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LAXATIVE ACTIVITY OF FRUIT PULP EXTRACT OF *MUSA BALBISIANA, VITIS VINIFERA, BETA VULGARIS, MALUS DOMESTICA, CITRUS SINENSIS* AND *ZIZIPHUS JUJUBA*

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ABSTRACT

The laxative activity of fruits (*Musa balbisiana, Vitis vinifera, Beta vulgaris, Malus domestica, Citrus sinensis and Ziziphus jujuba*) was studied in rats. The results showed that an oral administration of the fruit pulp extract produced significant and crude fiber dependant increase in faeces output of rats.

Keywords: *Musa balbisiana, Vitis vinifera, Beta vulgaris, Malus domestica, Citrus sinensis and Ziziphus jujube*, fruit pulp extract

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INTRODUCTION

In recent years crude fiber has become of considerable interest in human nutrition because of some demonstrated and some hypothesized beneficial attributes. However, these relate primarily to the nutrition of adults or, at least, school-age children. In contrast to the situation for adults, fiber in relation to infants and pre-school children raises important nutritional issues, primarily in relation to its potential disadvantages, rather than advantages. Over the last decade, significant developments have been made in our understanding of crude fiber and its role in the promotion of health and disease risk reduction. A wealth of scientific evidence demonstrates that adequate dietary fiber intake has a number of health benefits, including maintenance of healthy laxation and the reduced risk of cardiovascular disease and cancer. The 2005 *Dietary Guidelines for Americans* recommendation to "choose fiber-rich fruits, vegetables, and whole grains often" is based on this evidence. Other potential health benefits being investigated include fiber's role in maintaining a healthy weight, gastrointestinal health, and in treating or preventing constipation, haemorrhoids, coronary heart diseases, and some type of cancer, and glucose modulation. In 2002, the Institute of Medicine (IOM) established an Adequate Intake (AI) level for fiber as part of the Dietary Reference Intake (DRIs) for macronutrients. The IOM recommends that people of all ages consume 14 grams of fiber for each 1,000 calories. Fiber plays an important role in normal

laxation, which is related primarily to fiber's effect on stool weight. An increase in stool weight is caused by the presence of fiber, the water that the fiber holds, and by partial fermentation of the fiber, which increases the amount of bacteria in the stool.A larger and softer mass produced by consuming fiber-containing foods causes the large intestine to contract and move the contents towards excretion more rapidly. This reduction in transit time through the intestinal tract promotes bowel regularity and plays a role in preventing constipation and diseases of the large intestine. Different types of fiber have varying effects on stool weight. Cereal fibers, such as bran, are most effective in increasing stool weight and decreasing transit time, since these fibers are partially fermented in the large intestine. Diets low in fiber should not be assumed to be the cause of constipation, but may be considered a contributing factor. Increasing fiber intake may aid in relieving mild to moderate constipation, yet a higher fiber diet may not improve or may worsen bowel patterns in some individuals with chronic constipation or irritable bowel syndrome (IBS). Still, fiber may improve stool consistency in some individuals with IBS with constipation, but it has not been found to improve the abdominal pain, distension, or bloating associated with IBS. Some types of "prebiotics" (readily fermentable fibers, such as lactulose, that promote beneficial bacteria) have been found effective in improving stool frequency and consistency in individuals with mild-to-moderate constipation. More research is needed to determine the effects of prebiotic fibers on chronic constipation and IBS. Animal studies of the effects of prebiotic fiber on chronic inflammatory bowel diseases (IBD), including Crohn's disease and ulcerative colitis, show promising results. Prebiotics stimulate the growth and metabolism of protective bacteria, helping to restore a normal balance of intestinal bacteria, which appears to be associated with reduced disease activity in individuals with IBD. More research will help identify the specific types of prebiotics that may be effective in the dietary management of different types of IBD. A diet adequate in fiber is believed to reduce the risk of diverticular disease, which is prevalent in older adults. With the bulking action of some types of fiber, less forceful contractions are needed to propel the contents of the colon, thus reducing the likelihood of developing diverticula, or pockets that form in the mucosal layer of the colon. Inflammation of the diverticula results in acute divericulitis. A high-fiber diet is accepted as traditional treatment for diverticular disease to prevent the formation of additional diverticula, lower the pressure in the colon, and reduce the possibility of an existing diverticula becoming inflamed. More recent research is revealing that bacterial overgrowth or imbalance may be involved in the development of diverticular disease. Thus, the possibility of increased relevance of the use of prebiotics (and probiotics, the direct addition of beneficial bacteria to food) in the dietary management of this disease requires exploration (1-7).

Aim of the study is to compare the laxative activity induced in rats by following fruits like Ricinus communis, Musa balbisiana, Vitis vinifera, Beta vulgaris, Malus domestica, Citrus sinensis and Ziziphus jujuba based on the amount of crude fiber present in them respectively.

MATERIALS AND METHODS

Animals

Albinos Wistar rats weighing 150-200g were housed and breeded in the animal house. The animals were kept in standard cages with good ventilation, free access to feeds and water. Experimental procedures and protocols used in this study were approved by ethical committee. These guidelines were in accordance with the internationally accepted principles for laboratory use and care.

