

~ 2023 ~

U.S. Sunflower Crop Quality Report



Regarding the 2023 Sunflower Crop Quality Report . . .

The 2023 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 2023 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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2023 U.S. Sunflower Acreage & Production

United States sunflower production in 2023 totaled 2.26 billion pounds, according to the USDA — an decline of 19.4% from the 2.81 billion pounds of 2022. At 1.97 billion pounds, production of oil-type sunflower was down 23.4% from the prior year's crop, while at 296.8 million pounds, the 2023 confection crop was 22.6% higher than 2022.

North Dakota retained its top spot among states in 2023, harvesting a total of 1.12 billion pounds of sunflower. That was, however, 16.2% lower than in 2022. South Dakota came in at 817.2 million pounds, a 24.5% drop from the prior year. Among surveyed states, the only production hike in 2023 versus 2022 occurred in Texas, where sunflower production

totalled 61.3 million pounds, compared to 59.8 million in 2022. Drought was a factor again in the High Plains states, while damage from the red sunflower seed weevil had a significant impact in South Dakota.

Average yield among oil-type sunflower acres in 2023 was 1,747 pounds per acre — just two pounds more than the 2022 average. Minnesota led at 2,300 pounds per acre, followed by North Dakota (1,970 pounds) and South Dakota (1,650 pounds). On the lower end were Colorado (940 pounds) and Kansas (930 pounds).

On confection sunflower acreage, both Minnesota and South Dakota averaged 2,400 pounds per acre in 2023, while Kansas came in at just 850 pounds.



U.S. Sunflower Production

(1,000s of Pounds)

	2020	2021	2022	2023
Oil	2,617,340	1,738,160	2,566,400	1,966,715
Nonoil	365,070	167,125	242,155	296,805
Total	2,982,410	1,905,285	2,808,555	2,263,520

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

(1,000s of Hectares)

State	2016	2017	2018	2019	2020	2021	2022	2023
Colorado	23.1	29.9	19.8	17.8	13.0	15.8	17.4	9.7
Kansas	17.0	20.2	16.6	14.2	21.0	9.7	11.3	10.5
Minnesota	25.9	13.4	17.8	20.6	27.1	21.4	27.1	19.4
Nebraska	11.3	11.5	9.7	10.5	15.8	13.4	18.6	12.1
North Dakota	246.9	155.4	153.8	178.1	255.0	182.1	261.0	198.3
South Dakota	200.3	210.4	196.3	186.2	226.6	188.2	234.7	178.1
Texas	11.3	12.1	7.7	10.5	12.1	13.4	15.8	16.2
Other	18.0	21.4	23.1	19.8	17.2	18.0	12.5	11.1
Total	553.8	474.3	444.8	457.7	587.8	462.0	598.4	455.4

2023 Seed Quality/Confection Kernel Specifications

Seed quality and kernel specifications of the 2023 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 44.9%, which compares to the 2022 average of 44.3%. Test weight averaged 30.8 pounds per bushel — 0.4 pound heavier than the 2022 samples. Foreign material, at 3.7%, was 0.9% lower than the 2022 samples. At 8.9%, moisture was 0.3% higher than the average of 2022's samples.

The percentage of con-

fection (nonoil) seeds over 20/64 in size averaged 79.2% among the 2023 crop year samples — 3.4% lower than the 2022 average of 82.6%.

Foreign material in the nonoils averaged 13.0% in 2023, 1.3% above the

2022 average. At 21.2 pounds per bushel, average 2023 nonoil test weight was 2.8 pounds below than that of the 2022 samples. At 9.7%, nonoil average moisture was 0.3% above that of 2022's seed samples.

Oil-Type Sunflower Seed Quality

Year	Test Weight (Lbs/Bu)	Moisture (%)	Foreign Material (%)	Oil (%)
2023	30.8	8.9	3.7	44.9
2022	30.4	8.6	4.6	44.3
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

Nonoil Sunflower Seed Quality

Year	Test Weight (Lbs/Bu)	Moisture (%)	Foreign Material (%)	Seeds Over 20/64 Size (%)
2023	21.2	9.7	13.0	79.2
2022	24.0	9.4	11.7	82.6
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

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.

