

~ 2021 ~

U.S. Sunflower Crop Quality Report



Regarding the 2021 Sunflower Crop Quality Report . . .

The 2021 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 2021 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 at www.sunflowernsa.com.

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

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2021 U.S. Sunflower Acreage & Production

United States sunflower production totaled 1.90 billion pounds in 2021 according to USDA, down 36% from 2020. Average yield of 1,530 pounds/acre was down 260 pounds from 2020. Exceedingly dry conditions in much of the major production region were a key factor.

Planted area in 2021, at 1.29 million acres, was 25% below the previous year. Area harvested was also down 25% from 2020 to 1.24 million acres.

South Dakota, the leading sunflower-producing state during 2021, harvested 817,800 million pounds, down 30% from 2020. Planted area in South Dakota decreased 16% from 2020, and the state's average yield dropped by 278 pounds to 1,632 pounds/acre.

Production in

North Dakota decreased 43% from 2020 to 761,900 million pounds. Planted acreage in North Dakota, at 494,000 acres, declined 33% from the previous year. The average yield in North Dakota dropped 291 pounds from 2020 to 1,581 pounds/acre.

United States production of oil-type sunflower varieties in 2021, at 1.74 billion pounds, was 34% below that of 2020. Harvested acres were down 22% and average yield dropped by 279 pounds from 2020's record high of 1,802 to 1,523 pounds/acre.

Production of nonoil sunflower in 2021 is estimated at 167.1 million pounds, a drop of 54% from 2020. Area harvested, at 104,300 acres, was down 51% from 2020, and average nonoil yield was 1,602 pounds/acre.



U.S. Sunflower Production

(1,000s of Pounds)

	2018	2019	2020	2021
Oil	1,877,260	1,765,550	2,617,340	1,735,860
Nonoil	219,785	190,485	365,070	167,125
Total	2,097,045	1,956,035	2,982,410	1,902,985

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

(1,000s of Hectares)

State	2014	2015	2016	2017	2018	2019	2020	2021
Colorado	13.0	23.1	23.1	29.9	19.8	17.8	13.0	15.8
Kansas	17.0	21.4	17.0	20.2	16.6	14.2	21.0	9.7
Minnesota	18.2	30.4	25.9	13.4	17.8	20.6	27.1	21.4
Nebraska	10.1	10.9	11.3	11.5	9.7	10.5	15.8	13.4
North Dakota	206.4	244.8	246.9	155.4	153.8	178.1	255.0	182.1
South Dakota	161.9	230.7	200.3	210.4	196.3	186.2	226.6	188.2
Texas	16.2	35.2	11.3	12.1	7.7	10.5	12.1	12.5
Other	18.3	14.6	18.0	21.4	23.1	19.8	17.2	18.0
Total	461.1	611.1	553.8	474.3	444.8	457.7	587.8	461.1

2021 Seed Quality/Confection Kernel Specifications

Seed quality and kernel specifications of the 2021 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 44.4%, compared to the 2020 average of 42.2%. Test weight averaged 31.7 pounds per bushel — 2.7 pounds higher than the 2020 samples. Foreign material, at 4.4%, was identical to the 2020 samples. At 8.8%, moisture was 0.3% below the 9.1% average of the 2020 samples.

The percentage of confection (nonoil) seeds

over 20/64 in size averaged 85.4% among the 2021 crop year samples — 5.2% higher than the 2020 samples' average of 80.2%.

Foreign material in the nonoils averaged 12.8% in 2021, 0.6% above the

2020 average. At 21.4 pounds per bushel, average 2021 nonoil test weight was 0.3 pound higher than that of the 2020 samples. At 9.0%, nonoil average moisture was almost identical to 2020's 8.9%.

Oil-Type Sunflower Seed Quality

Year	Test Weight (Lbs/Bu)	Moisture (%)	Foreign Material (%)	Oil (%)
2021	31.7	8.8	4.4	44.4
2020	29.0	9.1	4.4	42.2
2019	29.5	10.9	5.6	42.6
2018	30.4	9.1	3.6	42.8
2017	30.0	9.1	5.1	41.6

Nonoil Sunflower Seed Quality

Year	Test Weight (Lbs/Bu)	Moisture (%)	Foreign Material (%)	Seeds Over 20/64 Size (%)
2021	21.4	9.0	12.8	85.4
2020	21.1	8.9	12.2	80.2
2019	21.7	9.5	13.0	80.6
2018	22.3	10.3	12.7	86.4
2017	20.2	9.8	16.3	87.1

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
<i>Quality and type of kernel is determined with the following factors to meet specific customer needs:</i>	
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.

