

~ 2016 ~

# U.S. Sunflower Crop Quality Report



## *Regarding the 2016 Sunflower Crop Quality Report . . .*

The 2016 U.S. Sunflower Crop Quality Report, compiled by the National Sunflower Association in cooperation with the Foreign Agricultural Service, U.S. Department of Agriculture, provides an overview on the size and quality of the 2016 U.S. sunflower seed crop. It includes statistics on the marketing of the crop, as well as U.S. and world supply/disappearance tables and information on U.S. sunflower oil.

Produced annually by the National Sunflower Association since 1981, this newest U.S. Sunflower Crop Quality Report can be found on the NSA's website. Address: [www.sunflowernsa.com](http://www.sunflowernsa.com). Printed copies of this report can be made available by the NSA. (See NSA's contact details on page 9).

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## 2016 U.S. Sunflower Acreage & Production

United States sunflower production totaled slightly above 2.65 billion pounds in 2016, down nearly 9% from the 2015 crop's size but almost 20% larger than the 2014 crop.

The U.S. average yield — at 1,731 pounds per acre — was an all-time record, about 7% higher than 2015's 1,625-pound average.

Planted area, at just under 1.6 million acres, was 14% lower than 2015. Area harvested in 2016 was 1.53 million acres.

North Dakota regained the title of the nation's leading sunflower-producing state. North Dakota producers harvested 1.14 billion pounds of sunflower in 2016, compared to about 1.06 billion pounds in South Dakota.

U.S. production of oil-type sunflower varieties in 2016, at 2.37 billion pounds, was identical to 2015's 2.38 billion. Harvested acreage of oil types was down by 9% from the prior year.

At 1,731 pounds per acre, the average yield of 2016 oil sunflower fields was 10% above 2015's 1,579-pound level and almost 19% above 2014's 1,460-pound average yield.

The 2016 U.S. production of nonoil sunflower varieties — at just over 285.7 million pounds — was 47% less than 2015's nonoil output. Average nonoil yield in 2015 — 1,726 pounds — was 139 pounds (7%) below the 2015 average. Harvested nonoil acreage was 42% lower than that of 2015.



### U.S. Sunflower Production

(1,000s of Pounds)

	2013	2014	2015	2016
Oil	1,646,805	1,664,090	2,383,870	2,369,015
Nonoil	385,920	554,960	539,860	285,720
<b>Total</b>	<b>2,032,725</b>	<b>2,219,050</b>	<b>2,923,730</b>	<b>2,654,735</b>

### U.S. Oil-Type Sunflower Harvested Area, By State

(1,000s of Hectares)

State	2009	2010	2011	2012	2013	2014	2015	2016
Colorado	27.5	37.2	39.3	24.7	15.8	13.0	23.1	23.1
Kansas	56.7	42.5	42.5	26.3	20.2	17.0	21.4	17.0
Minnesota	17.8	20.6	10.9	15.0	13.0	18.2	30.4	25.9
Nebraska	10.5	9.7	14.2	11.9	10.3	10.1	10.9	11.3
North Dakota	307.6	277.2	202.3	305.5	163.9	206.4	244.8	246.9
South Dakota	206.4	161.9	163.1	226.6	218.5	161.9	230.7	200.3
Texas	23.9	11.3	9.3	13.4	24.3	16.2	35.2	11.3
Other	18.6	15.1	17.6	20.8	23.6	18.3	14.6	18.0
<b>Total</b>	<b>669.0</b>	<b>575.5</b>	<b>499.2</b>	<b>644.2</b>	<b>489.6</b>	<b>461.1</b>	<b>611.1</b>	<b>553.8</b>

# 2016 U.S. Sunflower Crop Quality Report

## 2016 Seed Quality/Confection Kernel Specifications

Seed quality and kernel specifications of the 2016 crop were estimated from samples of oil and nonoil (confection) sunflower collected with the aid of the North Dakota Grain Inspection Service, Kansas Grain Inspection Service, Aberdeen (S.D.) Grain Inspection and several confection sunflower processing plants. The samples were drawn from sunflower loads delivered to processors, or from submitted samples taken at local grain buying facilities. The seed samples were then analyzed according to USDA Grain Inspection, Packers &

Stockyards Administration (GIPSA, formerly known as FGIS) directives. Oil content of oil-type seed samples was determined on a clean-seed basis using nuclear magnetic resonance (NMR) analysis.

