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EFFECT OF THREE LEVELS OF A SOY POLYSACCHARIDE FIBER IN A COMPLETE LIQUID DIET ON APPARENT FIBER DIGESTIBILITY AND PLASMA LIPIDS. E. Kennedy\*, F. W. Thyse, P. E. Boven\* and L. J. Taper. Virginia Poly. Inst. & State Univ., Blacksburg, VA 24061

Twenty-two adult male subjects were randomly assigned to 4 complete liquid diets at three different fiber levels and one without fiber which served as a control. All subjects were rotated through four, eleven day controlled feeding periods. Complete fecal samples were collected and composited from the last five days of each 11 day period for fiber analysis. Fasting blood samples were taken on the morning prior to starting each new dietary period for Total Cholesterol (TC), Triglycerides (TG) and HDL-Cholesterol (HDL-C) analyses. Increased mean fiber intake led to an increase in mean fecal fiber from 2.4% to 9.5%. Mean apparent digestibility of fecal fiber significantly decreased from 92% to 70% from the control to the intermediate fiber level. Plasma lipid levels on the four treatments are shown in the following table:

	Control	Low	Intermediate	High
TC(mg/dl)	131	123	136	132
TG(mg/dl)	72	64	69	72
HDL-C(mg/dl)	33	35	36	32
LDL-C*(mg/dl)	84	85	86	87

\*LDL-C = TC - (TG/5 + HDL-C)

Increased dietary fiber increased fecal fiber with no marked differences in plasma lipids between treatments. (Supported by a grant from Ross Laboratories.)

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MODIFICATION OF HUMAN FECAL STEROID EXCRETION BY A DIETARY FIBER SUPPLEMENT. Jon A. Story, Marilyn S. Petro\*, Gene A. Spiller, Les G. Wong\*, James H. Whittam\* and James Scallan. Dept. Foods & Nutrition, Purdue, Univ., W. Lafayette, IN 47907 and Shalke Research Center, Hayward, CA 94545.

Seven male and female adult subjects were fed a low fiber diet for 19 days and then given a fiber supplement for 10 days. The fiber supplement contained 10.1% water insoluble fiber, composed of 3.7% cellulose, 5.1% hemicellulose and 1.3% lignin supplied mainly by soy and corn bran, rolled oats, peanut butter, carrot flakes and prune powder. Feces were collected daily on days 10-14 and days 24-28, pooled and neutral and acidic steroids measured by gas-liquid chromatography. Fecal mass was significantly increased by the fiber supplement from 97 g/day to 136 g/day wet weight. Fecal bile acid concentration was significantly reduced by the dietary fiber supplement, being reduced from 0.96±0.07 to 0.63±0.06 mg/g wet weight. Daily excretion was only slightly increased in the experimental group, being 96.6±3.5 vs. 93.2±3.1 mg/day for the pretreatment period. Fecal neutral steroid concentration was also significantly reduced by the dietary fiber supplement, decreasing from 3.92±0.14 to 2.69±0.12 mg/g wet feces. Total neutral steroid excretion was unchanged 383.6±6.7 and 376.4±5.2 mg/day. Thus total steroid concentration was reduced by 32% by addition of this dietary fiber supplement while total steroid excretion was unchanged.

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INFLUENCE OF DIETARY PECTIN ON THE ACTIVITY OF INTESTINAL BRUSH BORDER MEMBRANE-ASSOCIATED HYDROLYSING ENZYMES IN THE RAT. M. H. Baig, C. M. Burgin\* and James J. Cerda. Univ. of Fla. College of Medicine, Gainesville, Fla. 32610

It has been shown that feeding of dietary fiber causes alterations in the morphology of the intestine. Therefore, we investigated the influence of chronic intake of dietary pectin on the activity of a number of brush border membrane (BBM) associated enzymes found throughout the length of the small intestine in rats fed control diet and diet supplemented with 5% dietary pectin. No remarkable differences were observed between control and pectin fed rats in the level of activities of lactase and leucine naphthyl amide hydrolase (LNAase). Levels of sucrase in the proximal and distal portions, maltase in the distal portion and alkaline phosphatase (Alk-P) in the middle and distal portion of intestine of the control and pectin-fed rats were not remarkably different. However, in the mid-portion, levels of sucrase were found to be lower in pectin-fed rats when compared with controls (p<0.022). Maltase was higher in the proximal portion and lower in the middle portion of intestine of rats fed pectin when compared with controls. Alk-P levels were elevated in proximal portion of the intestine in pectin-fed rats when compared with control (p<0.05). These results suggest that pectin causes an alteration in the levels of various BBM associated enzymes. This preliminary data may also suggest a role by which dietary pectin modulates post-prandial hypoglycemia. (Supported by Florida Citrus Commission).

