

~ 2018 ~

U.S. Sunflower Crop Quality Report



Regarding the 2018 Sunflower Crop Quality Report . . .

The 2018 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 2018 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. Printed copies of this report can be made available by the NSA. (See NSA's contact details on page 9).

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2018 U.S. Sunflower Acreage & Production

United States sunflower production totaled nearly 2.12 billion pounds in 2018, just 1% less than the 2017 crop's size but about 20% below that of 2016.

The U.S. average yield in 2018 — 1,731 pounds per acre — was 128 pounds above the average yield produced in 2017. The 2018 yield tied with that achieved in 2016 for the highest on record.

For the third consecutive year, South Dakota was the top sunflower-producing state. Its growers produced 975.3 million pounds of sunflower in 2018, down 4% from 2017. Compared with 2017, planted area in South Dakota decreased 8%, but average yield increased 105 pounds to 1,840 pounds per acre.

North Dakota produced

739.4 million pounds of sunflower in 2018, an increase of 5% from the previous season.

United States production of nonoil sunflower varieties in 2018 was estimated at 220 million pounds, a drop of 24% from 2017. Area harvested, at 123,500 acres, was down 26% from 2017. The average nonoil yield, however, increased by 31 pounds from 2017 to 1,781 pounds per acre.

Production of oil-type sunflower varieties in 2018, at nearly 1.9 billion pounds, was 3% higher than 2017. Compared with the previous year, oil-type harvested acreage was 6% lower. But the average yield increased by 142 pounds compared to 2017, ending up at 1,726 pounds per acre.



U.S. Sunflower Production

(1,000s of Pounds)

	2015	2016	2017	2018
Oil	2,383,870	2,369,015	1,847,525	1,896,410
Nonoil	539,860	282,620	290,225	220,000
Total	2,923,730	2,651,635	2,137,750	2,116,410

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

(1,000s of Hectares)

State	2011	2012	2013	2014	2015	2016	2017	2018
Colorado	39.2	24.7	15.8	13.0	23.1	23.1	29.9	19.8
Kansas	42.5	26.3	20.2	17.0	21.4	17.0	20.2	16.6
Minnesota	10.9	15.0	13.0	18.2	30.4	25.9	13.4	17.8
Nebraska	14.2	11.9	10.3	10.1	10.9	11.3	11.5	9.7
North Dakota	202.3	305.5	163.9	206.4	244.8	246.9	155.4	153.8
South Dakota	163.1	226.6	218.5	161.9	230.7	200.3	210.4	196.3
Texas	9.3	13.4	24.3	16.2	35.2	11.3	12.1	7.7
Other	17.6	20.8	23.6	18.3	14.6	18.0	21.4	23.1
Total	499.2	644.2	489.6	461.1	611.1	553.8	474.3	444.8

2018 Seed Quality/Confection Kernel Specifications

Seed quality and kernel specifications of the 2018 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 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) 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 42.8%, compared to the 2017 average of 41.6%. Test weight averaged 30.4 pounds per bushel — 0.4 pound above the 2017 samples. Foreign material, at 3.6%, was 1.5% lower than the 2017 average of 5.1%. At 9.1%, moisture was identical to the average of the 2017 samples.

The percentage of confection (nonoil) seeds over 20/64 in size averaged

86.4% among the 2018 samples, compared to the 2017 average of 87.1%.

Foreign material in the nonoils averaged 12.7% in 2018, which was 3.6% below the 2017 average. At 22.3 pounds per bushel, average 2018

nonoil test weight was 2.1 pounds higher than that of the 2017 samples. At 10.3%, moisture was slightly above the 9.8% average of the 2017 nonoil sunflower crop.

Oil-Type Sunflower Seed Quality

Year	Test Weight (Lbs/Bu)	Moisture (%)	Foreign Material (%)	Oil (%)
2018	30.4	9.1	3.6	42.8
2017	30.0	9.1	5.1	41.6
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

Nonoil Sunflower Seed Quality

Year	Test Weight (Lbs/Bu)	Moisture (%)	Foreign Material (%)	Seeds Over 20/64 Size (%)
2018	22.3	10.3	12.7	86.4
2017	20.2	9.8	16.3	87.1
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

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.