Analysis of the oil-type sunflower seed samples indicated an average oil content of 43.2%, up from the 2015 average of 42.5%. Test weight averaged 31.0 pounds per bushel — identical to that of the 2015 samples. Foreign material, at 4.4%, was one point lower than the 2015 average of 5.4%. Moisture, at 8.8%, was up slightly from the average of the 2015 samples.

The percentage of confection (nonoil) seeds over 20/64 in size averaged 82.4% among the 2016 samples, compared to the 2015 average of 84.8%.

Foreign material in the nonoils averaged 12.3% in 2016, which was 0.5%

below the 2015 average. At 20.1 pounds per bushel, average 2016 nonoil test weight was 0.5 pound lower than that of the 2015 samples. At 9.6%, moisture was nearly identical to the 9.7% average of the 2015 crop.

### Oil-Type Sunflower Seed Quality

Year	Test Weight (Lbs/Bu)	Moisture (%)	Foreign Material (%)	Oil (%)
2016	31.0	8.8	4.4	43.2
2015	31.0	8.6	5.4	42.5
2014	30.1	8.6	5.6	41.5
2013	30.1	10.0	5.0	41.9
2012	30.4	9.3	5.1	41.6

### Nonoil Sunflower Seed Quality

Year	Test Weight (Lbs/Bu)	Moisture (%)	Foreign Material (%)	Seeds Over 20/64 Size (%)
2016	20.1	9.6	12.3	82.4
2015	20.6	9.7	12.8	84.8
2014	21.0	9.3	11.6	79.7
2013	22.0	11.6	7.3	85.4
2012	22.4	10.4	7.9	84.1

### Product Specifications U.S. Sunflower Kernel

- Origin** - Sunflower hybrid seed
  - Flavor** - Good, typical, mild, distinctive
  - Odor** - Good, clean, fresh aroma
  - Texture** - Firm, not brittle or soggy
  - Color** - Off-white, gray
  - Microbiological** - Aflatoxin: Negative  
Pathogens: Negative
  - Chemical Additives** - No preservatives or chemical additives may be used
  - Pesticide Residues** - Meets all state & federal regulatory requirements
  - Fumigants** - Only FDA-approved fumigants may be used as considered necessary. Residues may not exceed FDA approved tolerances
- Quality and type of kernel is determined with the following factors to meet specific customer needs:**
- Size** - Defined as kernel count per oz
  - Foreign Material** - Includes shells and unshelled seed; defined as percentage or count per unit of weight
  - Moisture** - Defined as a percentage at or below 8%
  - Damage** - Distinctly discolored kernel or insect damage. Each defined as a percentage
  - Broken or Chip** - Any portion less than 1/2 kernel; defined as a percentage
  - Sticktites** - Kernel with a piece of shell adhering; defined as count per unit of weight.

## 2016 Oil Quality Analysis/Oil Traits & Rules

The tables below compare the oil quality and fatty acid content of representative samples of high-oleic and mid-oleic sunflower seed oil, gathered from the 2016 U.S. crop, to previous years' data on oil quality. The sunflower oil quality analysis was conducted with standard gas chromatography, basis American Oil Chemists' Society Method #Cel-62.

The 66.06% oleic average of the 2016 NuSun® (mid-oleic) samples was higher than 2015's 63.77%, but below the 67.23% average of 2014.

The 2016 high-oleic seed samples averaged an oleic acid content of

85.60%. That compares to an 84.23% average of the 2015 high-oleic seed samples and 85.52% in 2014.

As is the case each year, climatic factors and timing of production contributed to the fatty acid levels of both the NuSun and high-oleic samples collected at harvest.

