

Safety & Toxicology Research

Glucopolysaccharide	
Citation	Abstract
<p>K. Babiček a, I. Cechová, R.R. Simon, M. Harwood, D.J. Cox</p> <p>Toxicological assessment of a particulate yeast (1,3)-β-D-glucan in rats</p> <p>Food Chem. Toxicol. (2007), doi:10.1016/j.fct.2007.03.013</p>	<p>This study investigates the toxicity of WGP® 3–6, a yeast-derived β-glucan ingredient, during single-dose acute and sub-chronic toxicity studies in rats. For the acute study, Fisher-344 rats were administered WGP 3–6 via gavage at a dose of 2000 mg/kg body weight, and any evidence of toxicity was monitored over a 14-day period. WGP 3–6 was well tolerated, indicating that the LD50 value is greater than 2000 mg/kg body weight. For the sub-chronic study, Fisher-344 rats (10/sex/group) were randomly allocated to receive daily gavage treatment with WGP 3–6 at doses of 0, 2, 33.3, or 100 mg/kg body weight. Control and high-dose satellite recovery groups of each sex also were included. Full toxicological monitoring and endpoint investigations were performed throughout and upon completion of the study. No negative effects on animal weights or food consumption attributable to WGP 3–6 were evident at any dose. In addition, no mortality, clinical pathology, functional/behavioral, microscopic, or gross observations indicating toxicity were observed. Sporadic changes in some biochemical and hematological parameters were observed; however, since the effects were within the physiological ranges in historical controls, were not dose-responsive, or were not observed in both sexes, they were determined to be of no toxicological significance. In conclusion, no adverse or toxic effects were observed after subchronic oral administration of 2, 33.3, or 100 mg/kg body weight/day of WGP 3–6 in Fisher-344 rats, and therefore, a no observed adverse effect level (NOAEL) of 100 mg/kg body weight/day, the highest dose tested, was determined.</p>
<p>Nicolosi R, Bell SJ, Bistrrian BR, Greenberg I, Forse RA, Blackburn GL.</p> <p>Plasma lipid changes after supplementation with beta-glucan fiber from yeast.</p> <p>Am J Clin Nutr. 1999 Aug;70(2):208-12.</p> <p>PMID: 10426696 [PubMed - indexed for MEDLINE]</p>	<p>BACKGROUND: Dietary fiber has been shown to improve blood lipids.</p> <p>OBJECTIVE: The purpose of this study was to evaluate the effect on serum lipids of a yeast-derived beta-glucan fiber in 15 free-living, obese, hypercholesterolemic men.</p> <p>DESIGN: After a 3-wk period in which subjects ate their usual diet, 15 g fiber/d was added to the diet for 8 wk and then stopped for 4 wk. Plasma lipids were measured weekly during baseline and at week 7 and 8 of fiber consumption, and again at week 12.</p> <p>RESULTS: Compared with baseline, fiber consumption significantly reduced plasma total cholesterol (by 8% at week 7 and 6% at week 8; P < 0.05 using Bonferroni correction); week 12 values did not differ from baseline. No significant differences were noted between baseline LDL cholesterol and values at weeks 7, 8, or 12 when comparing individual groups by using Bonferroni correction, even though the overall one-way analysis of variance with repeated measures was highly significant (P < 0.001). LDL-cholesterol concentrations did decline by 8% at week 8 compared with baseline. There was a significant effect of diet on plasma HDL-cholesterol concentrations (P < 0.005 by one-way ANOVA with repeated measures). However, a group difference was observed only between baseline and week 12 (16% increase; P < 0.05 by Bonferroni correction). Triacylglycerol concentrations did not change.</p> <p>CONCLUSIONS: The yeast-derived beta-glucan fiber significantly lowered total cholesterol concentrations and was well tolerated; HDL-cholesterol concentrations rose, but only 4 wk after the fiber was stopped.</p>

