



## 1998 Indiana Soybean Composition Data

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This fact sheet summarizes the composition data compiled for soybean samples collected in Indiana during the 1998 harvest. District results are presented, and composition data from the 1996 and 1997 crop years are compared.

### Methodology

Soybean samples were taken directly from the field as part of the annual yield survey conducted by the Indiana Agricultural Statistics Service. All samples were analyzed for moisture, protein, oil, and fiber using a near-infrared transmittance (NIRT) whole grain analyzer (Infratech 1229) available at the Purdue University Grain Quality Laboratory in the Department of Agricultural and Biological Engineering. All results are reported based on a 13% moisture basis (wet).

There were 36 samples available for compositional analysis from eight districts. The SE district was not represented. Given the number of samples from each crop-reporting district, all of the districts were under-represented based on the total acres harvested per sample (Table 1). This was unfortunately an increase compared to 1997. It is hoped that in the future the number of samples can be increased to achieve a production per sample ratio of 2 million bushels, which is similar to the target of the annual American Soybean Association survey.

### Results

The 1998 data show that the average statewide protein content increased by 0.4 percentage points (Table 2) from the previous year, which was the second increase in a year since 1996. The spread between minimum and maximum protein values decreased from 11.6 percentage points in 1996

and 11.2 points in 1997, to 5.5 points in 1998, which is a 51% drop in variability. Average oil content increased 0.5 percentage points from 1997 to 18.2%, which was 0.9 points higher than the 1996 average. The spread between the range of oil values was 2.7 points, down from 4.3 points in 1996 and 5.4 points in 1997. Average fiber content was 5.3%, up 0.2 points from 1997, but still 0.3 points lower than the 1996 average. The spread between the range of fiber values decreased slightly, from 0.9 points in both 1996 and 1997 to 0.8 points in 1998.

An increase in both protein and oil, and a decrease in sample variability of both protein and oil would be desirable from a processor's perspective. More uniform soybeans with higher estimated processed values (EPV) yield more high protein soybean meal and more pounds of oil for every bushel of soybeans processed. (See Grain Quality Fact Sheet #39 for more information.) However, our current statewide soybean sample size may be too small to draw a conclusion that is representative for the entire state.

The results in Table 2 only give an indication of the composition values of soybeans across Indiana. Conditions during the growing season, variety selection, and soil fertility significantly affect intrinsic values, such as protein, oil, and fiber. Producers need to have their own samples analyzed to get more precise values.

### Analysis

A statistical analysis was performed on the data collected from the last three years using Statistical Analysis Software (SAS) to uncover differences between years and between districts within a year. All tests used an alpha of 0.05.

District summary values for 1996 and 1997 can be found in Grain Quality Fact Sheets 31 and 36, respectively. The results of the analysis are summarized in Tables 3 and 4. In Table 3, the years within a district are statistically similar if they have the same letter, while in Table 4, the districts with the same letter are similar within a year.

District trends were apparent in the analysis of data. All districts were statistically similar in protein content across all three years (Table 3). All districts were statistically similar in protein content within each year (Table 4). The NW and NC districts had the highest protein averages in 1996 and 1997, the NC district having the highest average in 1996, with 37.5%, followed by the NW district, with a 36.8% average. In 1997, the NW district had the highest average at 37.7%, with NC having a 37.6% average. In 1998, the C district had the highest average, with 38.3%, followed by the EC district, whose average was 38.0%. The EC and SW districts had the lowest protein averages two out of the three years. The EC district had the lowest protein in 1996 and 1997, with protein averages of 34.4 and 35.4%, respectively. The SW district had the second lowest average in 1996, with a 36.2% average, and in 1998, with a 36.5% average.

The NW and C districts were the only ones not statistically similar in oil content across all three years (Table 3). In 1997 and 1998, all districts were statistically similar in oil content, while in

1996 the NW district was significantly lower and the SW was higher compared to all other districts (Table 4). The SW district had the highest oil content average in 1996 (18.4%) and in 1998 (18.9%). The C district had the second highest average in 1996, with 17.2% oil content, and in 1997, it had the highest average at 18.3%. The NW, NC, and EC districts all had the two lowest averages over the three-year span. The NW district had the lowest average in 1996 and 1997, with averages of 16.7 and 17.0%, respectively. The NC district had the second lowest average in 1997 (17.1%) and the lowest average in 1998, with a 17.8% average. The EC district had the second lowest oil average in 1996 and 1998, with averages of 17.2 and 18%, respectively.

The SW district was the only district statistically similar in fiber content across all three years, while the C district was different for all three years (Table 3). In 1997 and 1998, all districts were statistically similar in fiber content, while in 1996 the EC district was significantly higher compared to all other districts (Table 4). The EC district had the highest fiber averages in 1996 and 1998, with values of 5.95 and 5.33%, respectively. The NC district had the highest fiber average in 1997 at 5.34%, but had the lowest average in 1996 at 5.47%, and the second lowest in 1998 at 5.20%. The NW district had the second highest average in 1996, with a 5.67% average; however, this district had the lowest average for 1997 and 1998, with 5.01 and 5.18%, respectively.

Table 1. Summary of the 1998 Indiana soybean acres, yield, and production.

