



US Market Report

Biofuels driving fats demand while proteins go abroad

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Two of the largest global events of 2018 were North and South Korea's commitment to formally end the Korean War and the June summit between United States (US) President Donald Trump and North Korean Supreme Leader Kim Jong-un, the first ever meeting of these two nations' leaders. In a stand of unity, the North and South Korean Olympic athletes marched under one flag at the Winter Olympics in Seoul, South Korea. Several other events of note occurred in 2018. In Cuba, Miguel Diaz-Canel Bermudez was sworn in as president, ending 59 years of rule over the island nation by Fidel Castro. In the Middle East, Iraq had its first parliamentary elections and the Islamic State of Iraq and Syria was nearly pushed out of Syria. In May, millions around the world watched the royal wedding of Prince Harry and Meghan Markle at Windsor Castle.

In the United States, the median household income was projected to set a third consecutive record high in 2018 and the unemployment rate dropped to 3.7 percent, the lowest in more than 50 years. Last spring, Trump issued multiple proclamations adjusting imports of steel and aluminum into the United States under Section 232 of the Trade Expansion Act of 1962. These adjustments included both import duties and quotas, causing a trade war as US trading partners countered with retaliatory tariffs. On July 6, China imposed a 25 percent tariff on US soybeans, causing prices to drop 20 percent and animal protein meal prices soon followed. Rendered products were spared direct tariffs until September, when China enacted a 5 percent retaliatory tariff on US animal protein meals.

In August 2017, North America Free Trade Agreement renegotiations began. The National Renderers Association represented the rendering industry's interests in the process by testifying before a panel at the International Trade Commission, responding to *Federal Register* notices, holding face-to-face meetings with the office of the U.S. Trade Representative, and supporting agriculture coalitions in Washington, DC. The key message was "do no harm" to current trade. On November 30, 2018, a new trade deal, the United States-Mexico-Canada Agreement, was signed by leaders and must now be ratified by each country's legislature. The agreement would go into effect in 2020 at the earliest.

The International Monetary Fund (IMF) estimated the world's 2018 economic growth rate remained the same as 2017 at 3.7 percent. A slowdown toward the end of 2018 along with the effects of the current trade wars has led the IMF to forecast global growth will decline to 3.5 percent in 2019.

Domestic Developments

More Fat, Less Protein

US cattle slaughter in 2018 was 33 million head, up 2.5 percent from 2017, showing a strong upswing in the cattle cycle that started in 2016, and was the largest cattle slaughter since 2011. Average annual live weight increased from 1,349 pounds in 2017 to 1,350 pounds in 2018. The swine and poultry industries continued to grow as well, with hog slaughter at 124.4 million head, up 2.6 percent from 2017. Annual average live weight at slaughter increased slightly from 282 pounds in 2017 to 283 pounds last year. Broiler and mature chicken production was up 1.2 percent in 2018, totaling nearly 9.16 billion birds slaughtered while live weight increased from 6.20 to 6.26 pounds, continuing an upward trend of heavier birds at slaughter. Turkey slaughter fell 2 percent from 241.7 million birds in 2017 to 236.9 million last year, although average annual live weight per bird increased from 30.9 pounds in 2017 to approximately 31.1 pounds in 2018.

Production and consumption data for the rendering industry was historically reported in the US Census Bureau's *M311K—Fats and Oils: Production, Consumption, and Stocks* report. This report was discontinued in July 2011 after government cutbacks; however, in May 2015, the National Agricultural Statistics Service (NASS) statisticians released their first survey results for rendered product production. In 2016, NASS published its first full year of data hence 2016 through 2018 production in table 2 is data from the NASS *Fats and Oils: Oilseed Crushings, Production, Consumption, and Stocks Annual Summary* that is released every March. The 2013–2015 data in table 2 was derived using NASS monthly data as a baseline to derive historic production via the relationship between the production of rendered products and slaughter data. Yellow grease production in 2016 thereafter is NASS

data, but prior to 2016 it was calculated using the relationship between yellow grease production numbers in the 2010 report titled *A Profile of the North American Rendering Industry* from Informa Economics, and cooking oil consumption as reported by the US Department of Agriculture (USDA). Unfortunately, the NASS publication does not include consumption so data for animal fats use in biodiesel/renewable fuel production in table 2 is compiled from the Energy Information Agency (EIA) *Monthly Biodiesel Production Report*. Other consumption data was derived by subtracting production estimates from export estimates and biofuels use.

In 2018, production of rendered products totaled 10.2 million metric tons, down more than 2 percent from 2017. This is in contrast to the increase in cattle, pig, and chicken slaughter. The decrease in rendering production could be partially explained by raw material being diverted for other uses, such as fresh pet food, gel bone, and edible offal, along with the decrease in turkey slaughter.