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EFFECT OF DIETARY FIBER ON PLASMA LIPIDS OF YOUNG AND ADULT RATS. M. Jacob (SPON: G.A. Emerson). Dept. of Home Economics, California State University, Long Beach, CA 90840

Previous studies have shown that plasma cholesterol (CHOL) is decreased by pectin and guar gum in rats. The present investigation was conducted to determine if locust bean gum (LBG) altered plasma lipids in weanling and adult rats. Sixteen, weanling and 14 adult, male hooded rats were used. Within each age category the animals were divided into 2 equal groups and fed either the control or the test diet. The test diet was made by substituting 10% LBG for an equivalent amount of dextrose in the control diet. Body weight and food intakes were recorded daily. After 6 weeks the young rats were killed and plasma was collected for (CHOL) and triglyceride (TG) analyses. Adult animals were killed after 5 weeks. Body weights, food intakes and food efficiency ratios (FER) showed no significant differences between the control and LBG-fed young rats. Adult animals on LBG ate more after the first 2 weeks. However, they maintained a lower mean body weight and showed a lower FER than the control rats. These differences were not significant. Plasma (CHOL) was significantly (P<.001) decreased in the young rats fed LBG. No such effect was noted in the adult rats. Plasma TG showed wide intra-individual variations between the 2 dietary treatments in the 2 age groups. The plasma (CHOL)-lowering effect observed in the LBG-fed young rats maybe related to the increased rate of cholesterol metabolism occurring in the growing animals. In contrast, the adult animals adapted to the LBG during the initial 2 weeks and showed no change in plasma (CHOL).

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BILE ACID BINDING TO DIETARY FIBERS IN VIVO. Dan Gallahe\* and Barbara Schneeman. Univ. of California, Davis, CA 95616.

It has been proposed that the hypocholesterolemic effect of certain dietary fibers is due to binding of bile acids by the fibers, causing increased excretion and greater conversion of cholesterol to bile acids. *In vitro* binding studies support this hypothesis. We sought to investigate this phenomenon in a more physiological manner. Rats were given a meal containing either no fiber (NF), cholestyramine (CB), a bile acid sequestrant, or one of the following fibers: cellulose (CE), guar gum (GG), lignin (LG), wheat bran (WB), or oat bran (OB). Two h later the animals were killed and the intestinal contents (IC) collected. An aliquot of the IC was centrifuged for 3 h at 100,000 g and the upper phase (UP) collected. As CE, LG, the insoluble fractions of OB and WB and cholestyramine pellet with centrifugation, the ratio of UP to IC bile acids indicates the proportion of bound bile acids. CB had a much lower ratio than NF, indicating substantial binding. LG, which binds bile acids strongly *in vitro*, also had a low UP/IC ratio. CE, WB, and OB, fibers which bind weakly *in vitro*, had ratios similar to NF. GG had a ratio higher than NF. GG does not pellet with centrifugation, but remains in the UP. The higher ratio here indicates binding or entrapment of bile acids in the UP. These results indicate that under physiologic conditions bile acids can be bound by certain fibers and support the hypothesis that bile acid binding *in vivo* can account for the hypocholesterolemic effect of some dietary fibers. (Supported by NIH grant AM 20446).

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EFFECTS OF DIETARY FIBER ON COLON PERMEABILITY IN RATS: Shi-Yen Shiao\* and George W. Chang\* (Spon: K.J. Carpenter). University of California, Berkeley, CA 94720.

Intestinal permeability was determined indirectly by orally administering a poorly absorbed dye, phenol red, to rats and measuring its recovery in feces and in urine. Increased intestinal permeability was recognized by decreased dye recovery in feces and increased recovery in urine. Guar gum, pectin, carrageenan type I (80% α, 20% λ), carrageenan type II (ι), and cellulose were each fed at levels of 5% and 15% (w/w) of the diet for 28 days to male, Fischer 344 rats. There were a total of 11 groups with 3 rats per group. A semisynthetic diet containing 20% casein, 5% corn oil, 70% cereals, 4% mineral mixture, and 1% vitamin mixture was used as basal diet. The average initial weight of rats was 230 grams. The following results were obtained: (A) Total recovery of phenol red was high with poorly fermentable dietary fiber (cellulose and α, λ - carrageenan) and low with fiber-free diet and easily fermented fiber (pectin and guar gum). The low recovery is consistent with destruction of dye by gut microflora. (B) Ratios of urinary to total dye recovery were higher in the fiber-free diet group than in most fiber diet groups, suggesting that the dietary fiber reduced gut permeability. (C) There seems to be an adaptation to three diets: 15% guar gum, pectin, and λ - carrageenan. These gave high apparent permeabilities initially and much lower values 14 days later. (Supported in part by NIH grant # 5 T32 AM 07291-04 SRC and NSP # FFR 79-19105).

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