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<p>Ikeda Y, Sunakawa T, Okamoto K, Hirayama A.</p> <p>Toxicological studies on sophorolipid derivatives. (II). Subacute toxicity study of polyoxypropylene (12) [2'-O-beta-D-glucopyranosyl-beta-D-glucopyranosyl) oxy-] fatty acid ester-</p> <p>J Toxicol Sci. 1986 Aug;11(3):213-24. Japanese.</p> <p>PMID: 3795299 [PubMed - indexed for MEDLINE]</p>	<p>Five groups of 12 male and 12 female rats each were fed diets containing 0, 0.06, 0.25, 1.00 and 4.00% PSL for a period of one month. Food consumption of PSL-fed groups did not differ from that of control. Urinalysis and autopsy findings were within normal in every group of rats treated. With 4.00% in the diet, body weight gain was significantly retarded and water consumption was increased, and soft stool occurred. In the hematological examination, decrease of red blood cells and increase of white blood cells were observed at the levels of 1.00 and 4.00% PSL. Changes of white blood cell differentials were also seen at the same levels. Serum Na⁺ concentration was slightly decreased at the 0.25, 1.00, 4.00% levels and serum glucose was also decreased at the 1.00, 4.00% levels, but the values were within the normal limits. Significant increase of relative liver weight, without histopathological changes, was observed at the 4.00% level. Histopathological examination revealed slight erosion, necrosis or enteritis in small intestine, at the levels of 0.25, 1.00, 4.00% PSL. It was considered that these findings were attributed to the irritation potential of PSL or its metabolite. These results indicated that the non-effect level was 0.06% (53 mg/kg/day) and the level causing no toxicological effect was 0.25% (208 mg/kg/day), but no deleterious effects was observed in the levels greater than 0.25%.</p>
<p>Williams DL, Sherwood ER, Browder IW, McNamee RB, Jones EL, Di Luzio NR.</p> <p>Pre-clinical safety evaluation of soluble glucan.</p> <p>Int J Immunopharmacol. 1988; 10(4):405-14.</p> <p>PMID: 3262594 [PubMed - indexed for MEDLINE]</p>	<p>Soluble glucan, a beta-1,3-linked glucopyranose biological response modifier, is effective in the therapy of experimental neoplasia, infectious diseases and immune suppression. Currently, soluble glucan is undergoing phase I clinical trials. The present study describes the pre-clinical safety evaluation of soluble glucan in mice, rats, guinea pigs and rabbits. ICR/HSD mice and Harlan Sprague-Dawley rats received a single i.v. injection of soluble glucan in doses ranging from 40 to 1000 mg/kg. Soluble glucan administration did not induce mortality, appearance or behavioral changes in mice or rats. In subsequent studies, mice and guinea pigs were injected i.p. with glucan (250 mg/kg) for 7 consecutive days. ICR/HSD mice gained weight at the same rate as the saline-treated controls. In contrast, guinea pigs receiving i.p. injections of soluble glucan showed a significant (P less than 0.05) 10-13% decrease in weight gain over the 7 day period. No other toxicologic, behavioral or appearance changes were noted. To examine chronic toxicity, soluble glucan was administered twice weekly for a period of 30 or 60 days to ICR/HSD mice in the dose of 40, 200 or 1000 mg/kg. No deaths were observed in any group. Chronic glucan administration did not alter body weight, liver, lung or kidney weight. However, a significant splenomegaly was observed in both the 30 and 60 day study. Histopathologic examination showed no tissue alterations at 40 or 200 mg/kg. However, at 1000 mg/kg a mononuclear infiltrate was observed in the liver. Pyrogenicity testing, employing New Zealand white rabbits, revealed that parenteral glucan administration (5 mg/kg) did not significantly alter body temperature. These data indicate that the systemic administration of soluble glucan, over a wide dose range, does not induce mortality or significant toxicity, an important consideration in preparing soluble glucan for parenteral administration to human populations.</p>

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<p>Ishii H, Usami S, Fujimoto T, Moriyuki H, Hashimoto S, Ichimura M.</p> <p>Subacute toxicity study of lentinan in rats. 5-week intravenous treatment (author's transl)</p> <p>J Toxicol Sci. 1980 Dec;5 Suppl: 11-31. Japanese.</p> <p>PMID: 7265322 [PubMed - indexed for MEDLINE]</p>	<p>Male and female JCL : SD rats were treated intravenously with lentinan in 5% mannitol solution at dose levels of 0, 0.03, 3.0 and 30.0 mg/kg/day for 5 weeks. Rats receiving 0.3, 3.0 and 30.0 mg/kg/day showed reddening in ear, tail and scrotum and edema in legs and scrotum after day 3 of treatment. Males receiving 30.0 mg/kg/day gained less body weight than control. Occult blood was found in the urine of rats receiving 30.0 mg/kg/day. With regard to haematology, rats from the treatment groups had low mean values relating to red blood cell count, packed cell volume and haemoglobin, while high white blood cell count were recorded for these rats. Biochemical examinations revealed decreases in albumin level and A/G ratio and increases in beta-globulin and gamma-globulin levels for rats from the treatment groups. Slightly high values of BUN were showed for rats receiving 30.0 mg/kg/day. Organ weight analysis showed dose-dependent increase in the spleen, liver and adrenal. Histopathological changes attributable to treatment included (1) changes in reticuloendothelial system such as proliferation of reticular cells and micronodule of epithelioid cells in the spleen, liver and lymph nodes; (2) arteritis in many organs especially notable in epididymis, intestines and mesentery; (3) haemorrhagic changes in lung, intestines and urinary bladder and secondary changes such as increased chronic nephropathy, hypospermatogenesis, spermatic granuloma in epididymis and granulomatous inflammation in ear, tail and scrotum. The maxim safe dose was estimated to be smaller than 0.03 mg/kg/day for males and 0.03 mg/kg/day for females in the present study.</p>
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