2023 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 2023 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 66.12% oleic average of 2023 NuSun® (mid-oleic) samples was well below 2022's mid-oleic average of 73.85%.

The 2023 high-oleic seed samples averaged an oleic acid content of 86.12%. That compares to

an 85.55% average of the 2022 high-oleic seed samples and an 83.87% average in 2021.

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
2023	3.30	3.22	86.12	5.01	0.16
2022	3.34	3.24	85.55	5.74	0.16
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

Sunflower Oil Quality / NuSun®

Percent

	Palmitic	Stearic	Oleic	Linoleic	Linolenic
Year	16:0	18:0	18:1	18:2	18:3
2023	4.01	3.18	66.12	24.55	0.23
2022	3.81	3.31	73.85	16.96	0.28
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

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)

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	2019/20	2020/21	2021/22	2022/23
Australia	646	392	382	273
Canada	23,716	26,370	40,498	21,348
Columbia	133	46	21	24
Honduras	174	240	313	480
Japan	567	1,257	509	467
Malaysia	48	2,261	0	16
Mexico	9,686	10,300	7,268	4,999
Netherlands	166	228	594	456
South Korea	2,261	1,692	3,828	2,917
Taiwan	501	540	815	551
Vietnam	63	15	26	97
Other	1,726	1,839	1,988	1,394
Total MT	39,687	45,180	56,242	33,022

U.S. Sunflower Meal Exports

(October-September, in Metric Tons)

Country	2019/20	2020/21	2021/22	2022/23
Canada	19,817	27,080	23,526	13,126
Indonesia	0	0	0	899
Mexico	0	663	0	0
Turkey	0	0	0	2,297
Vietnam	41	419	4,146	0
Other	103	0	64	722
Total MT	19,961	28,162	27,736	17,044



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

Item	2018/19	2019/20	2020/21	2021/22	2022/23 <i>Revised</i>	2023/24 <i>Forecast</i>
NONOIL SUNFLOWER						
Area Harvested (1,000 HA)	50	50	86	42	52	57
Area Harvested (1,000 AC)	123	123	214	104	129	142
Yield (MT/HA)	2.00	1.74	1.92	1.80	2.11	2.34
Yield (LB/AC)	1,781	1,555	1,711	1,602	1,884	2,090
Stocks, Oct. 1	50	33	26	43	34	12
Production	100	86	166	76	110	135
Seed Import	50	98	83	90	73	72
TOTAL SUPPLY	200	217	275	209	217	218
Disappearance	167	191	232	175	205	205
Ending Stocks	33	26	43	34	12	13
OIL SUNFLOWER						
Area Harvested (1,000 HA)	443	458	588	462	595	455
Area Harvested (1,000 AC)	1,094	1,131	1,452	1,142	1,471	1,126
Yield (MT/HA)	1.93	1.75	2.02	1.71	1.96	1.96
Yield (LB/AC)	1,725	1,561	1,802	1,523	1,745	1,747
Stocks, Oct. 1	97	65	57	103	66	123
Production	856	801	1,187	789	1,165	892
Seed Import	36	43	45	39	28	30
TOTAL SUPPLY	989	909	1,289	931	1,259	1,045
Oilseed Crushed	485	389	504	435	411	425
Planting Seed, Birdfood, Domestic Use	420	447	659	405	697	495
Exports	19	16	23	25	28	30
Disappearance	924	852	1,186	865	1,136	950
Ending Stocks	65	57	103	66	123	95
SUNFLOWER OIL						
Stocks, Oct. 1	33	18	22	27	29	39
Oil Imports	60	169	134	205	153	150
Oil Production	204	163	212	183	173	179
TOTAL SUPPLY	297	350	368	414	355	368
Domestic Oil Use	224	288	296	329	283	305
Oil Exports	55	40	45	56	33	32
Total Use	279	328	341	385	316	337
Ending Stocks	18	22	27	29	39	31
SUNFLOWER MEAL						
Stocks, Oct. 1	3	3	3	3	3	3
Production	247	198	257	222	210	217
TOTAL SUPPLY	250	201	260	225	212	220
Domestic Use	233	178	229	194	192	197
Exports	15	20	28	28	17	20
Total Use	248	198	257	222	209	217
Ending Stocks	2	2	3	3	3	3

