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EVALUATION OF SKELETAL MUSCLE ACTIVITY OF *ALOE VERA* EXTRACT ON FROG'S RECTUS ABDOMINUS MUSCLE

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ABSTRACT

Skeletal muscle activity of *Aloe vera* extract were studied in the green frog (*Rana hexadactyla*) by the rectus abdominis muscle preparation. *Aloe vera* extract with distilled water 1µg/ml, 5µg/ml and 10µg/ml concentrations. The result indicated that the treatment of *Aloe vera* extract alone and combination with acetylcholine produce skeletal muscle activity. Thus from the present study it was concluded that *Aloe vera* extract were have good skeletal muscle activity alone and combination with Acetylcholine.

Keywords: Skeletal muscle activity, *Aloe vera* extract, *Rana hexadactyla*, Acetylcholine.

INTRODUCTION

Aloe vera is a succulent plant species. The species is frequently cited as being used in herbal medicine since the beginning of the first century AD. Extracts from *Aloe vera* are widely used in the cosmetics and alternative medicine [1] industries, being marketed as variously having rejuvenating, healing, or soothing properties. There is, however, little scientific evidence of the effectiveness or safety of *Aloe vera* extracts for either cosmetic or medicinal purposes, and what positive evidence is available is frequently contradicted by other studies [2]. *Aloe vera* is a stemless or very short-stemmed succulent plant growing to 60–100 cm (24–39 in) tall, spreading by offsets. The leaves are thick and fleshy, green to grey-green, with some varieties showing white flecks on their upper and lower stem surfaces, The margin of the leaf is serrated and has small white teeth [3]. The flowers are produced in summer on a spike up to 90 cm (35 in) tall, each flower being pendulous, with a yellow tubular corolla 2–3 cm (0.8–1.2 in) long. Like other Aloe species, *Aloe vera* forms arbuscular mycorrhiza, a symbiosis that allows the plant better access to mineral nutrients in soil [4]. *Aloe vera* leaves contain phytochemicals under study for possible bioactivity, such as acetylated mannans, polymannans, anthraquinone C-glycosides, anthrones, other anthraquinones, such as emodin, and various lectins. This present study was to evaluate the skeletal muscle activity of *Aloe vera* extract on isolated frog's rectus abdominus muscle [5-8].

MATERIALS AND METHODS

Collection of Plant material

Aloe vera was collected from the botanical garden of Vaageswari Institute of Pharmaceutical Sciences, Karimnagar, Telangana.

Preparation of plant extract

The collected plant material was washed with hot water and cut them into pieces, collected in a beaker, kept boiling for two hours by adding some amount of distilled water, filter it, collect the filtrate and cool it, then add chloroform to it in a separating funnel, collect the chloroform extract and the chloroform extract was taken in a china dish and evaporated. The dried extract of *Aloe vera* was collected and stored. This dried extract contains the active compound aloe emodin-8-O-glycoside (AEG) [9].

Effect of *Aloe vera* Extract on the skeletal muscle of the frog

Since the antimigraine drugs were reported to have skeletal muscle activity, so this experiment was attempted to assess the effect of Fenugreek leaves and seeds extracts on the frog rectus abdominis muscle preparation. The experiment was carried as per the method described by Kulkarni.

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Frogs weighing 20-25 g were used in this study. The frog was stunned and decapitated and the spinal cord was destroyed. A frog was pithed and the skin of the anterior and abdominal wall was cut by a midline incision and then it was cut laterally to expose the anterior abdominal wall. The two rectus were seen running from the base of sternum. The muscles were cut across just above the sternum at its base and the pair of muscles attached to it were dissected and transferred to a dish containing frog ringer solution at room temperature. The muscles were then carefully cleaned and one of them was trimmed to the desired size and mounted in an organ bath filled with ringer solution at room temperature and aerated by stream of fine bubbles emerging near the bottom of the bath. Isotonic contractions were recorded using gimbel lever with a sideways writing point. The lever was balanced for a tension of approximately 2-5g. An extra load of approximately 1g on the long arm was supplied because sometime the lever may not return to the base line after washing. The drug period allowed for stabilization was 30 minutes during which the muscle was subjected to 1g stretch. At 0^{th} min - the kymograph was started after raising the extra load; in the 1^{st} min- the drug was added and in the 2^{nd} min- the kymograph was stopped. The tissue was washed and allowed to relax by applying an extra load. At the 5^{th} min- the lever point was brought to the base line and the next cycle was started. After recording the graded responses to different log dose of acetylcholine, the *Aloe vera* was added and their effects upon acetylcholine induced contractions as well as the effect of its own in the tissue was studied [10-12].

RESULTS

The results indicated that acetyl choline, when administered alone, exhibited increasing activity with an increase in the concentration. When administered alone, *Aloe vera* extract also showed an increase in the response with increasing concentration. But when administered in combination with acetyl choline, the extract showed synergistic effect, i.e. a potent action was observed when compared to individual responses.