Total animal fats produced last year was 5.7 million metric tons, up slightly from 2017, with tallow production up 3 percent from the previous year at nearly 2.7 million metric tons. This increase was led by strong growth in both technical and edible tallow production—technical tallow was up 8.6 percent compared to 2017 and edible tallow increased 9 percent during the same period. Inedible tallow production dropped less than one-tenth of a percent to more than 1.6 million metric tons in 2018. Even though hog slaughter was up in 2018, white grease production was down 1.8 percent to 737,000 metric tons, lard declined 5.6 percent to 149,400 metric tons, and choice white grease dropped less than 1 percent to 587,400 metric tons from 2017. Yellow grease/used cooking oil production was more than 990,000 metric tons, up 8.5 percent from 2017. Other greases were down 22 percent in 2018 at 285,300 metric tons.

Animal protein meal production in 2018 dropped 5.5 percent from 2017 levels to 4.5 million metric tons, with meat and bone meal production down 4.8 percent to 2.6 million metric tons, poultry by-product meal down 4.9 percent to

just over 1.3 million metric tons, and feather meal down a significant 11 percent to 464,300 metric tons.

While imports of rendered products are not uncommon due to intra-North American trade along with lamb meal imports for pet food production, recent increases of animal fats and greases is due to biodiesel and renewable diesel demand in the United States. In 2018, overall imports of fat were 238,700 metric tons, up close to 43 percent from 2017. Over the past 5 years, US imports of animal fats and used cooking oil have grown 133 percent. On the animal protein meal side, imports were 108,900 metric tons in 2018, up 30 percent from 2017 and close to 50 percent over the last 5 years. More than 70 percent of the animal protein meal imported was lamb meal from Australia and New Zealand that is used in US pet food. Additionally, 13 percent of imports were from European Union countries, followed by 8 percent from Canada and 4 percent from Brazil. The United States also imported 420,000 metric tons of feather meal in 2018, down 35 percent from 2017.

Fats Demand Continues to Climb, Proteins Fall

As mentioned earlier in this report, NASS does not include domestic consumption in its monthly surveys so the data in table 2 is derived by adding production plus imports and subtracting biodiesel/renewable diesel inputs as reported by EIA and exports as reported by the Global Trade Atlas. Table 2 does not account for any carryover stocks.

Despite domestic consumption of rendered products being steady over the last 5 years, increasing an average of 1 percent, consumption in 2018 was down 1.3 percent to almost 8.5 million metric tons. Last year, total animal fats use in the United States for biodiesel/renewable fuel production was 1.4 million metric tons, up 19 percent from 2017; however, two “other” categories were not available in 2017. If animal fats use is adjusted for those two categories, which account for around 100,200 metric tons, the increase was 10.5 percent from 2017. At the same time, other domestic use of animal fats and used

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Table 1. Average annual prices of select rendered products, 2013-2018 (per metric ton)

Product (Location)	2013	2014	2015	2016	2017	2018	% Change 17/18
Fats							
Beef tallow, packer (Chicago)	\$887	\$801	\$581	\$638	\$682	\$556	-18
Choice white grease (Missouri River)	\$846	\$711	\$498	\$537	\$549	\$463	-16
Edible tallow (Chicago)	\$946	\$865	\$638	\$714	\$762	\$690	-9
Edible tallow (Gulf)	\$966	\$803	\$563	\$746	\$731	\$662	-9
Lard (Chicago)	\$1,081	\$959	\$670	\$708	\$729	\$718	-2
Poultry fat (Mid-South)	\$793	\$660	\$502	\$546	\$605	\$566	-6
Yellow grease (Missouri River)	\$727	\$612	\$462	\$505	\$524	\$408	-22
Protein meals							
Blood meal, porcine (Midwest)	\$1,308	\$1,643	\$1,086	\$899	\$968	\$822	-15
Blood meal, ruminant (Missouri River)	\$1,232	\$1,580	\$1,070	\$857	\$931	\$790	-15
Feather meal (Mid-South)	\$701	\$772	\$521	\$391	\$437	\$497	14
Meat and bone meal, porcine (Missouri River)	\$527	\$556	\$377	\$314	\$314	\$308	-2
Meat and bone meal, ruminant (Missouri River)	\$464	\$502	\$359	\$294	\$273	\$263	-4
Poultry by-product meal, 57% protein (Mid-South)	\$582	\$610	\$447	\$330	\$306	\$295	-4
Poultry by-product meal, 67% protein (Mid-South)	\$821	\$871	\$602	\$614	\$688	\$721	5

Source: The Jacobsen.