2021 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 2021 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 68.41% oleic average of 2021 NuSun® (mid-oleic) samples was just slightly below 2020's mid-oleic average of 68.84%.

The 2021 high-oleic seed samples averaged an oleic acid content of 83.87%. That compares to

an 84.26% average of the 2020 high-oleic seed samples and an 85.21% average in 2019.

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: afoaonline.org.

Sunflower Oil Quality / High Oleic

Percent

	Palmitic	Stearic	Oleic	Linoleic	Linolenic
Year	16:0	18:0	18:1	18:2	18:3
2021	3.30	3.37	83.87	7.13	0.23
2020	3.28	3.39	84.26	6.76	0.22
2019	3.38	3.39	85.21	5.85	0.21
2018	3.37	3.37	85.04	6.09	0.12
2017	3.27	3.11	86.37	4.86	0.17

Sunflower Oil Quality / NuSun®

Percent

	Palmitic	Stearic	Oleic	Linoleic	Linolenic
Year	16:0	18:0	18:1	18:2	18:3
2021	3.97	3.50	68.41	21.83	0.35
2020	3.95	3.48	68.84	21.39	0.38
2019	3.99	3.38	70.19	20.32	0.27
2018	4.06	3.55	70.04	19.89	0.32
2017	3.97	3.34	70.67	19.51	0.26

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)

2021 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. Three types of sun meal, identified by their respective protein contents (28, 32 and 35%), are produced in the United States.

U.S. Sunflower Oil Exports

(October-September, in Metric Tons)

Country	2017/18	2018/19	2019/20	2020/21
Australia	492	1,511	646	392
Canada	20,282	20,402	23,716	26,370
Columbia	7	109	133	46
Germany	6	4,569	1	0
Japan	597	1,104	567	1,257
Malaysia	2,083	6,721	48	2,261
Mexico	12,572	17,015	9,686	10,300
Netherlands	224	35	166	228
Singapore	41	153	1	0
South Korea	236	157	2,261	1,692
Taiwan	611	616	501	540
Vietnam	1,230	1,415	63	15
Other	2,003	1,613	1,898	2,079
Total MT	40,384	55,420	39,687	45,180

U.S. Sunflower Meal Exports

(October-September, in Metric Tons)

Country	2017/18	2018/19	2019/20	2020/21
Canada	3,006	13,206	19,817	27,080
Indonesia	194	155	0	0
Mexico	35	0	0	663
Thailand	0	834	0	0
Vietnam	2,550	156	41	419
Other	0	0	103	0
Total MT	5,823	14,351	19,961	28,162



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

Item	2016/17	2017/18	2018/19	2019/20	2020/21 <i>Revised</i>	2021/22 <i>Forecast</i>
NONOIL SUNFLOWER						
Area Harvested (1,000 HA)	66	67	50	50	86	42
Area Harvested (1,000 AC)	164	166	123	123	214	104
Yield (MT/HA)	1.94	1.96	2.00	1.74	1.92	1.80
Yield (LB/AC)	1,729	1,750	1,781	1,555	1,711	1,602
Stocks, Oct. 1	71	38	49	32	25	43
Production	129	132	100	86	166	76
Seed Import	36	41	50	98	83	90
TOTAL SUPPLY	236	211	199	216	274	209
Disappearance	197	162	167	191	231	184
Ending Stocks	39	49	32	25	43	25
OIL SUNFLOWER						
Area Harvested (1,000 HA)	554	473	443	458	588	461
Area Harvested (1,000 AC)	1,369	1,168	1,094	1,131	1,452	1,140
Yield (MT/HA)	1.94	1.77	1.93	1.75	2.02	1.71
Yield (LB/AC)	1,731	1,582	1,725	1,561	1,802	1,523
Stocks, Oct. 1	105	187	97	65	57	104
Production	1,075	838	856	801	1,187	787
Seed Import	21	31	36	43	45	50
TOTAL SUPPLY	1,201	1,056	989	909	1,290	941
Oilseed Crushed	508	475	485	389	504	450
Planting Seed, Birdfood, Domestic Use	483	467	420	447	659	420
Exports	24	17	19	16	23	17
Disappearance	1,015	959	924	852	1,186	887
Ending Stocks	186	97	65	57	104	54
SUNFLOWER OIL						
Stocks, Oct. 1	34	41	33	18	22	26
Oil Imports	55	73	60	169	134	140
Oil Production	211	200	204	163	212	189
TOTAL SUPPLY	300	314	297	350	368	355
Domestic Oil Use	227	241	224	288	297	295
Oil Exports	32	40	55	40	45	35
Total Use	259	281	279	328	342	330
Ending Stocks	41	33	18	22	26	25
SUNFLOWER MEAL						
Stocks, Oct. 1	3	3	3	3	3	3
Production	259	242	247	198	257	230
TOTAL SUPPLY	262	245	251	201	260	233
Domestic Use	255	236	233	178	229	206
Exports	4	6	15	20	28	24
Total Use	259	242	248	198	257	230
Ending Stocks	3	3	3	3	3	3

