	+ + +	50
Dichloroethane	Excitatory *	+ + +	50
Diethylether	Excitatory *	+	50
Dimethylsulfoxide	Excitatory **	+	500

These results are obtained from two separate experiments which produced almost identical effects .

movement of the rabbit ileum , when aoued in quantities of approximately 50 ul to the bath . On the other hand , ethanol and dimethylsulfoxide produced slight effects only when added in quantitles of 500 μl or more . Therefore it was decided to use both ethanol and dimethylsulfoxide to dissolve the organic extracts . This was usually done in small amounts of the organic solvent and water in 1:1 ratio .

Both methanol and ether extracts were found to gradually inhibit the spontaneous movement of the rabbit ileum (figure 1) . Methanol extract was found to be more potent where it caused an inhibitony effect when sdded at a dose of $\geq$ 0.1 mg/ml . The ether extract inhibited the movement when presented at a concentration

* *The effect is contraction .*

** *The effect is increase in the amplitude of spontaneous motility .*

▲ *The effect of all solvents on the ileum was found to be reversible with washing .*

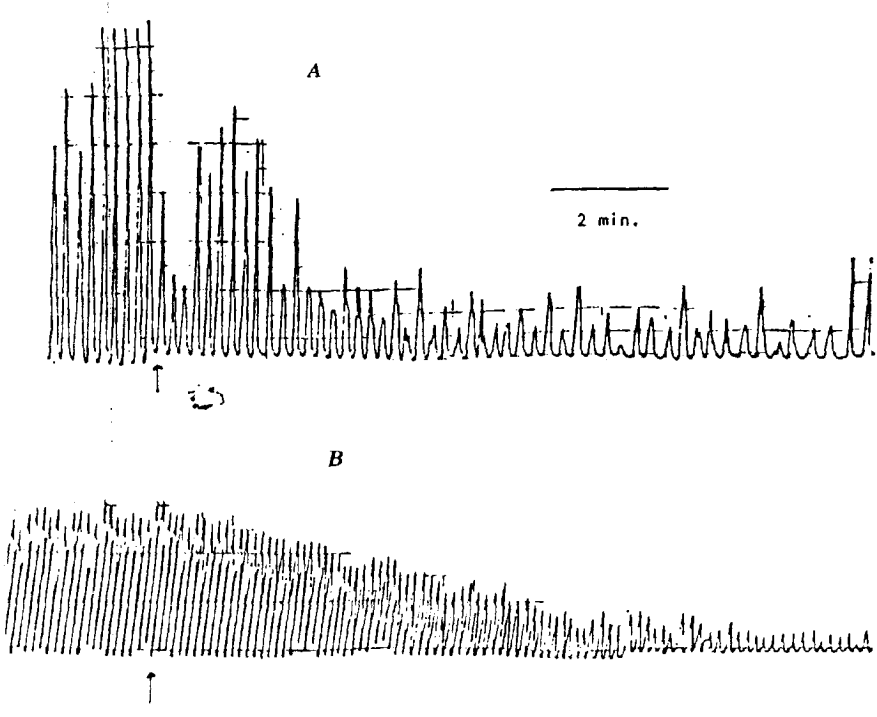

Figure 1 : The effect of methanol and ether extracts of **Salvia fruticosa** on the spontaneous activity of the rabbit ileum . Arrows indicate addition of extracts .

A : addition of methanol extract (0.1 mg/μl) .

B : addition of ether extract (0.3 mg./μl) .

These tracings are representative of at least three experiments .

of $\geq$ 0.3 mg/ml . Furthermore both the methanol extract and the ether extract were found to inhibit acetylcholine induced contractions of the rabbit ileum when added 10 minutes before acetylcholine (10^{-7} M) . The inhibition was observed at a concentration of $\geq$ 0.2 mg/ml of both extracts (figure 2) .

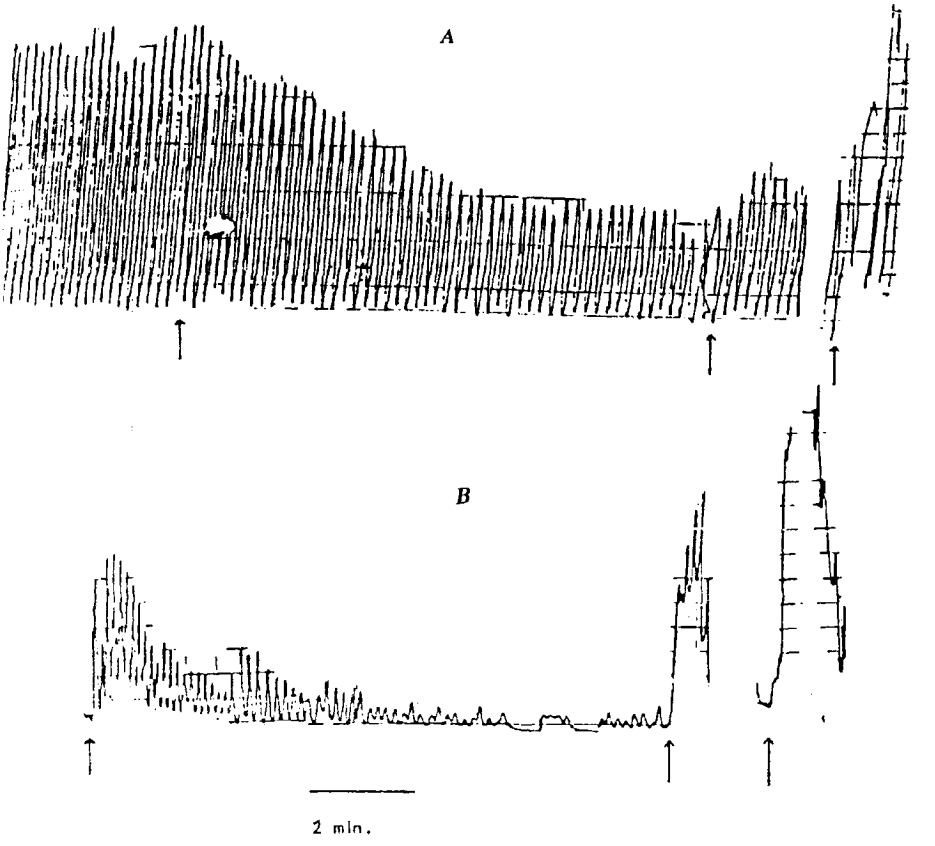

Figure 2 : The effect of methanol and ether extracts of **Salivia fruticosa** on the contractions produced by acetylcholine .

A : methanol extract added (first arrow) at a concentration of 0.2mg/ul , followed by a cetylcholine (10^{-7} M) (Second arrow) . Third arrow shows the control response to acetylcholine

B : ether extract added (first arrow) at a concentration of 0.2mg/ul followed by 10^{-7} M acetylcholine (second arrow) . Third arrow shows the control response to acetylcholine .

All aqueous extracts (neutral , acidic and basic) did not affect spontaneous contractions of the ileum even when presented at a concentration of 2mg/ml . In addition to that they were unable to inhibit the acetylcholine-Induced contractions .

It is evident from the above results that organic extracts of **Salvia fruticosa** inhibit the motility of the rabbit ileum possibly by interfering with the parasympathetic innervation . Further work on these extracts is underway to ellucidate the active ingredients .

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