Table 2. US production, imports, consumption, and exports of rendered products, 2013-2018 (000 metric tons)

Category	2013	2014	2015	2016	2017	2018	% Change 17/18
Production							
Tallow	2,589.3	2,441.4	2,385.7	2,559.5	2,594.9	2,675.5	3.1
Inedible tallow	1,631.2	1,538.0	1,502.9	1,587.4	1,663.8	1,662.4	-0.1
Technical tallow	543.9	512.8	501.1	562.5	521.5	566.5	8.6
Edible tallow	414.3	390.6	381.7	409.6	409.6	446.5	9.0
Poultry fat	1,040.2	1,056.5	1,088.8	1,113.3	1,095.3	1,054.0	-3.8
Yellow grease/used cooking oil	896.4	933.2	926.4	916.4	913.0	990.7	8.5
White grease	718.0	707.3	758.7	787.6	750.5	736.8	-1.8
Choice white grease	567.6	559.2	599.8	620.3	592.3	587.4	-0.8
Lard	150.4	148.1	158.9	167.3	158.2	149.4	-5.6
Other greases	346.7	333.9	341.7	336.0	369.2	285.3	-22.7
Subtotal	5,712.8	5,472.3	5,501.3	5,712.8	5,722.9	5,742.3	0.3
Meat & bone meal	2,629.9	2,532.4	2,591.8	2,711.5	2,790.2	2,657.4	-4.8
Poultry by-product meal	1,365.6	1,387.1	1,429.4	1,382.1	1,438.8	1,368.1	-4.9
Feather meal	512.7	520.7	536.6	527.2	522.0	464.3	-11.1
Subtotal	4,508.2	4,440.2	4,557.9	4,620.8	4,751.0	4,489.8	-5.5
Total production	10,221.0	9,912.4	10,059.2	10,333.6	10,473.9	10,232.1	-2.3
Imports							
Tallow	59.5	62.6	64.0	78.9	99.8	139.4	39.7
Yellow grease/used cooking oil	20.6	17.2	22.4	23.0	38.7	62.9	62.5
White grease	21.8	20.8	34.4	28.8	27.0	35.8	32.6
Choice white grease	15.3	13.5	28.0	24.1	21.2	28.9	36.6
Lard	6.4	7.3	6.5	4.7	5.8	6.9	18.0
Poultry fat	0.4	0.4	0.6	0.6	1.9	0.6	-69.7
Subtotal	102.2	101.0	121.4	131.2	167.4	238.7	42.6
Meat & bone/poultry/porcine meal	73.8	69.6	64.1	82.2	83.6	108.9	30.2
Feather meal	1.0	0.4	0.2	0.6	0.7	0.4	-35.2
Subtotal	74.7	70.0	64.3	82.8	84.3	109.3	29.7
Total imports	177.0	171.0	185.7	214.0	251.7	348.0	38.3
Consumption							
Feed, food, fatty acid, carryover, other	3,522.1	3,474.9	3,462.9	3,641.7	3,608.3	3,604.4	-0.1
Tallow	1,990.3	1,899.6	1,846.8	2,084.4	2,115.9	2,150.0	1.6
Poultry fat	952.6	959.0	983.7	999.4	1,000.9	979.4	-2.1
White grease	498.5	492.5	505.9	534.8	491.4	475.0	-3.3
Yellow grease*	80.6	123.7	126.5	23.1	0.0	0.0	
Biodiesel and renewable fuel	1,116.7	1,051.8	1,201.1	1,142.6	1,192.1	1,417.0	18.9
Animal fats	500.7	468.5	576.5	512.6	524.9	584.2	11.3
Tallow	205.0	161.0	195.0	150.6	176.5	219.5	24.4
Poultry fat	73.0	79.8	89.4	99.8	80.3	60.3	-24.9
White grease	211.4	213.6	267.2	262.2	268.1	280.3	4.6
Other	11.3	14.1	24.9	n/a	n/a	24.0	
Recycled oils	616.0	583.3	624.6	630.0	667.2	832.8	24.8
Yellow grease/used cooking oil	475.4	493.5	569.3	630.0	667.2	756.6	13.4
Other	140.6	89.8	55.3	n/a	n/a	76.2	
Subtotal	4,638.8	4,526.7	4,664.0	4,784.3	4,800.4	5,021.4	4.6
Meat & bone/poultry/porcine meal	3,415.4	3,414.7	3,399.4	3,331.2	3,346.8	3,100.3	-7.4
Feather meal	334.8	355.1	449.8	464.2	442.5	354.9	-19.8
Subtotal	3,750.3	3,769.8	3,849.2	3,729.0	3,789.3	3,455.2	-8.8
Total consumption	8,389.1	8,296.5	8,513.2	8,513.3	8,589.7	8,476.6	-1.3
Exports							
Inedible tallow/technical tallow	382.3	402.5	343.1	283.3	324.6	327.5	0.9
Yellow grease	361.0	333.1	253.0	286.2	300.2	356.6	18.8
Edible tallow	71.1	40.8	64.8	120.1	77.7	117.9	51.8
Lard	29.4	21.4	19.8	19.1	17.2	16.8	-2.1
Choice white grease	0.5	0.6	0.2	0.4	0.8	0.4	-47.2
Poultry fat	14.9	18.2	16.4	14.7	16.1	14.8	-7.5
Subtotal	859.2	816.7	697.2	723.8	736.5	834.1	13.3
Meat & bone/poultry/porcine meal	580.1	504.7	621.9	762.4	882.2	925.1	4.9
Feather meal	178.8	166.0	87.0	63.6	80.2	109.9	37.1
Subtotal	758.9	670.7	708.9	891.8	962.3	1,035.0	7.6
Total exports	1,618.1	1,487.3	1,406.1	1,615.6	1,698.8	1,869.1	10.0

Sources: Global Trade Atlas for exports, EIA for biodiesel inputs, and NASS *Fats and Oils: Oilseed Crushings, Production, Consumption, and Stocks Annual Summary* for 2018 production.