2018 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 2018 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 70.04% oleic average of 2018 NuSun® (mid-oleic) samples was below the 70.67% average of the 2017 crop, but well above 2016's average of 66.06%

The 2018 high-oleic seed samples averaged an oleic acid content of

85.04%. That compares to an 86.37% average of the 2017 high-oleic seed samples and 85.60% in 2016.

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.

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: foaonline.org.

Sunflower Oil Quality / High Oleic

Percent

	Palmitic	Stearic	Oleic	Linoleic	Linolenic
Year	16:0	18:0	18:1	18:2	18:3
2018	3.37	3.37	85.04	6.09	0.12
2017	3.27	3.11	86.37	4.86	0.17
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	0.18

Sunflower Oil Quality / NuSun®

Percent

	Palmitic	Stearic	Oleic	Linoleic	Linolenic
Year	16:0	18:0	18:1	18:2	18:3
2018	4.06	3.55	70.04	19.89	0.32
2017	3.97	3.34	70.67	19.51	0.26
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	0.28

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)

2018 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	2014/15	2015/16	2016/17	2017/18
Australia	148	77	51	492
Canada	18,944	18,996	17,869	20,282
Columbia	12	534	2,694	7
Costa Rica	191	82	36	354
Japan	4,384	4,442	2,530	597
Malaysia	0	5	0	2,083
Mexico	3,326	10,721	4,874	12,572
Netherlands	178	303	258	224
Singapore	33	4	0	41
South Korea	63	170	152	236
Taiwan	515	650	1,066	611
Vietnam	388	692	388	1,230
Other	763	2,144	2,542	1,655
Total MT	28,945	38,820	32,460	40,384

U.S. Sunflower Meal Exports

(October-September, in Metric Tons)

Country	2014/15	2015/16	2016/17	2017/18
Canada	4,370	3,781	3,503	3,006
Costa Rica	0	0	0	38
Indonesia	2,750	406	0	194
Mexico	0	1,070	300	35
Thailand	0	5,139	288	0
Venezuela	0	1,177	0	0
Vietnam	0	0	0	2,550
Other	312	200	13	0
Total MT	7,432	11,773	4,104	5,823



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

Item	2013/14	2014/15	2015/16	2016/17	2017/18 <i>Revised</i>	2018/19 <i>Forecast</i>
NONOIL SUNFLOWER						
Area Harvested (1,000 HA)	107	150	117	66	67	50
Area Harvested (1,000 AC)	264	371	289	164	166	124
Yield (MT/HA)	1.63	1.68	2.09	1.94	1.96	2.00
Yield (LB/AC)	1,458	1,497	1,865	1,729	1,750	1,781
Stocks, Oct. 1	23	30	71	71	39	33
Production	174	252	245	129	132	100
Seed Import	28	37	35	36	41	37
TOTAL SUPPLY	225	319	351	236	211	170
Disappearance	195	248	280	197	178	150
Ending Stocks	30	71	71	39	33	20
OIL SUNFLOWER						
Area Harvested (1,000 HA)	486	461	611	554	473	445
Area Harvested (1,000 AC)	1,201	1,140	1,510	1,369	1,168	1,099
Yield (MT/HA)	1.53	1.64	1.77	1.94	1.77	1.94
Yield (LB/AC)	1,363	1,460	1,579	1,731	1,582	1,726
Stocks, Oct. 1	165	15	34	105	186	96
Production	743	755	1,082	1,075	838	861
Seed Import	27	23	18	21	31	24
TOTAL SUPPLY	935	793	1,133	1,201	1,055	981
Oilseed Crushed	470	351	495	508	475	480
Planting Seed, Birdfood, Domestic Use	420	375	512	483	467	420
Exports	30	33	21	24	17	17
Disappearance	920	759	1,028	1,015	959	917
Ending Stocks	15	34	105	186	96	64
SUNFLOWER OIL						
Stocks, Oct. 1	20	18	21	34	41	33
Oil Imports	35	80	42	55	73	65
Oil Production	195	146	205	211	197	199
TOTAL SUPPLY	250	244	268	300	311	297
Domestic Oil Use	195	194	195	227	238	230
Oil Exports	37	29	39	32	40	35
Total Use	232	223	234	259	278	265
Ending Stocks	18	21	34	41	33	32
SUNFLOWER MEAL						
Stocks, Oct. 1	2	4	3	3	3	3
Production	240	179	252	259	242	245
TOTAL SUPPLY	242	183	255	262	245	248
Domestic Use	230	173	240	255	236	241
Exports	8	7	12	4	6	4
Total Use	238	180	252	259	242	245
Ending Stocks	4	3	3	3	3	3

