

# ***Cassia roxburghii* seeds – a substitute for official senna**

## **Arulkumaran KSG\*<sup>1</sup>, Somasundaram A<sup>1</sup>, Raja M<sup>2</sup>.**

<sup>1</sup>K.M.C.H. College of Pharmacy, Kalapatty Road, Kovai Estate, Coimbatore – 641048, Tamilnadu, India.

<sup>2</sup>Nehru College of Pharmacy, Pampady, Thrissur, Kerala, India.

### **Abstract**

Plants belonging to the genus *Cassia* (Caesalpiaceae), which comprises of 600 species and distributed in tropics and sub tropical regions. Some of the species of *Cassia* are used in folk medicine especially as cathartics and purgative e.g. *Cassia fistula*, *Cassia holosericea*, *Cassia italica*, *Cassia senna*, *Cassia sophera*. Besides the official senna as a purgative, other substitutes were also proposed. Thus to identify a potential substitute for senna we performed the screening of laxative activity of *Cassia roxburghii* seeds. Present results showed that the methanolic extract of seeds of *Cassia roxburghii* 250mg/kg of body weight was produced a similar response as that of Senna. The seed of *Cassia roxburghii* is rich in mucilage, which may be responsible for laxation. Since mucilage forms a protective layer on intestinal mucous, the mucous membrane protected. Thus it may be concluded that *Cassia roxburghii* seed is better alternative to senna which produces no irritant action on intestinal mucosa as that of senna.

**Key words:** Seed, methanolic extract, substitute, *Cassia roxburghii*.

### **1. Introduction**

Plants belonging to the genus *Cassia* (Caesalpiaceae), which comprises of 600 species and distributed in tropics and sub tropical regions. Some of the species of *Cassia* are used in folk flore medicine especially as cathartics and purgative e.g. *Cassia fistula*, *Cassia holosericea*, *Cassia italica*, *Cassia senna*, *Cassia sophera*. Due to different medicinal, especially laxative properties of various *Cassia* plants it was decided to prove the laxative activity of the seeds of *Cassia roxburghii* and to provide an alternative to senna in the treatment of constipation.

### **2. Experimental**

#### **2.1. Acute toxicity studies (up and down procedure) (OECD, 2000)**

Swiss albino mice of either sex weighing between 18-25gm were procured from KMCH College of Pharmacy animal house, Coimbatore. The animals are randomly selected, marked to permit

individual identification and kept in their cages for at least 5 days prior to dosing and to allow them for acclimatization to the laboratory conditions. The temperature in the experimental animal room was maintained at 25°C ( $\pm 1^\circ\text{C}$ ). Three animals were treated with 2000 mg/kg as single treatment per oral as per the limit test of OECD Guidelines 425 and the animals were observed continuously for first 4 hrs and finally overnight mortality was observed.

#### **2.2. Laxative activity**

In-vivo laxative activity of the extracts was determined using Wistar rats of both sexes. All the study was approved by Institutional Animal Ethical Committee. The animals were fasted for 12 h before the experiment, but provided with water *ad libitum*. They were divided into 4 groups of six animals each. The first group of animals, serving as control, received normal saline (25 ml /kg); the second group serving as reference, received calcium sennoside (2.16 mg/kg) while third and fourth groups received methanolic extract of seeds of *Cassia roxburghii* at doses of 250 and 500 mg/kg respectively. Immediately after administration of dose, the animals were isolated and housed separately in polypropylene

\*Corresponding author

Mobile: 09842008262

Fax: 04222628645

E-mail: yesmiarul@yahoo.com

cages suitable for collection of faeces. After 8 h of drug administration the faeces were collected on filter paper, which was weighed before and then difference in weight was the actual weight of faeces. Thereafter, food and water were given to all animals and faecal outputs were again weighed after a period of 16 h. Laxative activity was assessed by reference to the total amount of wet faeces produced and the results were compared to that of calcium sennoside.

### 2.3. Statistical Analysis

The data were expressed as mean  $\pm$ SEM (Standard error mean). The statistical significance between groups was analyzed using 't' test and P value of 0.05 or less was considered significant.

## 3. Results

The laxative activity of *Cassia roxburghii* seed is shown in Table 25. It is evident from the study that the methanolic extract of *Cassia roxburghii* exhibited significant laxative activity ( $p < 0.01$ ) at the dose of 250 mg/kg. The effect was comparable with reference standard (calcium sennoside). Further at the dose level of 500 mg/kg, the methanolic extract of *Cassia roxburghii* produced highly significant laxative activity ( $p < 0.001$ ).