Notes: n/a-not available; *carryover stocks not included.

cooking oil was up 1.6 percent in 2018 to reach approximately 2.2 million metric tons. Over the last 5 years, domestic use of animal fats and greases has increased 8 percent.

The increased demand for animal fats and used cooking oil in biodiesel and renewable diesel is being driven by the California Low Carbon Fuel Standard. Under this standard, these products are preferred due to their low carbon intensity (CI) scores over other feedstocks. Used cooking oil has some of the lowest CI scores, followed by distiller's corn oil, animal fats, and finally vegetable oils. To achieve California Air Resources Board reduction mandates for CI, biodiesel production is predicted to rise 150 percent and renewable diesel production 230 percent by 2030.

Domestic consumption of animal protein meals was a different story in 2018. Protein meal use was just under 3.5 million metric tons, down almost 9 percent from 2017. Over the last 5 years, domestic consumption has decreased 8 percent while production has remained relatively unchanged. As reported last year, this drop in domestic consumption was mainly due to the all-vegetarian diet trend in the broiler industry. It is estimated that between 25 and 30 percent of US broiler operations now use all-vegetarian diets, hence the supply/demand scenario for protein meals in the United States is critically off balance and shows the need to grow new markets for animal protein meals.

Overall rendered product exports in 2018 were almost 1.9 million metric tons, up 10 percent from 2017 and up 16 percent over the last 5 years. Of that, 1 million metric tons were protein meals and 834,000 metric tons were fats. This export growth was carried by a dramatic increase in protein meals while being offset by a decrease in fat exports. Over the last 5 years, animal protein meal exports grew 36 percent while fat exports dropped 3 percent.

Outlook Looks up—for Fats

As the cattle cycle rebounds and poultry and pork production continue to increase, there will be a greater supply of rendered products on the market. According to the USDA Agricultural Projections to 2028 report, the next 10 years of beef and poultry production is forecast to grow 10 percent and pork production 15 percent. Using these forecasts, animal protein and fat production can be estimated (chart 1). During the next 10 years, an increase of animal protein meals of approximately 937,000 metric tons and additional animal fats of 902,000 metric tons is projected.

The domestic demand for animal protein meals will continue to be influenced by the all-vegetarian diet trend. If this does not change, domestic demand for animal protein

meals and fats for livestock feed will either stabilize or continue to decline, hence the need for new markets for animal protein meals will be critical. Regarding animal fats and used cooking oil, as stated earlier, estimated demand from the biodiesel and renewable diesel industry is predicted to increase in the coming years. For instance, Diamond Green Diesel nearly doubled production in 2018 at its renewable diesel facility in Louisiana from 150 million gallons to 275 million gallons, with plans to expand to 550 million gallons, increasing its need for feedstock to more than 2 million metric tons. Therefore, the 10 year projected increase in animal fats production should be offset by added demand from the renewable diesel and biodiesel sectors. The projected increase in animal protein meal production, however, will need to be offset by expanding existing markets and finding new outlets for these products.

International Market Conditions

Proteins find Home in Exports

Global demand for protein meals continued to grow dramatically in 2018, coming from the livestock feed, aquatic feed, and pet food sectors. According to the 2019 *Alltech Global Feed Survey*, global feed production set a new record in 2018 by increasing 3 percent to more than 1.1 billion metric tons. The largest feed producer in the world is China, followed by the United States and Brazil. China is also the largest importer of feed ingredients in the world. In 2018, China produced 187.9 million metric tons of feed, up half a percent from 2017.

Total US meat and bone meal/poultry/porcine meal exports were up 4.9 percent in 2018 from the previous year.

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Chart 1. US rendered product production projections to 2027 (thousand metric tons)

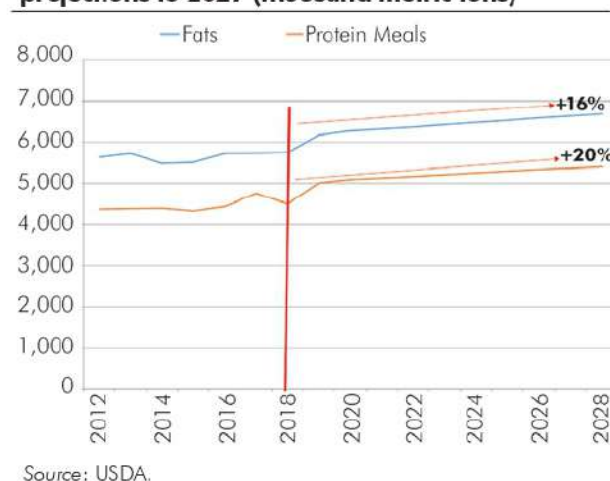


Table 3. US annual livestock and poultry slaughter, 2013-2018 (thousand head)

Species	2013	2014	2015	2016	2017	2018	% Change 17/18
Broilers/Mature chickens	8,648,756	8,669,628	8,822,692	8,908,986	9,050,716	9,158,885	1.2
Cattle	32,462	30,266	28,843	30,578	32,189	33,000	2.5
Hogs	112,077	106,958	115,512	118,220	121,317	124,437	2.6
Turkeys	239,404	236,617	232,389	243,255	241,677	236,860	-2.0

Source: NASS.

