



COMPARATIVE LAXATIVE EVALUATION FOR *ANDROGRAPHIS PANICULATA* AND *TERMINALLA CHEBULA* IN EXPERIMENTAL ANIMAL MODEL

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ABSTRACT

Crude aqueous extract of *A.paniculata* (family: Acanthaceae) and *T.chebula* (family: Combretaceae) at doses 100 and 200 mg/kg respectively were investigated for laxative activity according to Cappaso *et al.* in albino rats that were compared with standard drug Bisacodyl (8mg/kg, p.o.) in gum acacia. The rats were fasted for 12 hours before the experiment. After 8 hours of drug administration the faeces were collected and weighed. The extract was found to produce significant laxative activity in dose dependant manner. The activity may be contributed to the phytoconstituents present.

Keywords: *A.paniculata*; *T.chebula*; laxative activity; faeces; gum-acacia.

INTRODUCTION

Constipation also known as costiveness refers to bowel movements that are infrequent and/or hard to pass. Constipation is a symptom with many causes. These causes are of two types: obstructed defecation and colonic slow transit (or hypomobility). About 50% of patients evaluated for constipation at tertiary referral hospitals have obstructed defecation. This type of constipation has mechanical and functional causes. Causes of colonic slow transit constipation include diet, hormones, side effects of medications, and heavy metal toxicity. Laxatives are among the most widely used drugs.¹ These are drugs that either accelerate faecal passage or decrease faecal consistency. They work by promoting one or more of the mechanisms that cause diarrhoea. Because of the wide availability and marketing of OTC laxatives, there is a potential that an appropriate diagnosis will not be sought.²

Andrographis paniculata commonly known as “king of bitters” is used for its bitter tonic, stomachic, antipyretic and laxative properties in ayurveda. It is said to increase appetite, strengthen digestion and diminish flatulence and hyperacidity. The primary medicinal constituents of *A. paniculata* are andrographolide and related compounds which are diterpenoids showing antipyretic, antimalarial, anti-inflammatory and anticancerous activities.³

Terminalia chebula is a moderate tree used in traditional medicines. It belongs to the family Combretaceae. It is reported to contain various bio chemical compounds such as tannins, chebulinic acid, ellagic acid, gallic acid, punicalagin, flavonoids etc. It has been reported as antioxidant, antidiabetic, antibacterial, antiviral, antifungal, anticancerous, antiulcer, antimutagenic, wound healing activities etc.⁴

Present study aims at exploring the details of laxative action of aqueous extract of *A.paniculata* and *T. chebula*.

MATERIALS AND METHODS

Plant Material

The aerial part of *A.paniculata* and dry fruits *T.chebula* were collected from different places of Uttar Pradesh, India.

Preparation of aqueous extract of *T.chebula*

The dry fruits of *Terminalia chebula* were extracted with distilled water at 70°C, filtered and the supernatant was concentrated and spray dried to get the dry powder of the extract.⁵

Preparation of aqueous extract of *A.paniculata*

The leaves were rinsed thoroughly in distilled water and dried in the shade for 14 days. The dried leaves were ground to fine powder, using a domestic electric grinder and extracted with water at 37°C. The filtrates were pulled together and centrifuged at 2000 rpm for 10 minutes. The supernatant was filtered again and lyophilized using a freeze dryer. The yield of the aqueous extract was 16.28% w/w. The dried extract was stored in the desiccators and kept in the dark till when needed.⁶

Experimental animals

Albino Wistar rats of both sex weighing between 150-200 g were used. Institutional Animal Ethics Committee approved the experimental protocol; animals were housed under standard conditions of temperature (24 ± 2°C) and relative humidity (30-70%) with a 12:12 light: dark cycle. Animal handling was performed according to Good Laboratory Practice (GLP). The animals were given standard diet and water ad libitum.

Drugs

Bisacodyl (Dulcolax) German Remedies Pvt. Ltd, Gum acacia (Loba chemie Pvt. Ltd.)

Acute toxicity studies

Acute toxicity studies were determined by using fixed dose method according to OECD guidelines.⁷ Healthy adult Swiss albino mice, weighing 25-30 g, were used.

Evaluation of Laxative activity

Faecal output model⁸

The laxative activity was performed according to Cappaso *et al.* on rats of either sex, non fasted animal. The animals were divided into 7 groups of four animals each. The first group of

animals, serving as vehicle control, received 1% gum acacia (10 ml/kg); the second group serving as reference, received Bisacodyl (8 mg/kg) while third and fourth groups received aqueous extract of *A. paniculata* and *T. chebula* at doses of 100 and 200 mg/kg respectively. Immediately after administration of dose, the animals were isolated and housed separately in polypropylene cages suitable for collection of feces. After 8 h, 16 h and 24 h of drug administration the

feces were collected and weighed. The dry weight determined after the feces were dried for 8 hour at 70 c. The water content of the feces was calculated according to the following formula.

$$\text{Water content of fecal output (\%)} = \frac{[1 - (\text{Dry weight of fecal pellet output (g)})] \times 100}{[\text{Wet weight of fecal pellet output (g)}]}$$

