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EFFECT OF ADMINISTRATION OF CRUDE AQUEOUS LEAVE EXTRACT OF *Anacardium occidentale* ON ISOLATED RABBIT INTESTINE

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ABSTRACT

The effect and probable mechanism of action of an aqueous extract of *Anacardium occidentale* on intestinal motility of the rabbit was studied. Five (5) rabbits were used as experimental animals in the study and the standard organ bath procedure was used to monitor and record the contractions of the isolated intestine of the rabbits. The result showed strong correlation between the log concentration of the extract and the % contractility of the ileum with r= 0.879. This correlation was highly significant at p,<0.05. Also regression analysis done on these result show y=12.236**x-**0.2789 and was highly significant at (p<0.05). The above result suggests that aqueous extract of *Anacardium occidentale* increase intestinal contraction in rabbits.

Keywords: *Anacardium occidentale,* intestinal motility, rabbit.

INTRODUCTION

Anacardium occidentale L. belongs to the family *Anacardiaceae.* It is popularly called cashew. Extracts of the leaf, bark and root of the plant have wide application in folk medicine.

The plant has been variously used as antidiabetic, antibacterial, antiinflammatory, purgatives, hypotensive and diuretic. It has been found to be particularly useful in the management of gastrointestinal disorders like colic, dyspepsia, stomach ache, diarrhoea, dysentery and stomach ulcer (Leslie, 2005).

Phytochemical studies have produced evidence that the extract of the plant contains bioactive components like gallic acid, flavonoids, tannins, etc. all of which show gastroprotective functions through antisecretory, antacids and cytoprotective actions. These compounds decrease the rate of gut motility.

Although scientific research has confirmed both the antidiabetic (Leonard *et al.,* 2006, Ojewole, 2003; Evans, 2005) and its anti inflammatory effects (Ojewole, 2004; Mota, 1985; Olajide, 2004) there is currently a dearth of research publication to support the folkloric use of the plant in the management of diarrhea and colic.

Since motility function of the gut is critical in the pathogenesis of both diarrhoea and colic there is need to evaluate this function of gut

in response to oral administration of the crude extract of the plant.

In the present work, we did not only study the effect of aqueous extract of the plant on ileal motility in rabbits, we also attempted identifying the receptors involved in the observed response.

MATERIALS AND METHODS

Experimental Animals

Rabbits were considered necessary for these experiments since their intestine show more pronounced contraction than other laboratory animals, like rats, guinea pig, mice, etc (Ibu *et al.,* 2005). The 5 rabbits used were purchased from the rabbitary unit of the University of Agriculture, Abeokuta. They were kept in cages in well-ventilated room and fed properly. Water was also given.

Preparation of Isolated Tissue and Experimental Procedure

The animals were starved for 12hours prior to the commencement of the experiment to ensure complete emptying of the small intestine (Ibu *et al.,* 2005). The animal was made unconscious by stunning. A midline incision was made in the abdomen to expose the small intestine immediately. A length of the small intestine, precisely the ileum was isolated and quickly cut and placed in a Petri dish containing Tyrode's solution of the following composition NaCl 140, KCl 2.7, Na HCO_3 120, $MgCl_2$ 0.5, $NaHPO_4$ 0.3, $CaCl_2$ 0.9 and glucose 5.5Mm. The solution was bubbled with air and maintained at 37^oC

Following the preparation of the isolated tissue, thread was attached to both ends of the tissue with the aid of a suture needle. The tissue was then mounted in the tissue bath of 50ml capacity (Harvard apparatus, UK). The length of the tissue was about 3-5cm. One end of the tissue was tied to the tip of the tissue bath and the other end tied to the writing lever of the kymograph. The tissue was bathed with Tyrode's solution and allowed to equilibrate for about 30 minutes. During this period, the bathing solution was flushed out at intervals of 15 minutes and the kymograph drum was set to a rotating velocity of 0.01 revolutions per second. After the equilibration period, the basal response was obtained. Thereafter, the aqueous extract of *Anacardium occidentale* was administered to the tissue at graded concentration of 1mg-25mg/ml. Contact time of studies was between 30 and 45 seconds because the response of the tissue in some cases was not immediate. (Akomolafe *et al.,* 2003). The tissue was washed at least twice with fresh Tyrode solution after each dose to ensure that the tissue was allowed to rest for between 10-15 minutes before the next dose of the extract infusion was applied (Akah *et al.,* 1997).