Table 4. US export customers by product, 2013-2018 (metric tons)

Product/Country	2013	2014	2015	2016	2017	2018	% Change 17/18
Inedible tallow							
Mexico	238,079	235,843	227,876	145,636	126,624	136,558	7.8
Singapore	0	5,000	14,275	46,312	119,240	88,421	-25.8
Canada	14,841	18,493	20,797	22,600	20,000	35,428	77.1
Morocco	5,000	9,000	7,000	7,198	6,450	13,750	113.2
Guatemala	13,332	21,470	20,449	20,094	15,249	13,608	-10.8
Turkey	45,871	59,474	20,898	19,249	7,200	11,260	56.4
Nigeria	0	0	0	0	7,500	10,400	38.7
Colombia	3,899	6,100	8,000	0	1,856	9,200	395.7
Dominican Republic	2,499	3,000	3,500	4,550	2,750	3,750	36.4
Honduras	14,097	11,499	9,000	8,240	5,641	3,370	-40.3
El Salvador	4,199	3,750	2,900	3,000	1,200	500	-58.3
China	0	0	0	0	0	385	
Trinidad and Tobago	179	264	205	78	159	73	-54.1
Venezuela	18,799	3,800	0	0	7,500	0	-100.0
Haiti	4,519	8,348	917	275	2,000	0	-100.0
Total	382,263	402,548	343,115	283,280	324,586	327,503	0.9
Yellow grease (includes used cooking oil)							
European Union-28	147,289	153,813	128,128	185,000	176,004	169,134	-3.9
Singapore	2,593	2,675	1,755	1,541	8,110	70,742	772.3
Mexico	95,892	95,574	72,564	50,034	63,372	39,186	-38.2
Bosnia and Herzegovina	1,567	499	3,883	11,045	24,407	38,388	57.3
Dominican Republic	18,082	15,518	9,585	10,639	9,652	7,943	-17.7
Canada	11,533	10,604	11,716	9,073	7,747	7,825	1.0
Honduras	3,605	5,890	7,057	6,939	2,167	6,497	199.8
Jamaica	6,991	7,300	1,310	1,568	1,211	3,511	189.9
South Korea	502	552	961	1,350	307	3,205	944.0
China	144	276	965	1,796	1,952	2,333	19.5
Guatemala	3,799	7,125	6,066	651	618	1,583	156.1
Ecuador	99	373	48	301	554	1,388	150.5
Colombia	388	439	593	1846	743	501	-32.6
Brazil	278	189	252	272	289	362	25.3
Nicaragua	1,052	1,932	712	187	543	121	-77.7
Total	361,031	333,133	252,959	286,226	300,219	356,624	18.8
Edible tallow							
Mexico	66,278	35,840	61,076	114,154	72,120	113,527	57.4
Canada	4,870	4,807	3,657	5,706	5,552	4,338	-21.9
Total	71,148	40,783	64,762	120,146	77,678	117,905	51.8
Lard							
Mexico	28,299	18,848	17,691	16,924	15,876	16,173	1.9
Canada	596	612	393	988	605	264	-56.4
Total	29,398	21,390	19,768	19,050	17,181	16,825	-2.1
Choice white grease							
Mexico	33	208	27	67	659	295	-55.2
Dominican Republic	0	66	22	3	54	62	14.8
China	38	0	58	136	37	26	-29.7
Total	491	639	202	374	797	421	-47.2
Poultry fat							
Canada	11,065	13,072	10,943	9,320	10,111	8,822	-12.7
Peru	0	0	0	958	1,597	2,511	57.2
Mexico	854	1,731	2,418	2,139	2,545	1,955	-23.2
Guatemala	370	458	446	516	567	561	-1.1
Dominican Republic	644	577	616	671	443	403	-9.0
Vietnam	160	157	180	188	227	198	-12.8
Total	14,895	18,173	16,376	14,728	16,051	14,842	-7.5

In the last 5 years, exports in this category have grown 60 percent and are approaching 1 million metric tons. The global expansion of poultry, pet, and aqua feeds have led the demand surge. As fish meal production declines, for diets that require an animal protein, terrestrial animal protein meals are essential. Indonesia was the largest importer of US animal protein meals in 2018, importing 347,000 metric tons, a decline of 5 percent from 2017. China imported 199,000 metric tons of non-ruminant animal protein meals in 2018, up 21 percent from 2017 and 265 percent in the last 5 years. Exports of non-ruminant meals to Mexico dropped 13 percent when compared to 2017, to 112,400 metric tons.