See general trading rules for mid-oleic and high-oleic oil, as well as product specification tables, at [www.sunflowernsa.com](http://www.sunflowernsa.com).

Click on the link "Sunflower oil," then "product specifications." For more details or questions regarding trading rules, go to the American Fats & Oils Assn., Inc., website, [afoaonline.org](http://afoaonline.org).

### Sunflower Oil Quality / High Oleic

Percent

Year	Palmitic 16:0	Stearic 18:0	Oleic 18:1	Linoleic 18:2	Linolenic 18:3
2016	3.43	3.17	85.60	5.51	0.19
2015	3.47	3.20	84.23	6.70	0.27
2014	3.62	3.09	85.52	5.38	0.30
2013	3.72	3.29	85.87	4.96	0.18
2012	3.54	3.18	84.80	6.30	0.23

### Sunflower Oil Quality / NuSun®

Percent

Year	Palmitic 16:0	Stearic 18:0	Oleic 18:1	Linoleic 18:2	Linolenic 18:3
2016	4.13	3.57	66.06	23.80	0.40
2015	4.25	3.56	63.77	26.02	0.36
2014	4.14	3.20	67.23	22.98	0.43
2013	4.41	3.72	66.17	23.44	0.28
2012	4.43	3.74	62.90	26.56	0.40

### Mid-Oleic Sunflower Oil (NuSun®): Crude

Trading Rules: Specifications from American Fats and Oils Association: Rule 14B

ITEM	VALUE
Flash Point (AOCS Cc 9b-56)	250°F Minimum
Halphen Test	Negative
Saponification Value	188-194
Unsaponifiable	1.3% Maximum
Free Fatty Acid (as Oleic)	Basis 2.0% Maximum 3.0%
Moisture & Volatile (AOCS Ca 2d-25)	0.5% Maximum
Insoluble Impurities (AOCS Ca 3-46)	0.3% Maximum
Color (in 5 1/4 inch cell or tube), as determined under AOCS Method Cc 13b-45, Bleached (AOCS Cc 8g-52), after refining (AOCS Ca 9a-52)	2.5 Red Maximum
Linolenic acid	1.0% Maximum
Oleic (as % of TFA)	55% Minimum 75% Maximum

Rule 14B -- Crude mid-oleic sunflower oil (NuSun®) shall be pure and produced only from sunflower seed of fair average quality by hydraulic, expeller, or solvent extraction process. Buyer shall receive an allowance of 0.1% of the invoice value for each 0.1% of free fatty acid in excess of 2%; fractions in proportion. (Effective 1/1/2003)

### Mid-Oleic Sunflower Oil (NuSun®): Fully Refined, Bleached & Deodorized

Trading Rules: Specifications from American Fats and Oils Association: Rule 15B

ITEM	VALUE
Free Fatty Acid (as Oleic)	0.05% Maximum
Moisture & Impurities (AOCS Ca 2d-25)	0.10% Maximum
Peroxide Value	2.0 Maximum
Color (Lovibond Scale)	2.5 Red Maximum
Iodine Value	88-115.0
Oleic	55% Minimum 75% Maximum
Flavor	Pleasing
Appearances (Waxes Not Separated)	Will be cloudy at room temperature

#### Other Possible Specs:

Saponification Value	186-194
Unsaponifiable	1.5% Maximum
Specific Gravity by 20° Centigrade	0.917-0.924

Rule 15B -- Fully refined, bleached and deodorized mid-oleic sunflower oil (NuSun®) shall be pure mid-oleic sunflower seed oil. It shall be produced from fair average quality crude mid-oleic sunflower seed oil from which essentially all of the free fatty acids and non-oil substances have been removed by chemical treatments and by mechanical or physical separation. (Effective 1/1/2003)

## 2016 Sunflower Oil & Sunflower Meal Exports

**Oil Exports** - Sunflower oil is the preferred oil in most of Europe, Russia and Mexico, as well as in countries along the Mediterranean and several South American nations.

U.S. sunflower oil exporters can deliver three types of sunflower oil: NuSun®, Linoleic and High Oleic.