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World Sunflower Supply & Disappearance

Sources:
Oil World & USDA

Item	2018/19	2019/20	2020/21	2021/22	2022/23 <i>Revised</i>	2023/24 <i>Forecast</i>
Area Harvested (1,000 HA)	27,185	27,413	28,045	29,877	29,801	29,552
Yield (MT/HA)	1.91	2.03	1.81	1.95	1.85	1.91
SUNFLOWER SEED —						
Production						
Argentina	3,530	3,020	3,200	3,360	4,139	3,600
European Union	9,482	9,469	8,969	10,389	9,520	9,863
China	2,550	2,680	2,750	2,880	2,930	3,000
Russia	12,756	15,379	13,420	15,660	16,600	16,800
Ukraine	15,250	16,500	13,900	16,900	12,400	14,400
United States	956	887	1,353	864	1,276	1,027
South Africa	678	810	678	846	724	830
Turkey	1,530	1,700	1,580	1,750	1,820	1,320
Other	5,292	5,202	4,995	5,652	5,834	5,674
TOTAL	52,024	55,647	50,845	58,301	55,234	56,514
Seed Import						
Turkey	1,051	1,058	844	673	981	580
European Union	550	1,057	817	1,807	1,466	896
Other	1,445	1,451	1,308	1,639	1,513	1,571
TOTAL	3,046	3,566	2,969	4,119	3,960	3,047
Seed Exports						
Argentina	149	214	178	158	91	140
United States	87	64	72	69	64	72
Russia	338	1,278	528	280	285	352
Ukraine	119	76	186	1,793	1,685	640
Other	2,392	1,980	1,907	1,875	1,750	1,806
TOTAL	3,085	3,612	2,871	4,175	3,875	3,010
Oilseed Crushed	47,231	50,300	45,568	48,315	52,192	52,586
SUNFLOWER OIL —						
Oil Opening Stocks	2,518	2,818	2,817	2,294	3,488	4,476
Oil Production	20,050	21,532	18,891	20,481	22,071	22,246
Oil Imports						
Iran	797	527	903	668	729	760
Turkey	529	772	719	1,065	1,262	1,150
Egypt	452	398	204	281	293	340
European Union	2,128	2,479	1,720	2,322	2,482	2,649
India	2,328	2,514	1,958	1,956	2,988	2,470
Others	5,171	6,881	5,872	4,968	6,243	6,592
TOTAL	11,405	13,571	11,376	11,260	13,997	13,961
Oil Exports						
Argentina	968	675	796	894	945	980
European Union	482	875	671	846	1,187	1,078
Russia	2,763	3,706	3,228	3,193	4,217	4,400
Ukraine	6,041	6,763	5,250	4,725	5,447	5,530
United States	55	40	45	56	33	32
Other	1,277	1,640	1,337	1,697	2,073	2,057
TOTAL	11,586	13,699	11,327	11,411	13,902	14,077
Disappearance	19,750	21,533	19,414	19,287	21,083	22,490
Ending Stocks	2,818	2,817	2,294	3,488	4,476	4,232
SUNFLOWER MEAL —						
Meal Production	20,900	21,972	20,285	21,443	23,122	23,171
Meal Imports	8,302	9,009	8,048	8,274	9,621	9,969
Meal Exports	8,221	8,991	8,092	8,432	9,472	10,007
Disappearance	20,861	21,967	20,278	20,925	22,937	23,101
Ending Stocks	538	272	308	693	1,026	1,058

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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