Fat Exports Rebound

Total fat exports were 834,100 metric tons in 2018, up 13 percent from 2017. Exports of all rendered fats hit a historical low of 697,000 metric tons in 2015, but have since rebounded mostly due to overseas demand from biodiesel and renewable diesel. In 2018, exports of used cooking oil to Europe for biofuel use were 169,000 metric tons, up 15 percent over the last 5 years. In addition, exports of yellow grease to Singapore for renewable fuel production in 2018 reached 70,000 metric tons, up from 8,000 metric tons in 2017. Finally, tallow exports to Singapore for renewable diesel production,

although down, totaled more than 88,000 metric tons. Inedible tallow exports to traditional markets grew in 2018. Mexico, the largest importer, increased almost 8 percent last year, reaching 136,500 metric tons. Exports of tallow to traditional markets for soap production like Morocco, Turkey, and Nigeria grew 113, 56, and 39 percent, respectively.

Outlook

US rendered product production will continue to grow with increased livestock production (chart 1). Over the next 10 years, more than 937,000 metric tons of animal protein meals and 902,000 metric tons of animal fats are projected to be added into the supply chain. As mentioned earlier, the global demand for fat as a biodiesel and renewable diesel feedstock will continue to grow and offset the added supply. Additional international demand, however, will be needed to make up for the increased supply of animal protein meals because of the declining demand in the United States due to the all-vegetarian diet trend in poultry. Aside from that, the global protein meal market is awash in an oversupply of soybean meal with carryover stocks and stock-to-use ratios at record highs. In addition, the trade war with China has depressed US protein meal prices and distorted the world marketplace. The key for animal protein meals will be to work at finding a niche in markets that demand these products, such as the aquaculture and pet food industries. **R**

Table 4. US export customers by product, 2013-2018 (metric tons) (continued)

Animal protein meals							
Indonesia	227,122	218,855	257,695	333,465	368,823	347,162	-5.9
China	54,483	63,174	81,400	138,088	164,515	199,034	21.0
Mexico	83,474	74,874	103,789	99,618	129,371	112,375	-13.1
Vietnam	1,780	1,613	8,214	28,414	39,528	65,834	66.6
Canada	43,368	48,690	58,743	64,292	66,435	54,462	-18.0
Chile	59,689	32,026	57,084	18,144	26,963	44,454	64.9
Philippines	29,704	12,462	10,734	9,203	6,518	23,609	262.2
Ecuador	9,786	10,299	8,470	11,550	15,808	22,182	40.3
Thailand	14,965	5,743	5,166	3,493	17,137	18,068	5.4
Malaysia	16,902	13,300	1,446	3,823	15,300	9,447	-38.3
Honduras	3,406	1,100	3,704	10,693	4,102	8,694	111.9
Peru	1,156	994	1,019	2,410	5,564	5,809	4.4
Myanmar	0	0	0	120	1,905	4,872	155.7
Sri Lanka	0	0	0	0	1,914	2,456	28.3
Cambodia	5,308	305	0	0	5,574	2,006	-64.0
Colombia	2,276	1,523	950	459	925	1,204	30.2
Jamaica	0	0	0	0	0	1,150	
Guatemala	12,595	7,399	1,381	4,130	2,934	915	-68.8
Bangladesh	3,425	1,505	3,820	1,501	771	409	-47.0
Total	580,072	504,726	621,890	762,404	882,151	925,119	4.9
Feather meal							
China	183	1,265	977	7,391	18,904	30,813	63.0
Chile	52,972	48,135	24,403	10,046	11,744	30,289	157.9
Indonesia	110,087	98,990	41,750	27,373	29,177	28,058	-3.8
Canada	8,961	16,227	15,573	16,872	18,297	15,093	-17.5
Vietnam	4,120	7	2,637	1,440	0	3,892	
Philippines	0	0	100	200	800	859	7.4
Peru	0	0	578	0	427	761	78.2
Total	178,815	165,952	87,000	63,580	80,179	109,891	37.1

Source: Global Trade Atlas.

Building Relationships

Among the pet food industry, renderers, and consumers

By Tina Caparella

Rendering and pet food are intertwined more now than ever before as both industries depend on one another to ensure healthy diets for pets worldwide. Building a relationship together, and with the consumers they service, is important. This was evident in mid-February at the annual International Production and Processing Expo (IPPE) held in Atlanta, Georgia, where the Pet Food Conference, sponsored by the American Feed Industry Association (AFIA), and International Rendering Symposium, put on by the National Renderers Association (NRA), were both well attended.

The global pet food industry has seen impressive development, according to Jared Koerten, Euromonitor International, with an average growth rate of six percent per year since 2013. This trend, however, should not be taken for granted, Koerten told Pet Food Conference attendees, even though large corporations such as General Mills, Smuckers, and Archer Daniels Midland continue to show interest in the growing pet food industry as evidenced by the recent acquisitions of pet food companies Blue Buffalo, Ainsworth, and Neovia.