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World Sunflower Supply & Disappearance

Sources:
Oil World & USDA

Item	2016/17	2017/18	2018/19	2019/20	2020/21 <i>Revised</i>	2021/22 <i>Forecast</i>
Area Harvested (1,000 HA)	26,964	26,885	27,185	27,413	28,037	29,915
Yield (MT/HA)	1.86	1.83	1.91	2.03	1.80	1.93
SUNFLOWER SEED —						
Production						
Argentina	3,300	3,400	3,530	3,020	2,800	3,100
European Union	8,641	10,058	9,482	9,469	8,904	10,574
China	2,750	2,580	2,550	2,680	2,750	2,850
Russia	11,600	11,000	12,756	15,379	13,420	15,400
Ukraine	15,100	13,400	15,250	16,500	13,900	16,800
United States	1,203	970	956	887	1,353	863
South Africa	874	862	678	810	677	820
Turkey	1,470	1,700	1,530	1,700	1,580	1,750
Other	5,130	5,086	5,292	5,202	5,032	5,527
TOTAL	50,068	49,056	52,024	55,647	50,416	57,684
Seed Import						
Turkey	611	721	1,051	1,058	844	840
European Union	632	520	550	1,057	817	630
Other	1,396	1,322	1,445	1,451	1,297	1,410
TOTAL	2,639	2,563	3,046	3,566	2,958	2,880
Seed Exports						
Argentina	74	58	149	214	178	161
United States	99	89	87	64	73	63
Russia	362	103	338	1,278	528	270
Ukraine	261	50	119	76	186	220
Other	1,804	2,234	2,392	1,980	1,921	2,222
TOTAL	2,600	2,534	3,085	3,612	2,886	2,936
Oilseed Crushed	44,845	44,663	47,231	50,300	45,410	51,275
SUNFLOWER OIL —						
Oil Opening Stocks	2,015	2,731	2,518	2,842	2,841	2,304
Oil Production	18,933	18,820	20,050	21,532	18,891	21,849
Oil Imports						
Iran	593	388	797	527	946	700
Turkey	801	517	529	772	719	850
Egypt	581	545	452	398	198	350
European Union	1,861	1,635	2,128	2,479	1,719	2,430
India	2,137	2,484	2,328	2,514	1,958	2,350
Others	4,494	4,613	5,171	6,881	5,795	6,939
TOTAL	10,467	10,182	11,405	13,571	11,335	13,619
Oil Exports						
Argentina	729	737	968	675	796	730
European Union	454	522	482	875	667	893
Russia	2,223	2,258	2,763	3,706	3,228	3,750
Ukraine	5,892	5,278	6,041	6,763	5,250	6,670
United States	32	40	55	40	45	35
Other	1,341	1,150	1,277	1,640	1,310	1,603
TOTAL	10,671	9,985	11,586	13,699	11,296	13,681
Disappearance	18,217	19,033	19,750	21,533	19,428	21,296
Ending Stocks	2,731	2,518	2,818	2,841	2,304	2,857
SUNFLOWER MEAL —						
Meal Production	19,917	20,046	20,900	21,972	20,186	22,496
Meal Imports	7,376	7,014	8,302	9,009	7,964	9,406
Meal Exports	7,504	6,944	8,221	8,991	8,089	9,432
Disappearance	19,696	20,088	20,861	21,967	20,098	22,397
Ending Stocks	321	348	538	272	235	307

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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