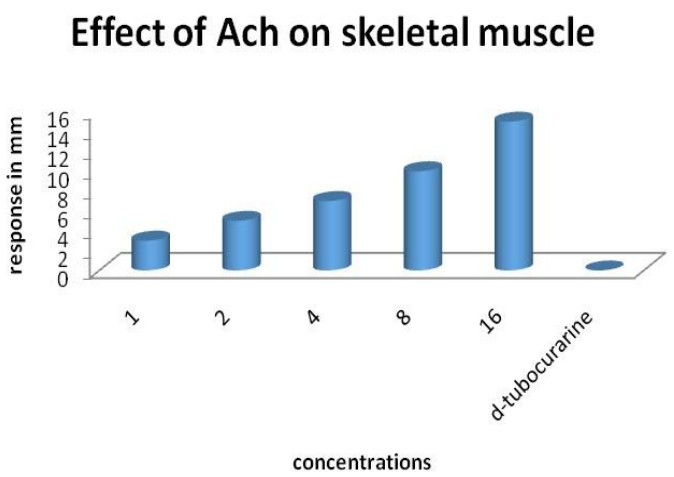
Table 1. Skeletal muscle activity of Acetylcholine, AVE, d-tubocuraine, Acetylcholine +AVE

S.NO	Drug	Dose (µg/ml)	Height (mm)	Response
1	Acetylcholine	1	3	Increased
2	Acetylcholine	2	5	Increased
3	Acetylcholine	4	7	Increased
4	Acetylcholine	8	10	Increased
5	Acetylcholine	16	15	Increased
6	d-tubocuraine	4	-	-
7	AVE	1	2	Increased
8	AVE	5	7	Increased
9	AVE	10	11	Increased
13	Acetylcholine + AVE	1 1	6	Increased
14	Acetylcholine + AVE	1 5	11	Increased
15	Acetylcholine + AVE	1 10	15	Increased

Fig 1. *Aloe vera*

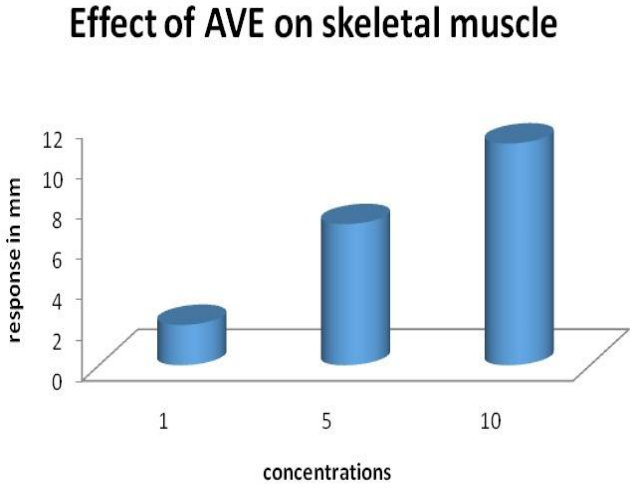
Fig 2. *Aloe vera* gel

Fig 3. Effect of Acetylcholine on Skeletal muscle



A1- Acetyl choline-1µg/ml A2-Acetyl choline-2µg/ml, A3-Acetyl choline 4µg/ml, A4- Acetyl choline-8µg/ml A5- Acetyl choline-16µg/ml and D-d-tubocuraine.

Fig 4. Effect of AVE on Skeletal muscle



AVE1- *Aloe vera* Extract 1µg/ml, AVE5- *Aloe vera* Extract 5µg/ml, AVE10 – *Aloe vera* Extract 10µg/ml

