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SUBJECTIVE EVALUATION OF SATIETY AFTER FIBER CONSUMPTION. V. Wookley, C. Jensen and M. Moshrefi (SPON: G. Spiller). Shalee Research Center, Hayward, CA 94545.

Dietary fiber (DF) has been suggested for use in weight-loss regimens due to possible appetite satiating properties. 10 healthy adults participated in a crossover comparison of satiety, using a hunger/satiety scale (HSS) based on subjective responses at baseline, 1,30,60,120,180 and 240 minutes, following consumption of a formula diet (FD) alone (210 Kcal) versus low-fiber crackers (LF) with the FD and 2 different high-fiber crackers (HF1 and HF2) with the FD. LF (rice flour), HF1 and HF2 provided 50 Kcal. HF1 provided 8.7 g DF (2.3 g soluble, 6.4 g insoluble) from corn bran, barley bran, psyllium husk and acacia gum. HF2 provided 8.7 g DF (3.7 g soluble, 5.0 g insoluble) from corn bran, barley bran, guar gum and acacia gum. Possible HSS responses ranged from -10 (painfully hungry) to +10 (full to nausea). HF1+FD tended to yield the greatest satiety, followed by HF2+FD, LF+FD and FD alone. The mean HF1+FD score at 3 hr showed a slight significant difference (p<0.10) over other treatments.

TREATMENT	BASELINE	180 MINUTES	DIFFERENCE
HF1+FD	-5.38	-0.13	5.25
HF2+FD	-3.75	-0.25	3.50
LF+FD	-3.50	-2.13	1.37
FD alone	-3.75	-4.25	-0.50

These data add to the literature suggesting that DF (perhaps water insoluble DF more than water soluble DF) may have satiating properties.

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EFFECTS OF DIETARY FIBER ON FEED INTAKE, PASSAGE RATE, HYDROGEN PRODUCTION, AND DIGESTIVE TRACT MEASUREMENTS IN LAYING HENS. C. Hanson, E. Winterfeldt and R. Teeter (SPON: E.C. Nelson). Oklahoma State Univ., Stillwater, OK 74078.

Corn bran (CB), wheat bran (WB), oat bran (OB), or citrus flour (CF) displaced cornstarch at 10, 20, or 40% of a semipurified diet fed to 65 two-year-old laying hens. As the level of fiber in the diet increased, intake of feed, amount of digesta in both the small intestine and cecum, and hydrogen gas concentration increased while digestibility declined. Cecal expansion was greater (P<.05) with OB than with other fiber sources, although feed intake was greater with WB. Hydrogen production was measured by placing chickens in a 19 liter collection chamber for 45 minutes. Hydrogen, as PPM per 100 g feed consumed, was greater (P<.05) with OB and CF (57 and 64 PPM) than with CB and WB (10 and 13 PPM). Digestibility with added CB was lower than with other added fibers, 51% vs. 64%, 65%, and 71% for CB, CF, WB and OB, respectively. Percent dry matter of feces increased then decreased from basal with level of fiber, with CB producing drier excreta overall (P<.05) than other fiber sources (43% vs. 35%, 33% and 31% for CB, WB, OB, and CF, respectively). Passage time was increased from basal with lower levels of added fiber but decreased with higher levels of fiber. Results indicate that not only do effects of fiber vary with fiber source but also the direction of the effects within a fiber source may vary with level fed.

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THE BULKING EFFECT OF DIETARY FIBER IN THE RAT LARGE INTESTINE: AN IN VIVO STUDY OF CELLULOSE, GUAR, PECTIN, WHEAT BRAN AND OAT BRAN. J. M. Gazzaniga and J. R. Lupton (SPON: F. Byers). Dept. Animal Science/Nutrition, Texas A&M University, College Station, TX 77843.

Dietary fiber is thought to protect against colon cancer by diluting out carcinogens in a bulky stool, yet the in vivo bulking ability of fiber has not been previously examined. This study tested the in vivo bulking ability of dietary fiber by providing ninety male Sprague-Dawley rats with a fiber-free control diet, or that diet diluted by 8X dietary fiber from pectin, guar, cellulose, wheat bran or oat bran. Chromic oxide, a non-absorbable marker, was incorporated into all diets at 0.4% by weight. In vivo samples of colonic contents were analyzed for chromium concentration, using atomic absorption spectrophotometry, and in vivo pH readings provided an index of a fiber's fermentability. Twenty-four-hour fecal collections determined which fibers contributed most to fecal weight. The less fermentable fibers (cellulose and wheat bran) produced the heaviest 24-hour fecal collections (P<0.05) and the best in vivo dilution of the chromic oxide (P<0.01). The more fermentable fibers (pectin, guar, and oat bran) did not increase 24-hour fecal weight, but did provide a moderate in vivo dilution effect when compared to controls (P<0.05). This study shows, for the first time, the in vivo bulking ability of selected dietary fibers, and suggests that 24-hour fecal weight is not a good predictor of the bulking ability of fermentable fibers.

