

EVALUATION OF HP-DDG AND DDGS IN HIGH PROTEIN OR LOW PROTEIN DIETS FOR RAINBOW TROUT *Onchorhynchus mykiss*

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The objective of this experiment was to evaluate the nutritional value of two corn co-products from ethanol production, distillers dried grains with solubles (DDGS) and a high protein distillers dried grains (HP-DDG), in diets for rainbow trout. A 2 × 3 factorial arrangement of treatments was used with 2 levels of dietary protein and 3 corn co-product replacement levels, 0%, 50%, or 100%, as shown in Table 1. Addition of DDGS and HP-DDG replaced typical plant ingredients such as soy protein concentrate, extracted sunflower meal, rapeseed meal, and peas. Each of the six experimental diets was provided in three 200 L tanks holding 20 rainbow trout with an average initial weight of 142 g. The fish were fed twice daily by use of automatic feeders, and uneaten feed was collected daily to calculate feed intake. The temperature ranged from 9-13°C and the trial was terminated after 77 days. Feed intake, weight gain and feed conversion ratio (FCR) are shown in Table 1. Feces were collected by stripping the intestinal tract and nutrient digestibilities were determined by use of an inert marker (yttrium). Gut samples were collected and used for intestinal histopathological evaluation, mucosal and pancreatic enzyme activities and gut microflora determinations. Our results show that the overall weight gain was higher ($P < 0.05$) and FCR lower ($P < 0.05$) in fish fed high protein diets compared with those fed the low protein diets. The FCR in fish fed 50% HP-DDGS was lower ($P < 0.05$) than in groups of fish fed 0 or 100% HP-DDG, whereas DDGS inclusion gradually improved ($P < 0.05$) the FCR in fish fed the low protein diets.

TABLE 1. Diet composition of high and low protein diets containing increasing levels of DDGS and HP-DDG, and growth performance of rainbow trout following a 77 day feeding trial.

	High protein diets			Low protein diets		
	HP-DDG 0%	HP-DDG 50%	HP-DDG 100%	DDGS 0%	DDGS 50%	DDGS 100%
Sunflower meal	144	72	0	125	67.5	0
Soy protein concentrate	162	81	0	0	0	0
Rapeseed meal	144	72	0	125	67.5	0
Peas	0	0	0	250	125	0
DDGS	0	0	0	0	250	500
HP-DDG	0	225	450	0	0	0
Other	550	550	550	500	500	500
<i>Calculated composition, % DM</i>						
Protein	44.3	44.4	44.3	36.2	36.4	36.0
Lipid	20.1	20.3	20.9	19.5	20.1	20.7
<i>Performance 0-77 days</i>						
Feed intake, g	221	229	220	222	249	204
Weight gain, g	254 ^{ab}	277 ^a	255 ^{ab}	217 ^c	261 ^a	231 ^{bc}
FCR (feed/gain)	0.87 ^d	0.83 ^e	0.87 ^d	1.02 ^a	0.96 ^b	0.88 ^c