RESULTS

The results obtained show an increase in the intestinal motility of the rabbit ileum on administration of various concentration of the aqueous extract of *Anacardium occidentale* ranging from 1 to 25mg/ml. This increase was statistically significant ($p<0.05$) and was expressed as percentages too. These are shown in Tables 1 and 2.

Table 2 shows the log concentration of the extract, and the percentage contractility of the ileum. The data in Table 2 were used to plot the correlation, r= 0.879. This was highly significant ($p<0.05$). A regression analysis of this, was also done, and was highly significant ($p<0.05$). The regression equation, Y= a+bx, was therefore, given as Y= 12.236X - 0.2789.

There was a dose dependent increase in contractility of the ileum. The greatest response of 20% increase in contractility was due to application of 25mg/ml of the extract.

Table 1: Effect of administration of various concentrations of *Anacardium occidentale* extract on the contraction of the ileum

Volume of Extract	Concentration Of extract (mg/ml)	Basal Contraction (mm)	Response Owing to Extract (mm)
0.02	1	9.7mm±0.95	9.9mm ±0.82
0.1	5	10.1mm±1.17	10.6mm±0.92
0.2	10	9.7mm±0.92	10.8mm±1.06
0.4	20	8.3mm±0.60	9.4mm±0.52
0.5	25	7.3mm±0.38	9.4mm±0.55

All values are in mean±SD.

Table 2: Log concentration of an aqueous extract of *Anacardium occidentale* and percentage contractility of ileum

Organ bath Concentration (mg/ml)	Log concentration (mg/ml)	Percentage Contractility
1	0	1.7%
5	0.69	4.9%
10	1.0	11.6%
20	1.30	12%
25	1.39	22%

DISCUSSION

The cashew leaf extract has been proven to dose dependently increase the contractility of the rabbit's ileum. At doses of between 1 -25 mg/ml, the height of the intestinal contraction increased.

Gastrointestinal motility is used to describe the various kinds of contraction patterns of muscles of the gastrointestinal tract. This contraction which involves the propulsion and mixing of intestinal content is aimed at optimizing the process of digestion and absorption (Guyton and Hall, 2005). The intestinal smooth muscles has spontaneous myogenic activities which are generated by pacemaker potential or slow depolarization of the membrane (slow waves) although these waves may be markedly influenced by nervous activity (Kuriyama *et al;* 1988, Koh *et al.,* 1998) it is the slow fluctuations (waves) that modulate the spike activity and spike fre-

quency (Koh *et al.,* 1988). Slow waves can normally be recorded in both circular and longitudinal muscle layers of the intestine (Torihashi *et al.,* 2002).

From the current study, it is evident that this extract contains agent (s) capable of stimulating the intestinal smooth muscle in a dose-dependent manner.

This result has provided scientific evidence in support of the tradomedical use of the plant as a purgative (stimulant laxative). Though literature had widely reported the use of the same plant as anti diarrhoeic agent in traditional medicine. This claim although not substantiated in our current study is not impossible. On the basis of its high tannin and flavonoid contents its use as an anti diarrhoeic agent appears logical. The anti diarrhoeic effect, which usually is associated with reduced intestinal motility, could therefore be a possibility at higher dose range of the extract.

Our previous investigation from the same laboratory (manual under review) has revealed that the extract of the same plant brings about an increase in gastric acid secretion in rats therefore, we concluded that the enhanced motility noticed in the present study could only be attributable to muscarinic cholinoceptors. Since this receptor could produce the two effects noticed, another probable mechanism of action of this extract is through the enhanced synthesis of prostaglandin. These compounds, as earlier discussed, have positive effect on gastric secretion and intestinal motility, both of which are noticed in this research.

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