

FEED VALUE OF SPROUTED GRAINS

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Adverse moisture conditions during harvest can cause grain to sprout in the head. It is not unusual in North Dakota to have rainy weather conditions during the harvest season and as a result large amounts of sprouted wheat become unsuitable for milling purposes and become available for livestock feeding.

U.S. Grade standards discount wheat on the basis of percent of sprouted kernels. Wheat showing more than 2% sprouted kernels is classified as sprouted wheat. Grade is lowered with increased sprouting until at 15% the grain is classified as sample grade. Elevators may dilute sprouted with unsprouted grain, but much sprouted grain is destined for feed channels only.

Only a small amount of direct information is available on the alteration in feed value of grain due to sprouting. In general, it appears a reduction in feed value is largely one of energy content, due to the heat, CO₂, and moisture production and energy expenditure involved in germination. Nutritive value of grain protein does not appear to be depressed, and may, in fact, be slightly improved by moderate sprouting. Substantial sprouting will involve proportionate reduction of energy available per kernel, with slight to moderate sprouting showing smaller effects on the animal feed value of sprouted grains.

Preliminary swine nutrition research involving feed values of sprouted Durum and Hard Red Spring wheat at North Dakota State University indicated acceptable performance of these grains when compared to a "control" barley-soybean meal diet.

Table 1. Evaluation of Sprouted Grain in Swine Finishing Rations

Treatment	Barley* Basal (Control)	20%* Sprouted Durum	40%* Sprouted Durum	20%* Sprouted Hard Red Spring	40%* Sprouted Hard Red Spring
Number of Pigs	12	12	10	12	12
Average Initial Weight	100.2	99.3	97.1	100.3	98.5
Average Final Weight	188.0	204.6	190.4	189.5	186.0
Average Daily Gain	1.65	1.98	1.72	1.68	1.65
Feed/Cwt. Gain	3.99	3.47	3.56	3.55	4.07
Bushel Weight		58.6	56.7	57.4	56.0

S
FH.3
Vg
A
WH

NDSU data

*All diets contain 10 percent soybean meal.



Average daily gain of all treatments was equal to or superior to the control lot fed the basal barley ration. The treatment fed the 20% durum ration showed significantly higher gains than all other treatments. This difference may in fact not be related to the treatment, and studies are needed to determine if the difference is real. The feed required per 100 pounds of gain is similar for all treatments. Additional work at NDSU utilizing sprouted durum fed to early maturing market-type turkeys indicated no difference in average daily feed consumption or feed per gain between treatments. Treatments consisted of hard spring wheat, sprouted durum replacing wheat, and sprouted durum replacing corn.

Idaho research on the value of sprouted Gaines wheat (60% sprouted for hogs when fed so sprouted wheat kernels represented 0, 10, 20 or 30% of the growing-finishing ration) indicate the following reduction in energy value for swine as compared to normal unsprouted wheat:

20% sprouted	92.5% of normal wheat
40% sprouted	87.2% of normal wheat
60% sprouted	85.6% of normal wheat

Wheat was used as 50% of a balanced growing-finishing ration for hogs. Pig gains were unaffected (Table 2).

Value of sprouted wheat for ruminant feed is apparently only slightly affected, if at all, by moderate sprouting. The same Idaho data indicates the following with fattening yearling steers. Nonsprouted and sprouted wheat together represented 60% of the ration, together with 38% roughage and 2% minerals and salt.

Test weight of wheat in the Idaho trials was reduced from 60.4 to 55.9 pounds per bushel. Crude protein increased from 12.32 to 13.16%, fat increased from 0.79 to 0.88%, crude fiber increased from 3.22 to 3.57% due to concentration of other nutrients when energy is expended during germination.

An early 1950's trial at NDSU had shown that moderately sprouted barley gave pig performance similar to that of unsprouted barley.

Molds and toxins were not reported to be a problem in these studies. This does not rule out possible detrimental effects from molds and toxins that may be present in sprouted grains.

The data show that grain sprouted to the extent of that used in the data discussed contained essentially the same feeding value as normal grain per unit weight for cattle, swine and poultry. Reduced test weight represents the major loss due to moderate sprouting.

Table 2. Gains and Feed Conversion of Weanling Pigs Fed Normal or Sprouted Wheat

Proportion of "Sprouted" Wheat	Sprouted Wheat In Ration	Weight* Range		Average Daily Gain	Feed Per Lb. Gain	Sprouted Wheat Value, Relative/ Unsprouted Wheat	
		Initial	Final				
0%	0%	61	-	206	1.71 lbs.	3.68 lbs.	Control
20%	10%	58	-	204	1.65 lbs.	3.83 lbs.	92.5%
40%	20%	62	-	205	1.64 lbs.	3.95 lbs.	87.2%
60%	30%	62.5	-	208	1.72 lbs.	3.99 lbs.	85.6%

Idaho data.

*Ten animals per lot.

Table 3. Weight Gain and Efficiency of Yearling Steers Fed Normal or Sprouted Wheat

Proportion of "Sprouted" Wheat	Sprouted Wheat Kernels In Ration	Weight* Range		Average Daily Gain	Feed Per Lb. Gain	
		Initial	Final			
0%	0%	729	-	1,048	2.28 lbs.	8.94 lbs.
20%	12%	751	-	1,074	2.30 lbs.	8.56 lbs.
40%	24%	742	-	1,080	2.41 lbs.	8.46 lbs.
60%	36%	753	-	1,080	2.34 lbs.	8.89 lbs.

Idaho data.

*Ten animals per lot.