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MODELS DESCRIBING DOSE REQUIRED TO SUSTAIN PREDETERMINED CONCENTRATION OF FEED IN MULTICOMPARTMENT FERMENTATION SYSTEM FOR FIBER DIGESTION. J. G. FADEL, D. S. ROBSON, AND J. L. JERACI (SPON: G. H. NEWMAN) Montana State University, Bozeman, MT 59717 and Cornell University, Ithaca, NY 14853

Chemostats are usually designed for soluble substrates such as glucose. However, providing a chemostat with a continuous insoluble feed, such as timothy hay, becomes mechanically difficult. A cascade system of compartments has been developed where the compartments are set up in series and only the first compartment is dosed regularly. The dose is transferred through a series of homogenous compartments by overflow to the last compartment where fiber fermentation occurs. Mathematical models were developed to determine the amount of a periodic pulse dose to be added to the first compartment to achieve a fixed concentration of feed in the last compartment for a given time. Errors from model prediction when compared to experimental data ranged from 1.0% to 12.0% in the first experiment and from 0.3% to 0.8% in the second experiment. Minimizing fluctuations of concentration across time by altering the turnover time of the compartments and/or the frequency of dosing can be examined with these models.

NUTRITIONAL INTERRELATIONSHIPS IN PARENTERAL AND ENTERAL FEEDING I (2579-2580)

2579

GLYCEROL AS AN INTRAVENOUS ENERGY SOURCE IN RATS RECEIVING TOTAL PARENTERAL NUTRITION. R. R. Ramakrishnan, R. C. Tao and N. N. Yoshimura. Research and Development, Kendall McGav Laboratories, Irvine, CA 92714.

Glycerol is a sugar alcohol used in pharmaceutical preparations as an osmotic agent. It can undergo phosphorylation and enter carbohydrate metabolic pathways. In an attempt to determine the maximum utilization of glycerol as an energy source, a total parenteral nutrition (TPN) study was conducted in growing male Wistar rats (~200 g). All animals were cannulated at the jugular vein and fed intravenously at 265 kcal/kg non-protein calories and 900 mg/kg nitrogen (FreeAmine III) for 6 days. Group A received all non-protein calories from dextrose. Groups B, C, D and E received an isocaloric TPN regimen providing glycerol at 8, 16, 24 and 32 g/kg, respectively. Each group had 6 animals. All animals gained weight and were in positive nitrogen balance. In comparison to A group, nitrogen balance and weight gain in groups B and C were comparable, slight but insignificant decrease in D group; significantly lower (p<0.05) in E group. There were significant increases in serum concentration and excretion of glycerol in D and E compared to A, B and C animals (p<0.05). Blood chemistry results and gross tissue examination did not indicate any untoward effects associated with glycerol infusion. It was concluded that glycerol is a metabolizable energy substrate comparable to dextrose for TPN at a dose limit of 16 g/kg in the rat.

2580

Liver regeneration in response to the quantity and type of non-protein intake S. Awad, R.H. Birkhahn, and N.R. Thomford, Department of Surgery, Medical College of Ohio, Toledo, Ohio 43699.

The restoration of liver tissue after hepatic resection is most likely responsive to dietary intake. This study compared regeneration of rat liver during I.V. infusion of a protein-free diet containing vitamins, trace elements, electrolytes and non-protein energy from glucose (G), monoacetacetin (MA) or a combination of them. 35 rats received 68% of partial hepatectomy and were divided into 7 groups receiving 45 ml/day of (A) G, (B) 10% G, (C) 5% MA, (D) 10% MA, (E) 18% G+7% MA (F) 18% MA+7 G or (H) 9% NaCl. At 48 hrs all rats were killed. 2 hrs before ³H-Thymidine was given I.P. for estimate of DNA synthesis from labeled cells. The liver was weighed and measured for protein and fat content. The results are:

	A	B	C	D	E	F	G
Regeneration Rate	51	63	67	62	68	57	57
% of BW lost	17	19	21	98	84	12	16
% of labeled cells	73	76	52	71	79	73	76
mg prot./gr. liver	175	156	189	178	166	166	182
mg lipid/gr. liver	72	60	61	57	55	49	78
Negative N balance (mgN)	156	172	162	225	226	221	228

These results show that increasing amounts of dietary energy reduce liver fat accumulation and accelerate DNA synthesis. Also glucose and ketone bodies have similar effectiveness.

THEME PREVIEWS
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