While global dog ownership continues the shift to smaller dogs that eat less food, global cat ownership has seen an annual average growth rate of six percent each year since 2013. Cats are better suited for modern life, especially in Asia and Latin America, where people lead busier lives and are located in urban areas.

Koerten described how North America remains the market giant in pet food sales whereas Asia is the “next frontier,” with dog food sales in the United States (US) predicted to reach \$4 billion and cat food sales forecasted to be \$2 billion by 2023, both about one-third of total global sales. For dogs, the trend is more about value over volume due to small dog owners’ preference for premium foods driving the average unit price up 18.5 percent. In Asia, cat treats are the biggest growth, averaging 23 percent over the past five years.

The humanization of pets and their food remains a driver in the industry, Koerten noted, with “all natural,” “grain free,” and “meat first” trends following human food. Pet food buyers are also influencing ethical business decisions, such as sustainable packaging and ingredient sourcing, as 60 percent of global consumers consider “recyclable” a trustworthy label on products. Pet food producers Mars and Nestle have invested heavily in sustainability practices that set standards for the next 20 years, including zero environmental impact from their operations and obtaining animal protein ingredients from sustainable sources. These and other pet food companies have joined the Pet Sustainability Coalition, which “envisions a thriving and collaborative pet industry that creates positive impact for the communities and environments where they do business.”



Customization of pet foods has significantly evolved, with specific food formulations for breed, age, and allergies; therapeutic diets to address specific health conditions that are prescribed by veterinarians; and now personalized diets for a specific animal. Koerten summarized that the pet food market is healthy and growing, cat populations are accelerating, smaller dogs and a new generation are driving food premiumization, and ethics and sustainability are long-term objectives. “It’s a lot to think about and digest,” he concluded.

The export market for pet food manufactured in the United States isn’t as rosy, according to AFIA’s Gina Tumbarella. Although US pet food exports are consistent, the country’s market share is declining while top exporter France remains stable and Germany’s exports continue to grow. US pet food exports peaked in 2013 at 747 million metric tons valued at \$1.46 billion with a downward trend since; however, 2018 exports are on track to be higher than 2017. The top five export markets for US pet food are Canada, Japan (though declining significantly due to pet ownership changes), Mexico, Australia, and Hong Kong.

Tumbarella explained that US pet food strengths include supply availability and high quality products whereas its weaknesses are barriers related to bovine spongiform encephalopathy (BSE) and high pathogenic avian influenza. Despite the World Organization for Animal Health, or OIE, classifying the United States in 2012 as negligible risk for BSE, trade barriers for pet food containing ruminant material still exist, especially in Asia and particularly China.

“It’s a very long process to regain lost markets after a disease outbreak,” Tumbarella commented. She touched on the new United States-Mexico-Canada Agreement (USMCA) that awaits ratification in Congress, the US tariff issue with China, and a Japan trade agreement with the European Union (EU). One major hurdle for a United States-EU agreement is agricultural trade, something the EU will not include, showing that US trade objectives differ from the EU.

Other topics of discussion at the Pet Food Conference included block chain management for traceability of product, a technology Walmart has partnered with IBM that reduces traceability time of lettuce from around seven days to 2.2 seconds. One speaker provided an emotional overview of policy development and programming in support of service dogs for military veterans and children with cancer, while Dr. David Edwards of the Food and Drug Administration Center for Veterinary Medicine updated attendees on Food Safety Modernization Act (FSMA) inspections. He shared that

current good manufacturing practice inspections have begun this year at large businesses, with routine preventive control inspections for small businesses beginning in the fall of 2019 and for very small businesses in fall 2020. Edwards noted that manufacturers should expect to be asked about consumer complaints, business volume, and customer and supplier lists to establish history and culture of the company. He thanked everyone for working hard at keeping the US food and feed supply safe.

Pet Food and Rendering Partnerships

About a decade ago, NRA was invited to sponsor an International Rendering Symposium at the end of IPPE and this year continued that tradition. Many speakers educated attendees about various aspects of the rendering industry, beginning with NRA President Nancy Foster. She discussed the top agriculture issues in Washington, DC, highlighting that exports of US bovine meat and bone meal into Mexico was part of the USMCA, potentially opening up a \$30 million market for US renderers. The trade deal still has to be approved by Congress and there are signs it could be in trouble due to the steel and aluminum tariffs imposed by the United States on Canada and Mexico. "Members are calling ag groups with questions," Foster commented.

In the recently approved 2018 farm bill, wording was included that specifies federal funding for food waste projects cannot disrupt existing business relationships and must follow the Environmental Protection Agency's Food Recovery Hierarchy pyramid, which indicates rendering is the "highest and best use" for food waste above anaerobic digestion and composting. This should protect the rendering industry as composting and waste-to-energy facilities seek out the raw materials renderers have long been collecting and processing into valuable commodities.

Ansen Pond, Pilgrim's Pride, presented the basics of the rendering process and what it offers, such as killing organic pathogens, reducing raw material volume by 60 percent, protecting the environment, recycling carbon to prevent greenhouse gas emissions, and recycling energy for use in animal feed or in biofuels. He showed the myriad of food safety and quality programs renderers must follow to ensure safe commodities that are also heavily regulated, emphasizing that the sustainability impact rendered products bring to pet food is a great story to tell the pet food customer.