## 4. Discussion

Literature survey revealed that no chemical or biological work on *Cassia roxburghii* has been reported so far. Due to different medicinal, especially laxative properties of various *Cassia* plants it was considered to carry out chemical (Mansoor, 1989) and biological investigations on *Cassia roxburghii*. Besides the official *Senna* as a purgative, other substitutes were also proposed. Anthraquinones derivatives responsible for laxative properties have been reported in the leaves of *Cassia podocarpa* (Duquenois and Anton 1968; Rai, 1982; Elujoba and Iweibo, 1988) confirmed that leaf extract of *Cassia podocarpa* contains anthraquinones glycosides e.g. sennoside A and B was also present in *Cassia roxburghii* (Mansoor, 1989). Other species

tested for their laxative properties were *Cassia angustifolia*, *Cassia fistula* and *Cassia holosericca* (Ahmad et al., 1989). These species have different quantities of sennosides content in leaves and legumes/pods (Yasmeen et al., 1986). Present results showed that the extract of seeds of *Cassia roxburghii* 250mg/kg of body weight was produced a similar response as that of *Senna*. The intestinal motility is stimulated because of irritant action of sennosides present in *Senna* thereby justifying action. The methanolic extract of *Cassia roxburghii* seed at 500 mg/kg body weight also produced highly significant laxative activity as that of *Senna*. The mechanism of action for this activity of *Cassia roxburghii* extract is not clear. However linseed being a known bulk forming drug due to its mucilage content might have induced peristalsis stretching reflexes. *Senna* known laxative, contain anthraquinone glycoside (A, B, C and D), which are gastric irritants (Karnick, 1994). Thus it may be concluded that methanolic extract *Cassia roxburghii* seed is better alternative. The possible mechanism of action of linseed may be by the retention of intraluminal fluid (Karnick, 1994), as the extract forms fine hydrophilic colloid. Linseed is mucilaginous drug containing 3- 10 j of mucilage (Simopoulos, 2002). The seed of *Cassia roxburghii* was also rich in mucilage, which may be responsible for laxation. Since mucilage forms a protective layer on intestinal mucous, the mucous membrane protected.

## 5. Conclusion

The methanolic extract of *Cassia roxburghii* seed produced highly significant laxative activity as that of *Senna*. The mechanism of action for this activity of *Cassia roxburghii* extract is not clear. The seed of *Cassia roxburghii* is rich in mucilage and the extract forms fine hydrophilic colloid which may be responsible for laxation. Since mucilage forms a protective layer on intestinal mucous, the mucous membrane protected. *Senna* known laxative, contain anthraquinone glycoside (A, B, C and D), which are gastric irritants. Thus it may be concluded that methanolic extract *Cassia roxburghii*

seed is better alternative. It may be concluded that the laxative property of the *Cassia roxburghii* could be due to the presence of anthraquinone glycoside and mucilage. Further, extensive pharmacokinetic and

toxicological studies need to be done to explore the possibility of using *Cassia roxburghii* for its laxative activity.

**Table No – 1:** Effect of methanolic extract of *Cassia roxburghii* (MECR) in normal rats

Groups	Treatment	Dose (mg/kg, p.o)	Weight of faecal matter (gm)	
			(8h)	(16h)
1	Normal saline	25 ml /kg	0.5816±0.0045	2.6807±0.4324
2	Calcium sennoside	2.16	0.6218±0.2845	5.024±0.4812
3	MECR	250	0.6187±0.0070*	4.786±0.3648*
4	MECR	500	1.5634±0.3840**	7.327±0.7081*

The values are expressed as Mean ± S.E.M of six animals (n=6) \* P<0.01; \*\* P<0.001

### References

Ahmed S, Qureshi S, Cathartic activity of *Cassia* species. *Pakistan Journal of Pharmaceutical Sciences*, 2(2), 1989, 37-46.

Bruce RD, An Up- and- Down Procedure for Acute Toxicity Testing. *Fundamental and Applied Toxicology*, 5, 1985, 151-157.

Capasso F, Mascolo N, Autore G, Romano V, Laxatives and the production of autocooids by rat colon. *Journal of Pharmacy and Pharmacology*, 13, 1986, 627-629.

Duquenois P, Anton P, Search for derivatives of anthracene in 2 African *Cassia*. *Annales Pharmaceutiques Francaises*, 26, 1968, 607.

Elujoba AA, Iweibo GO, *Cassia podocarpa* as substitute for official senna. *Planta Medica*, 54, 1988, 372.

Fairbairn JW, Moss MJR, The relative purgative activities of 1, 8-dihydroxyanthracene derivatives. *Journal of Pharmacy and Pharmacology*, 22, 1970, 584.

Karnick CR, Clinical references of Ageless- The herbal anti aging site with great herbal product. In

Pharmacopoeial Standards of Herbal Plants, Vol. I, Sri Satguru Publications, Delhi, 1994, 228-229.

Karnick CR, Clinical references of Ageless- The herbal anti aging site with great herbal product. In Pharmacopoeial Standards of Herbal Plants, Vol. II, Sri Satguru Publications, Delhi, 1994, 55.

Mansoor A, Phytochemical and Cathartic evaluation of *Cassia roxburghii*. M. Pharm. Thesis, Department of Pharmacognosy, University of Karachi, Karachi, 1989.

OECD Guidelines for the testing of chemicals, revised draft guidelines 423, Acute oral toxicity - Acute toxic class method, Revised Document, October 2000.

Rai PP, Shock M, Anthraquinone formation in callus cultures of *Cassia podocarpa*. *Chromatographia*, 15, 1982, 249.

Simopoulos AP, Omega-3 fatty acids in inflammation and autoimmune disease. *Journal of American Coll Nutrition*, 21, 2002, 495-505.

Yasmeen A, Kapadia Z, Badar Y, A comparative study of sennoside content of *Cassia* species. *Pak. J. Sci. Ind. Res.*, 29, 1986, 348.