Table 1: Wet weight

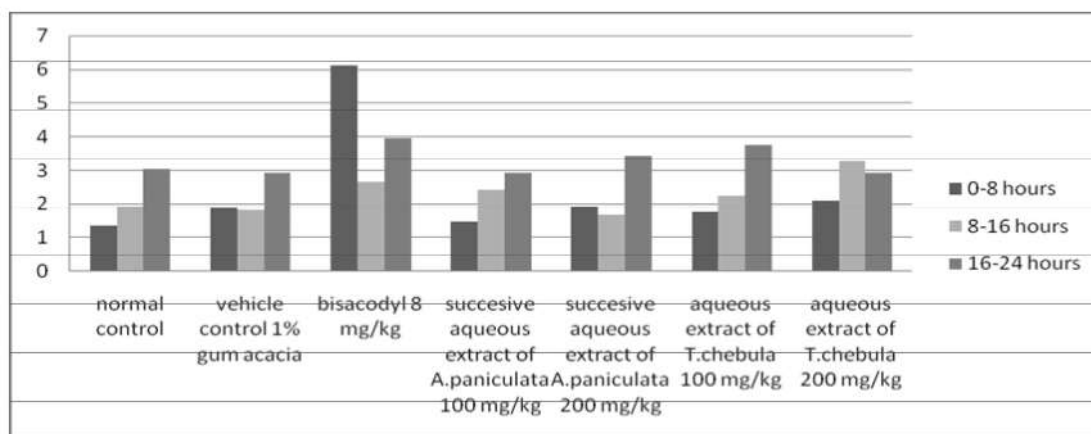
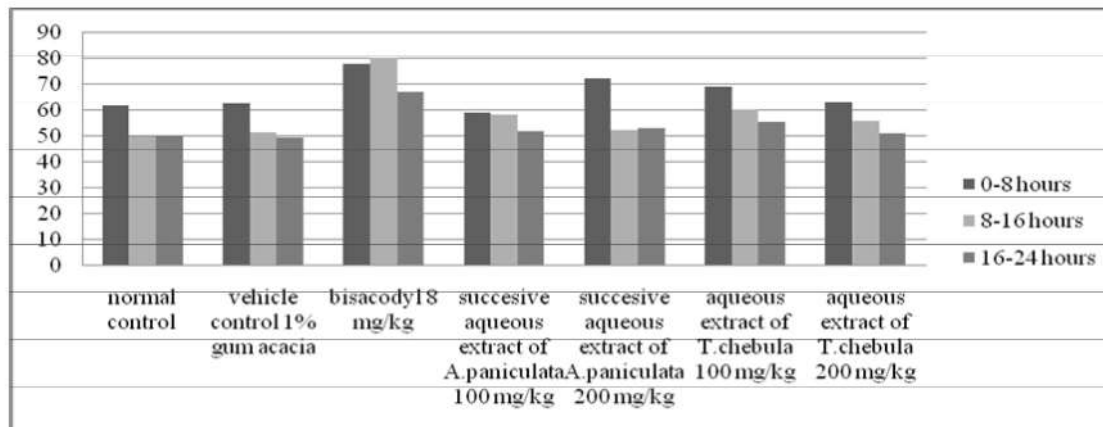
Treatment groups	0-8 hours	8-16 hours	16-24hours
Normal control	1.346 ± 0.268	1.912 ± 0.407	3.052 ± 0.441
Vehicle control 1% Gum acacia p.o.	1.891 ± 0.486	1.844 ± 0.310	2.925 ± 0.540
Bisacodyl 8.0 mg/kg; p.o.	6.11 ± 0.801 ^a	2.66 ± 0.523	3.95 ± 1.062
Successive aqueous extract of <i>A. paniculata</i> 100 mg/kg; p.o.	1.463 ± 0.168	2.428 ± 0.656	2.934 ± 0.689
Successive aqueous extract of <i>A. paniculata</i> 200 mg/kg; p.o.	1.932 ± 0.411	1.687 ± 0.404	3.412 ± 0.580
Aqueous extract of <i>T. chebula</i> 100 mg/kg; p.o.	1.785 ± 0.688	2.251 ± 0.779	3.744 ± 0.454
Aqueous extract of <i>T. chebula</i> 200 mg/kg; p.o.	2.093 ± 0.480	3.289 ± 0.889	2.912 ± 0.489

p < 0.05 Bisacodyl 8.0 mg/kg Vs Vehicle control

Table 2: Water Content

Treatment groups	0-8 hours	8-16 hours	16-24hours
Normal control	61.908 ± 4.681	49.68 ± 3.627	50.23 ± 3.558
Vehicle control 1% Gum acacia p.o.	62.87 ± 6.494	51.29 ± 1.771	49.52 ± 2.044
Bisacodyl 8.0 mg/kg; p.o.	77.902 ± 3.952	80.26 ± 4.77 ^a	67.15 ± 7.217
Successive aqueous extract of <i>A. paniculata</i> 100 mg/kg; p.o.	59.182 ± 5.442	58.207 ± 3.101	51.974 ± 3.997
Successive aqueous extract of <i>A. paniculata</i> 200 mg/kg; p.o.	72.239 ± 9.690	52.129 ± 2.591	52.955 ± 2.783
Aqueous extract of <i>T. chebula</i> 100 mg/kg; p.o.	68.979 ± 4.278	60.248 ± 5.254	55.499 ± 2.350
Aqueous extract of <i>T. chebula</i> 200 mg/kg; p.o.	63.112 ± 4.652	55.712 ± 3.389	50.899 ± 4.207

p < 0.05 Bisacodyl 8.0 mg/kg Vs Vehicle control

Figure 1: Graph for wet content of *A. paniculata* & *T. chebula* extractFigure 2: Graph for water content of *A. paniculata* & *T. chebula* extract

RESULT AND DISCUSSION

Main objective of this study was the Comparative laxative activity evaluation for *A. paniculata* & *T.chebula* in experimental animal model. Our experiment showed that both the extracts of *A.paniculata* and *T.chebula* ability to increase the laxative activity in constipation condition. The property of the herbal extract was determined by in vivo, its effect on faecal output in rats and the results were shown when compared with standard drug Bisacodyl. The herbal extracts and standard value were shown in figure 1 and 2, and table 1 and 2.

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