Fig 5. Effect of Ach and AVE on skeletal muscle

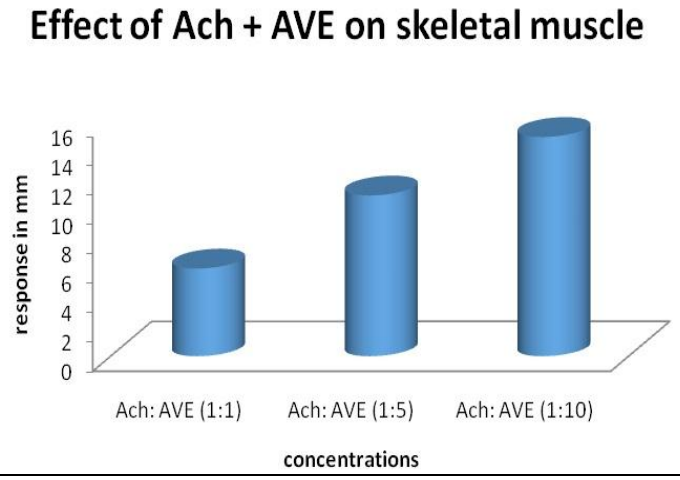


Fig 6. Kymograph - Effect of Ach on Skeletal muscle

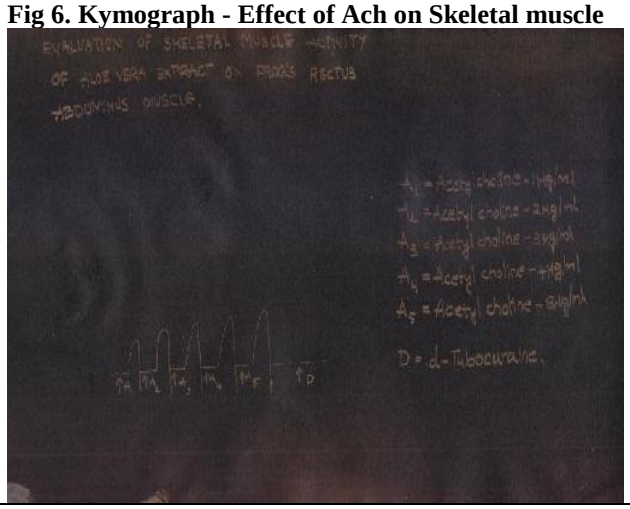
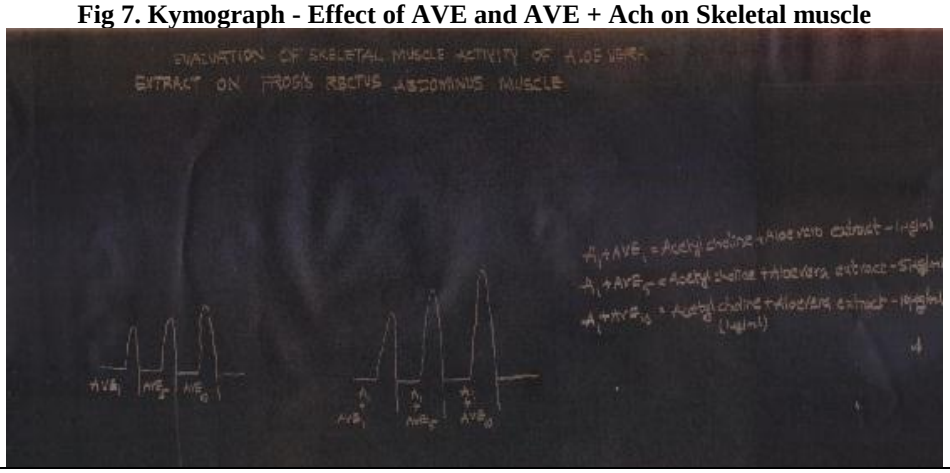


Fig 7. Kymograph - Effect of AVE and AVE + Ach on Skeletal muscle



DISCUSSION

The *Aloe vera* extract was found to have skeletal muscle activity with the concentrations of 1 µg/ml, 5 µg/ml, and 10 µg/ml. When the activity was compared between the standard drug i.e, Acetylcholine and test drug *Aloe vera* extract. The activity of the standard drug is more compare to test drugs and it is above to reach with the standard drug.

The skeletal muscle activity was evaluated first by the acetylcholine of different doses like 1 µg/ml, 2 µg/ml, 3 µg/ml, 4 µg/ml and 8 µg/ml and with d-tubocuraine of dose about 16 µg/ml. The acetylcholine were shown more activity by increasing the dose response whereas, the drug d-tubocuraine has shown no effect and no action it neither contraction nor depolarization because

it inhibits muscular contraction induced by the application of acetylcholine.

Then skeletal muscle activity is evaluated by using test drugs *Aloe vera* extract of using different doses like 1 µg/ml, 5 µg/ml and 10 µg/ml. For both the tests drugs the response have been increased.

The effect of acetylcholine and *Aloe vera* extract (AVE) were compared and the result shown the more active response with the acetylcholine rather than the extract. The effect of single *Aloe vera* extract and combination of *Aloe vera* extract + Acetylcholine is compared and the result shown more active with the combination of AVE + ACH. The results showed that the acetylcholine i.e, 1 µg/ml + AVE1 1µg/ml was less active than acetylcholine 1 µg/ml + AVE5 5 µg/ml and this is less active than acetylcholine 1 µg/ml + AVE10 10 µg/ml. Thus from the present study it was concluded that *Aloe vera* extract has good skeletal activity. Thus, the present investigation proves that *Aloe vera* extract has good skeletal muscle activity alone and combination with acetylcholine and it produces the significant skeletal muscle activity at high concentration.

CONCLUSION

This study finally concluded that the effect of acetylcholine and *Aloe vera* extract (AVE) were compared and the result shown the more active response with the acetylcholine rather than the extract and acetylcholine. It *was* selected for further investigation, involving bioassay guided fractionation, in order to isolate the constituents responsible for the effect of the plant.

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