- **NuSun®** is a mid-range oleic, 55%-75% (monounsaturated) sun-

flower oil. It needs no hydrogenation and has a 9% saturated fat level. NuSun® is extremely functional for frying applications and has a good balance of linoleic acid — an essential fatty acid that enhances products' taste.

- **Linoleic** sunflower oil has about 69% polyunsaturated fat, 20% monounsaturated fat and 11% saturated fat. Linoleic sunflower is an excellent cooking oil with a neutral taste. This enhances the taste of food rather than overpowering it.

- **High-Oleic** sun-

flower oil has 80% or more oleic (monounsaturated) acid. This unique oil has many specialty applications.

**Sun Meal Exports** - Most of U.S. sunflower meal produced is utilized within the United States as an ingredient for the domestic livestock feeding industry, although some U.S. sunflower meal is exported. Four types of sun meal, identified by their respective protein contents (28, 30, 32 and 35%), are produced in the United States.

### U.S. Sunflower Oil Exports

(October-September, in Metric Tons)

Country	2012/13	2013/14	2014/15	2015/16
Australia	211	910	148	77
Canada	15,178	16,652	18,944	18,996
Costa Rica	413	519	191	82
Germany	2	2,000	0	0
Japan	1,106	2,575	4,384	4,442
Mexico	8,343	4,654	3,326	10,721
Netherlands	1	2,445	178	303
Singapore	312	146	33	4
South Korea	998	900	63	170
Taiwan	313	45	515	650
United Kingdom	4	4,094	0	15
Vietnam	1,029	1,390	388	692
Other	1,421	854	775	2,668
<b>Total MT</b>	<b>29,331</b>	<b>37,184</b>	<b>28,945</b>	<b>38,820</b>

### U.S. Sunflower Meal Exports

(October-September, in Metric Tons)

Country	2012/13	2013/14	2014/15	2015/16
Canada	5,112	4,328	4,370	3,781
Germany	0	1,036	0	0
Israel	14,057	0	0	0
Indonesia	0	76	2,750	406
Mexico	18	0	0	1,070
Romania	0	2,012	0	0
Thailand	0	0	0	5,139
Venezuela	0	0	0	1,177
Other	71	261	312	200
<b>Total MT</b>	<b>19,258</b>	<b>7,713</b>	<b>7,432</b>	<b>11,773</b>





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## U.S. Sunflower Supply & Disappearance (in 1,000 Metric Tons, Unless Specified)

Item	2011/12	2012/13	2013/14	2014/15	2015/16 <i>Revised</i>	2016/17 <i>Forecast</i>
<b>NONOIL SUNFLOWER</b>						
Area Harvested (1,000 HA)	91	101	107	150	117	67
Area Harvested (1,000 AC)	224	249	264	371	289	166
Yield (MT/HA)	1.58	1.74	1.63	1.68	2.09	1.94
Yield (LB/AC)	1,406	1,548	1,458	1,497	1,865	1,726
Stocks, Oct. 1	50	28	23	31	72	71
Production	143	175	174	252	245	130
Seed Import	28	25	28	37	35	30
<b>TOTAL SUPPLY</b>	<b>221</b>	<b>228</b>	<b>226</b>	<b>320</b>	<b>351</b>	<b>231</b>
Disappearance	193	205	195	248	280	200
Ending Stocks	28	23	31	72	71	31
<b>OIL SUNFLOWER</b>						
Area Harvested (1,000 HA)	499	644	486	461	611	554
Area Harvested (1,000 AC)	1,233	1,592	1,201	1,140	1,510	1,369
Yield (MT/HA)	1.57	1.69	1.53	1.64	1.77	1.94
Yield (LB/AC)	1,397	1,508	1,363	1,460	1,579	1,731
Stocks, Oct. 1	38	30	165	15	34	130
Production	782	1,089	743	755	1,082	1,075
Seed Import	15	25	27	23	18	20
<b>TOTAL SUPPLY</b>	<b>835</b>	<b>1,144</b>	<b>935</b>	<b>793</b>	<b>1,133</b>	<b>1,225</b>
Oilseed Crushed	355	467	470	351	495	550
Planting Seed, Birdfood, Domestic Use	420	478	420	375	487	510
Exports	29	34	30	33	21	30
Disappearance	804	979	920	759	1,003	1,090
Ending Stocks	31	165	15	34	130	135
<b>SUNFLOWER OIL</b>						
Stocks, Oct. 1	25	17	19	17	20	34
Oil Imports	74	33	35	80	42	35
Oil Production	146	194	195	146	205	228
<b>TOTAL SUPPLY</b>	<b>244</b>	<b>244</b>	<b>249</b>	<b>243</b>	<b>267</b>	<b>298</b>
Domestic Oil Use	208	196	195	194	194	230
Oil Exports	19	29	37	29	39	35
Total Use	227	225	232	223	233	265
Ending Stocks	17	19	17	20	34	33
<b>SUNFLOWER MEAL</b>						
Stocks, Oct. 1	4	2	2	4	3	3
Production	181	238	240	179	252	281
<b>TOTAL SUPPLY</b>	<b>185</b>	<b>240</b>	<b>242</b>	<b>183</b>	<b>255</b>	<b>284</b>
Domestic Use	179	219	230	173	240	270
Exports	3	19	8	7	12	10
Total Use	182	238	238	180	252	280
Ending Stocks	3	2	4	3	3	4