Experimental Procedure for Laxative Activity Estimation

Sample preparation

The extract of Musa balbisiana, Vitis vinifera, Beta vulgaris, Malus domestica, Citrus sinensis and Ziziphus jujuba fruits pulp of was prepared homogenizing the pulp and dried under shade and thus mass obtained was powdered, weighed and subjected to the evaluation for its laxative potential. The yield of dark pasty like mass was diluted by adding 10ml of saline to give a fluid like consistency for better oral administration through needle (8)

Laxative activity

The method of Capasso *et al* (9) was followed for this activity. Rats are fasted for 12hrs before he

experiment were placed individually in cages lined with clean filter paper.

Rats were divided in six groups and the dose was given orally.

1st group: Acting as the control and administered normal saline (1 mL/rat/hour).

2nd group: Acting as the standard and administered castor oil (1 mL/rat/hour).

3rd group: Received *Musa balbisiana* solution (1 mL/rat/hour).

4th group: Received *Vitis vinifera* solution (1 mL/rat/hour).

5th group: Received *Beta vulgaris* solution (1 mL/rat/hour).

6th group: Received *Malus domestica* solution (1 mL/rat/hour).

7th group: Received *Citrus sinensis* solution (1 mL/rat/hour).

8th group: Received *Ziziphus jujuba* solution (1 mL/rat/hour).

The same amount of dose solutions was given to each groups for 5 hours respectively. The faeces produced in all six groups was monitored for 16 hours.

Laxative actitvity induced = $\frac{\text{Control X - Test/Standard X}}{\text{Control X}} \times 100$

Where X= Wt. of faeces output from each group

Data obtained are presented as means ± standard error of mean (S.E.M.) for the number of animals in each group (n = 6).

RESULTS AND DISCUSSION

The laxative activity of fruits (*Musa balbisiana, Vitis vinifera, Beta vulgaris, Malus domestica, Citrus sinensis and Ziziphus jujuba*) was studied in rats. The results showed that an oral administration of the fruit pulp extract produced significant and crude fiber dependant increase in faeces output of rats (Table-1, 2).

Table-1 Data showing the weight of faeces output from each group and each rat

Group no	Treatment	Wt. of faeces output from each group(X in gms)
1.	Saline (control)	2.8
2.	Castor oil (std)	18.4
3.	*Musa balbisiana*	11.06
4.	*Vitis vinifera*	4.21
5.	*Beta vulgaris*	3.18
6.	*Malus domestica*	9.34
7.	*Citrus sinensis*	2.41
8.	*Ziziphus jujube*	3.61

Table-2 Data showing the amount of laxative activity induced on each rat based on the fruit extract given orally

Group no	Treatment	Laxative activity induced on each group (in %)
1.	Castor oil (std)	3.67
2.	*Musa balbisiana*	2.90
3.	*Vitis vinifera*	0.48
4.	*Beta vulgaris*	0.12
5.	*Malus domestica*	2.30
6.	*Citrus sinensis*	0.14
7.	*Ziziphus jujuba*	0.27

Fibrous foods, especially cellulose and other insoluble fibers, are important in preventing constipation. Since fibrous substances are poorly digested and remain in the lumen of the gastrointestinal tract, they form viscous, gel-like

substances, hold minerals loosely, and tend to bind chemical compounds. These properties result in significant interactions with nutrients that affect metabolism. However, not all types of bran or fiber affect gastrointestinal motility or transit time in the same way, and their effectiveness may be altered by pathological disorders. Low intake of fiber is of concern in the diets of Americans and is one reason fiber content is included on food labels. To encourage an increase in dietary fiber intake, "high fiber" on a food label indicates 5 g or more. Dietary fiber can affect the balance of nutrient intake by reducing the energy density of the diet and promoting postprandial satiety distension of the stomach and proximal intestine. Patients should be cautioned against suddenly increasing their fiber intake from 10 g per day to the recommended 20 to 35 g because excess fiber may cause abdominal distress, bloating, flatulence, cramping, and diarrhea. To avoid these symptoms, gradual increases in fiber are recommended. These side effects are more common with the ingestion of a fiber-rich diet (20–35 g per day) from a variety of food sources rather than from dietary fiber supplements. Fiber intake from food sources increases the likelihood of improved intake of minerals, other nutrients, and other constituents of the diet that have a protective effect on health.

CONCLUSION

From the above values of crude fiber percentage in different natural plant materials it is found that different plant material contains varying amounts of crude fiber. So according to IOM people of different ages and sex should intake prescribed amount of crude fiber daily for the respective food stuff consumed. The laxative activity of fruits (*Musa balbisiana, Vitis vinifera, Beta vulgaris, Malus domestica, Citrus sinensis and Ziziphus jujuba*) was studied in rats. The results showed that an oral administration of the fruit pulp extract produced significant and crude fiber dependant increase in faeces output of rats. A wealth of scientific evidence demonstrates that adequate crude fiber intake has a number of health benefits, including maintenance of healthy laxation and the reduced risk of cardiovascular disease and cancer etc.

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