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World Sunflower Supply & Disappearance

Sources:
Oil World & USDA

Item	2013/14	2014/15	2015/16	2016/17	2017/18 <i>Revised</i>	2018/19 <i>Forecast</i>
Area Harvested (1,000 HA)	25,730	24,708	25,242	26,964	27,291	27,802
Yield (MT/HA)	1.68	1.67	1.70	1.86	1.82	1.88
SUNFLOWER SEED —						
Production						
Argentina	2,250	3,000	2,830	3,300	3,400	3,800
European Union	9,105	9,006	7,769	8,641	9,985	9,546
China	2,423	2,380	2,698	2,750	2,800	2,860
Russia	10,200	9,000	9,700	11,600	11,000	12,000
Ukraine	10,941	10,250	12,100	15,100	13,500	15,500
United States	917	1,005	1,326	1,203	978	961
South Africa	736	736	755	874	859	740
Turkey	1,450	1,350	1,350	1,470	1,700	1,540
Other	5,315	4,607	4,386	5,130	5,343	5,341
TOTAL	43,337	41,334	42,914	50,068	49,565	52,288
Seed Import						
Turkey	581	523	436	611	721	780
European Union	329	275	577	632	520	600
Other	1,050	1,078	1,100	1,396	1,305	1,346
TOTAL	1,960	1,876	2,113	2,639	2,546	2,726
Seed Exports						
Argentina	80	63	302	74	58	100
United States	132	126	107	99	89	70
Russia	131	61	105	362	98	200
Ukraine	71	123	171	261	50	200
Other	1,536	1,462	1,467	1,804	2,253	2,155
TOTAL	1,950	1,835	2,152	2,600	2,548	2,725
Oilseed Crushed	38,360	36,581	38,177	44,845	44,974	47,114
SUNFLOWER OIL —						
Oil Opening Stocks	1,645	1,989	1,903	2,015	2,731	2,613
Oil Production	16,102	15,241	15,936	18,933	18,955	19,916
Oil Imports						
Iran	306	329	205	593	381	500
Turkey	773	789	766	801	517	530
Egypt	777	299	329	581	543	570
European Union	1,128	882	1,530	1,861	1,650	1,800
India	1,578	1,531	1,533	2,137	2,484	2,600
Others	3,644	3,486	3,989	4,494	4,461	4,778
TOTAL	8,206	7,316	8,352	10,467	10,036	10,778
Oil Exports						
Argentina	435	443	630	729	736	850
European Union	367	411	369	454	522	498
Russia	1,810	1,406	1,611	2,223	2,256	2,350
Ukraine	4,280	3,734	4,602	5,892	5,278	6,000
United States	37	29	39	32	40	35
Other	1,359	1,231	1,212	1,341	1,130	1,103
TOTAL	8,288	7,254	8,463	10,671	9,962	10,836
Disappearance	15,758	15,327	15,824	18,217	19,073	19,630
Ending Stocks	1,989	1,903	2,015	2,731	2,613	2,899
SUNFLOWER MEAL —						
Meal Production	17,492	16,634	17,082	19,917	20,160	20,957
Meal Imports	6,300	5,841	6,309	7,376	7,056	7,764
Meal Exports	6,360	5,854	6,339	7,504	6,940	7,755
Disappearance	17,450	16,688	17,076	19,696	20,241	20,940
Ending Stocks	293	251	227	321	355	361

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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U.S. Sunflower Information Online

The National Sunflower Association has a wealth of U.S. sunflower information online at 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.

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