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## World Sunflower Supply & Disappearance

Sources:  
Oil World & USDA

Item	2011/12	2012/13	2013/14	2014/15	2015/16 <i>Revised</i>	2016/17 <i>Forecast</i>
Area Harvested (1,000 HA)	25,856	25,470	25,730	24,708	25,143	26,635
Yield (MT/HA)	1.53	1.40	1.68	1.67	1.69	1.78
<b>SUNFLOWER SEED —</b>						
<b>Production</b>						
Argentina	3,775	2,850	2,250	3,000	2,850	3,550
European Union	8,323	7,018	9,105	9,006	7,586	8,251
China	1,700	1,730	2,423	2,380	2,350	2,330
Russia	9,500	8,000	10,200	9,000	9,700	11,000
Ukraine	9,500	8,387	10,941	10,250	12,100	14,000
United States	925	1,264	917	1,005	1,326	1,204
India	620	615	580	390	330	400
Turkey	940	1,100	1,450	1,350	1,350	1,480
Other	4,226	4,783	5,471	4,953	4,873	5,182
<b>TOTAL</b>	<b>39,509</b>	<b>35,747</b>	<b>43,337</b>	<b>41,334</b>	<b>42,465</b>	<b>47,397</b>
<b>Seed Import</b>						
Turkey	844	627	581	523	436	600
European Union	291	220	329	275	576	670
Other	830	638	1,050	1,078	1,058	1,364
<b>TOTAL</b>	<b>1,965</b>	<b>1,485</b>	<b>1,960</b>	<b>1,876</b>	<b>2,070</b>	<b>2,634</b>
<b>Seed Exports</b>						
Argentina	83	85	80	63	302	400
United States	114	144	132	126	108	100
Russia	402	59	131	61	105	150
Ukraine	284	124	71	123	171	400
Other	1,097	1,128	1,536	1,462	1,439	1,546
<b>TOTAL</b>	<b>1,980</b>	<b>1,540</b>	<b>1,950</b>	<b>1,835</b>	<b>2,125</b>	<b>2,596</b>
<b>Oilseed Crushed</b>	<b>36,145</b>	<b>32,355</b>	<b>38,360</b>	<b>36,581</b>	<b>37,933</b>	<b>42,226</b>
<b>SUNFLOWER OIL —</b>						
<b>Oil Opening Stocks</b>	<b>1,212</b>	<b>1,926</b>	<b>1,645</b>	<b>1,989</b>	<b>1,903</b>	<b>1,991</b>
<b>Oil Production</b>	<b>15,171</b>	<b>13,554</b>	<b>16,102</b>	<b>15,854</b>	<b>15,854</b>	<b>17,756</b>
<b>Oil Imports</b>						
Iran	300	197	306	329	226	370
Turkey	681	656	773	789	766	820
Egypt	863	643	777	299	322	630
European Union	1,046	936	1,128	882	1,536	1,420
India	1,151	939	1,578	1,531	1,533	1,750
Others	3,094	2,894	3,644	3,486	3,970	4,473
<b>TOTAL</b>	<b>7,135</b>	<b>6,265</b>	<b>8,206</b>	<b>7,316</b>	<b>8,353</b>	<b>9,463</b>
<b>Oil Exports</b>						
Argentina	936	612	435	443	630	600
European Union	200	235	367	411	369	407
Russia	1,505	1,088	1,810	1,406	1,611	1,930
Ukraine	3,454	3,120	4,280	3,734	4,612	5,250
United States	19	29	37	29	39	35
Other	1,166	1,101	1,359	1,231	1,177	1,295
<b>TOTAL</b>	<b>7,280</b>	<b>6,185</b>	<b>8,288</b>	<b>7,254</b>	<b>8,438</b>	<b>9,517</b>
<b>Disappearance</b>	<b>14,525</b>	<b>13,895</b>	<b>15,758</b>	<b>15,327</b>	<b>15,766</b>	<b>17,341</b>
<b>Ending Stocks</b>	<b>1,858</b>	<b>1,585</b>	<b>1,989</b>	<b>1,903</b>	<b>1,991</b>	<b>2,406</b>
<b>SUNFLOWER MEAL —</b>						
Meal Production	16,934	15,033	17,492	16,634	16,955	18,809
Meal Imports	6,955	5,465	6,300	5,841	6,342	7,138
Meal Exports	6,980	5,450	6,360	5,854	6,320	7,151
Disappearance	16,845	15,120	17,450	16,688	17,002	18,726
<b>Ending Stocks</b>	<b>407</b>	<b>318</b>	<b>293</b>	<b>251</b>	<b>226</b>	<b>296</b>