A large group listens to Jared Koerten, Euromonitor International, discuss global pet food trends during the AFIA Pet Food Conference.

Sarah Hubler, Collings Nutrition Solutions, said consumers are concerned about sustainability and are hungry for information. A survey by the company found that when "pet parents" go looking for answers on the Internet, they find:

- nutrition information from bloggers with no nutrition background
- review site contributions written by other consumers with no training
- rhetoric from activists who are convinced pet food is killing pets

Communicating about pet nutrition is difficult due to consumers' high emotions, their own food beliefs, the abundance of misinformation on the Internet, and a lack of trust they have for "industry insiders." In an effort to find more effective ways of communicating factual nutrition information to consumers, Collings Nutrition Solutions discovered that pet parents love to watch random pet videos, so the company developed an animated dog named Satchmo, or "Mo" for short. They created a video and launched a website at www.moknows.org, a YouTube channel, and Facebook and Twitter accounts. Content for these platforms will include nutrition discussions, reviews on various pet foods, and fun pet activities for consumers.

"We think there is opportunity for our pets to 'talk' nutrition from pet parent to pet parent," Hubler stated. "Video content is underutilized in our industry. Viewers retain about 90 percent of what they hear in a video and only 10 percent if they read it."

Dr. Kurt Rosentrater, Iowa State University, presented early results of a life cycle assessment to understand the sustainability of a process, product, and pet food ingredient. He presented the methodology used (literature databases extensively researched), the sustainability metrics examined (greenhouse gases, acidification, and land and water use), and the comparison of meat products versus rendered products. The studies reviewed were all performed on farms and did not take transportation into account, but the key takeaways were the use of animal by-products in pet food results in substantially lower environmental impacts than the use of meat.

Relationships with the Research, Regulatory, and Trade Communities

Dr. Annel Green, Clemson University, provided an overview of the numerous research projects underway or completed at the Animal Co-Products Research and Education Center (ACREC) on behalf of the Fats and Proteins Research Foundation (FPRF). Since ACREC's inception at Clemson in March 2006:

- 136 rendering research projects have been conducted or are in progress
- at least 19 post-graduate students, 91 graduate students, and 350 undergraduate students have been directly involved in research projects related to rendering challenges, with many now employed in the rendering industry
- more than 2,500 undergraduate students have been introduced to the rendering industry through classroom instruction

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"This partnership is bringing in talent that is not currently in agriculture research," Green commented. Rendering research projects at ACREC/Clemson University include biodegradable plastic laminates for automobiles using animal protein meals, renderable gloves and bags for the meat processing industry that degrade during the rendering process, converting tallow and other animal fats to omega-3 fatty acids, and creating a potent antioxidant from blood products that also lead to further creating a flocculant product that is proving beneficial for wastewater treatment.

Dr. Michele Sayles, Diamond Pet Foods, discussed the newly developed Pet Food Alliance that brings together the rendering, meat, and pet food industries with researchers to collaboratively identify challenges and discuss realistic and implementable research solutions. Since 2017, several meetings have taken place to address sustainability, public perception, *Salmonella* and product safety, and oxidation issues. Participation in the alliance has grown 450 percent, showing the demand for such collaboration. To date, a bulk fat transportation survey has been drafted, the need to develop foreign material training videos and materials for employees has been identified, and six research proposals for hazard reduction have been received and are under review by the alliance. The next meeting will be held in Fort Collins, Colorado, June 26–28, following the American Meat Science Association's Reciprocal Meat Conference. More information is available at www.fprfalliance.agsci.colostate.edu.

Dr. Jeff Firman, University of Missouri, highlighted rendered animal protein and fat use in poultry nutrition, which has had a long and successful history of providing the nutrients needed at a competitive price. He showed how using computers for poultry feed formulation ensures balanced nutrients to ensure ideal protein levels at the best price. Richard Weeks of The Dupps Company provided symposium attendees with a look at modern rendering equipment. He emphasized that the rendering industry has been around a lot longer than the recycling and sustainability discussions of today.

Louise Calderwood, AFIA, examined the role of key state and federal regulatory players, stating that most state feed laws adopt some version of the American Association of Feed Control Officials' model bill and regulations. Dr. David Meeker, NRA Scientific Services, looked at FSMA's effect on the rendering industry. He emphasized that the rendering process inactivates any bacteria, viruses, protozoa, and parasites that are in raw materials collected, validated by research conducted at various universities, including Clemson, Colorado State, and Texas Tech. Meeker shared that the Animal Protein Producers Industry has developed videos and materials for employee training on meeting FSMA regulations.

Kent Swisher, NRA International Programs, wrapped up the symposium with an overview of international markets and trade for rendered products. US government data estimates meat production will continue to rise, leading to increased animal proteins and fats. He showed that world biodiesel and renewable diesel production is growing and using more animal fats and used cooking oil each year. **R**