District	Harvested Acres (1000's)	Acres per Samples	Yield (Bu/Ac)	Production (1000 Bu)	Production (Bu) per Sample
NW	765	76,500	44	33,723	3,372,300
NC	632	126,400	46	29,325	5,865,000
NE	611	305,500	43	26,029	13,014,500
WC	697	232,333	42	29,395	9,798,333
C	1,248	178,286	44	54,687	7,812,429
EC	532	177,333	42	22,097	7,365,667
SW	692	138,400	36	24,804	4,960,800
SC	194	194,000	35	6,869	6,869,000
SE	229	0	36	8,271	0

Table 1 continued

	Harvested Acres (1000's)	Acres per Samples	Yield (Bu/Ac)	Production (1000 Bu)	Production (Bu) per Sample
<b>State</b>	<b>5,600</b>	<b>155,555</b>	<b>41</b>	<b>235,200</b>	<b>6,533,333</b>
<b>1997</b>	<b>5,400</b>	<b>122,727</b>	<b>44</b>	<b>237,600</b>	<b>5,400,000</b>
<b>1996</b>	<b>5,360</b>	<b>148,889</b>	<b>36</b>	<b>203,680</b>	<b>5,657,778</b>

Table 2. Summary of the 1998 Indiana soybean composition survey (13% moisture basis).

District	Number of Samples	% Protein		%Oil		%Fiber	
		Ave.	Range	Ave.	Range	Ave.	Range
NW	10	37.7	35.9-40.3	18.1	17.1-19.7	5.2	4.9-5.5
NC	5	37.5	36.3-38.2	17.8	17.2-18.7	5.2	4.8-5.4
NE	2	36.0	35.8-36.1	18.7	18.1-19.2	5.3	5.1-5.4
WC	3	36.6	36.5-36.7	18.8	18.5-19.1	5.3	5.0-5.6
C	7	38.3	37.0-40.0	18.2	17.1-19.1	5.3	5.0-5.6
EC	3	38.0	35.8-39.4	18.0	17.0-18.9	5.3	5.1-5.5
SW	5	36.5	34.8-39.0	18.9	18.4-19.2	5.3	5.0-5.4
SC	1	39.1	NA	17.6	NA	5.3	NA
<b>State</b>	<b>36</b>	<b>37.5</b>	<b>34.8-40.3</b>	<b>18.2</b>	<b>17.0-19.7</b>	<b>5.3</b>	<b>4.8-5.6</b>
<b>1997</b>	<b>44</b>	<b>37.1</b>	<b>32.9-44.1</b>	<b>17.7</b>	<b>14.3-19.7</b>	<b>5.1</b>	<b>4.7-5.6</b>
<b>1996</b>	<b>36</b>	<b>36.6</b>	<b>31.3-42.9</b>	<b>17.3</b>	<b>15.5-19.8</b>	<b>5.6</b>	<b>5.3-6.2</b>

Table 3. Statistical analysis within districts across years.

District	Year	Protein	Oil	Fiber
NW	1996	A	A	A
	1997	A	A	B
	1998	A	B	B
NC	1996	A	A	A
	1997	A	A	A, B
	1998	A	A	B
NE	1997	A	A	A
	1998	A	A	A
WC	1997	A	A	A
	1998	A	A	A
C	1996	A	A	A
	1997	A	B	B
	1998	A	B	C
EC	1996	A	A	A
	1997	A	A	B
	1998	A	A	B
SW	1996	A	A	A
	1997	A	A	A
	1998	A	A	A

Table 4. Statistical analysis across districts within a year.

District	Protein	Average	Oil	Average	Fiber	Average
<b>1996</b>						
NW	A	36.83	A	16.67	A	5.67
NC	A	37.54	A, B	17.19	A	5.47
C	A	36.68	A, B	17.19	A	5.65
EC	A	34.45	A, B	17.15	B	5.95
SW	A	36.17	B	18.37	A	5.57
<b>1997</b>						
NW	A	37.74	A	17.03	A	5.01
NC	A	37.64	A	17.10	A	5.34
NE	A	37.13	A	17.30	A	5.07
WC	A	36.75	A	17.30	A	5.15
C	A	36.72	A	18.25	A	5.03
EC	A	35.45	A	18.15	A	5.15
SW	A	37.25	A	17.95	A	5.30
<b>1998</b>						
NW	A	37.71	A	18.10	A	5.18
NC	A	37.48	A	17.78	A	5.20
NE	A	35.95	A	18.65	A	5.25
WC	A	36.60	A	18.77	A	5.30
C	A	38.29	A	18.17	A	5.31
EC	A	38.03	A	18.00	A	5.33
SW	A	36.48	A	18.90	A	5.28

Purdue University's Grain Quality Laboratory continues to offer composition analysis for whole corn, soybeans, and soybean meal. This service is offered at no charge to Indiana producers, elevators, and processors thanks to a Value-Added Grant from the Office of Indiana's Commissioner of Agriculture and a grant from the Mary S. Rice Farm Estate. 450 g (about 1 lb.) may be sent to

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For further information, call (765) 494-2285, or send e-mail to [grainlab@ecn.purdue.edu](mailto:grainlab@ecn.purdue.edu), or visit us on the World Wide Web at <http://pasture.ecn.purdue.edu/~grainlab>, where data from a number of county test plots are summarized.

Grain Quality Fact Sheets can be accessed on-line through the World Wide Web at: <http://www.agcom.purdue.edu/AgCom/Pubs/grain.htm>

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