## About the National Sunflower Association

The National Sunflower Association (NSA) is a nonprofit organization dedicated to the promotion of U.S. sunflower and its products, and to the development of sunflower markets throughout the world.

Based in the central North Dakota city of Mandan, NSA was incorporated in 1981. It is funded and governed by U.S. sunflower growers and industry representatives. Agreements with the U.S. Department of

Agriculture's Foreign Agricultural Service provide funding for overseas market development programs, including this publication.

Among the many NSA programs and activities are the following:

- Developing and distributing technical literature on sunflower refining and nutrition.
- Providing technical assistance to foreign companies on oil refining and finished product manufacture; also, providing tech-

nical aid to U.S. confection sunflower customers.

- Producing and distributing a variety of literature pertaining to sunflower markets, the U.S. sunflower crop and sunflower products, including *The Sunflower* magazine, which is published six times annually

- Researching the marketplace and surveying consumer awareness of (and attitudes toward) sunflower products.

- Conducting industrial research abroad, including

confection shelf-life and other utilization studies.

- Hosting foreign marketing and technical personnel, arranging meetings with U.S. sunflower industry representatives, setting up tours of U.S. processing and research facilities, and coordinating educational seminars for the benefit of foreign visitors.

The National Sunflower Association welcomes inquiries from any foreign agencies, companies or individuals interested in U.S. sunflower.

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2016 U.S. Sunflower Crop Quality Report data were coordinated by John Sandbakken, National Sunflower Association.

### *U.S. Sunflower Information Online*

The National Sunflower Association has a wealth of U.S. sunflower information online at [www.sunflowernsa.com](http://www.sunflowernsa.com).

This web site provides international marketing information, product specifications, and a list of sunflower product suppliers.

Click on the "Buyers and Sellers" link for a list of sunflower product suppliers and buyers.

The "Sunflower oil" link provides more detailed information on sunflower oil.

Use the "Sunflower seed/kernel" link if you require information about confection sunflower seeds and kernel.

***NSA is an equal opportunity  
provider and employer.***



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