

ANALYTICAL REVIEW OF THE FEED AMINO ACID MARKET

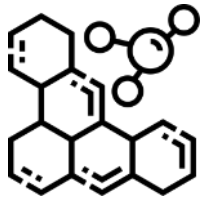
January-May 2023

This report is for the client company's employees' use only. No part of the report may be distributed, quoted or reproduced for use outside the client company without prior written permission from Feedlot. The prices shown in Feedlot reports are estimates based on information obtained from market participants and industry unions in various countries. This information may be used as an indicator and not as a recommendation for a sale or purchase price.

CONTENTS



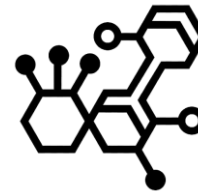
@FEEDLOT_RU



01 AMINO ACIDS



02 PRICE DYNAMICS



03 REGISTERED FEED ADDITIVES IN RUSSIA



04 INVESTMENT PROJECTS IN THE INDUSTRY

01

AMINO ACIDS

Methionine

Threonine

Tryptophan

Lysine HCL

Lysine sulfate 70%

Lysine sulfate 80%

Valine

Betaine

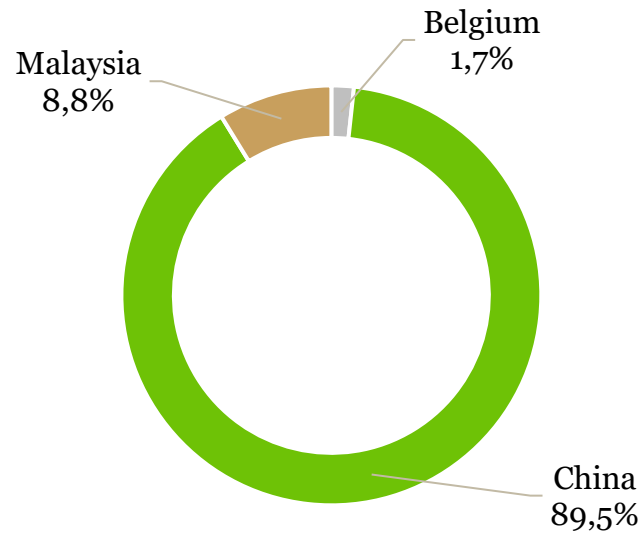
Arginine

Isoleucine

January-May 2023

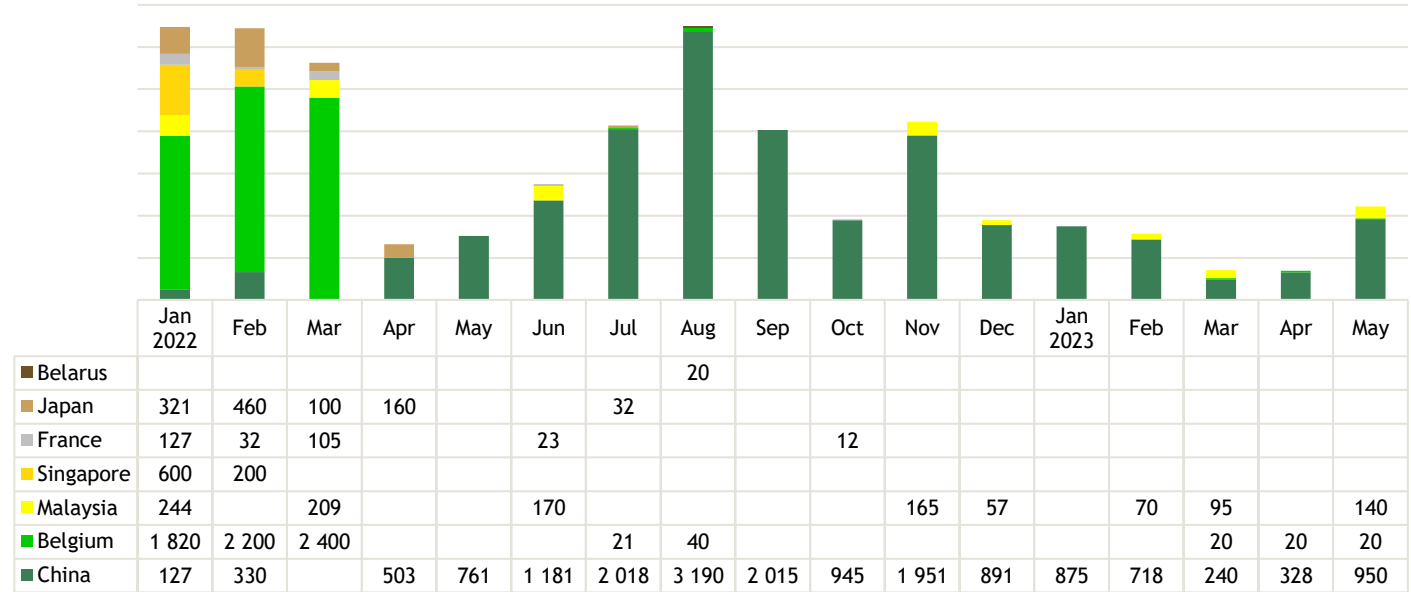
3 476 tons

2,50 \$



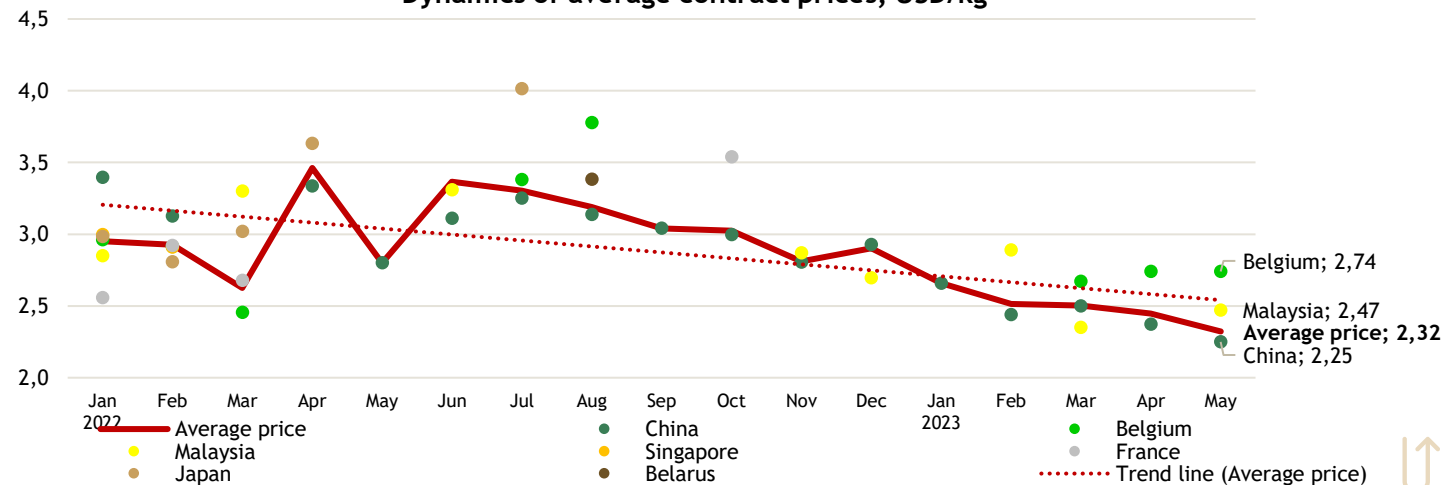
According to FEEDLOT's estimates, methionine imports fell by 68% year-on-year to 3,500 tons in January-May 2023. The average contract price has also decreased, by 14% over the year to 2.50 USD/kg. China accounts for 90% of shipments. Imports from Belgium and Malaysia decreased by 99% and 33% relative to January-May 2022, respectively. In May, the volume of supplies increased threefold in monthly terms to 1.1 thousand tons. Prices during the same period decreased by 5.1% to 2.32 USD/kg.

Dynamics of import volumes, tons



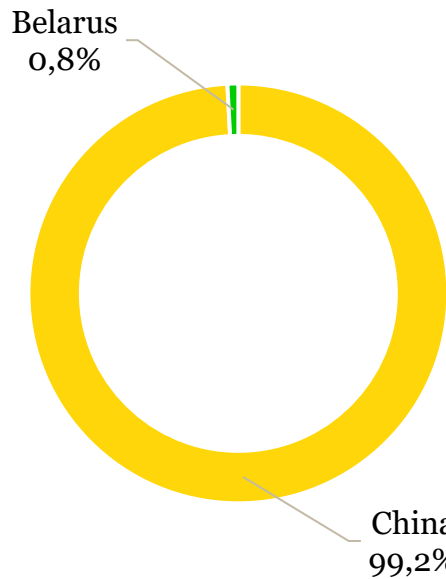
* including EAEU countries in January 22 - April 23

Dynamics of average contract prices, USD/kg



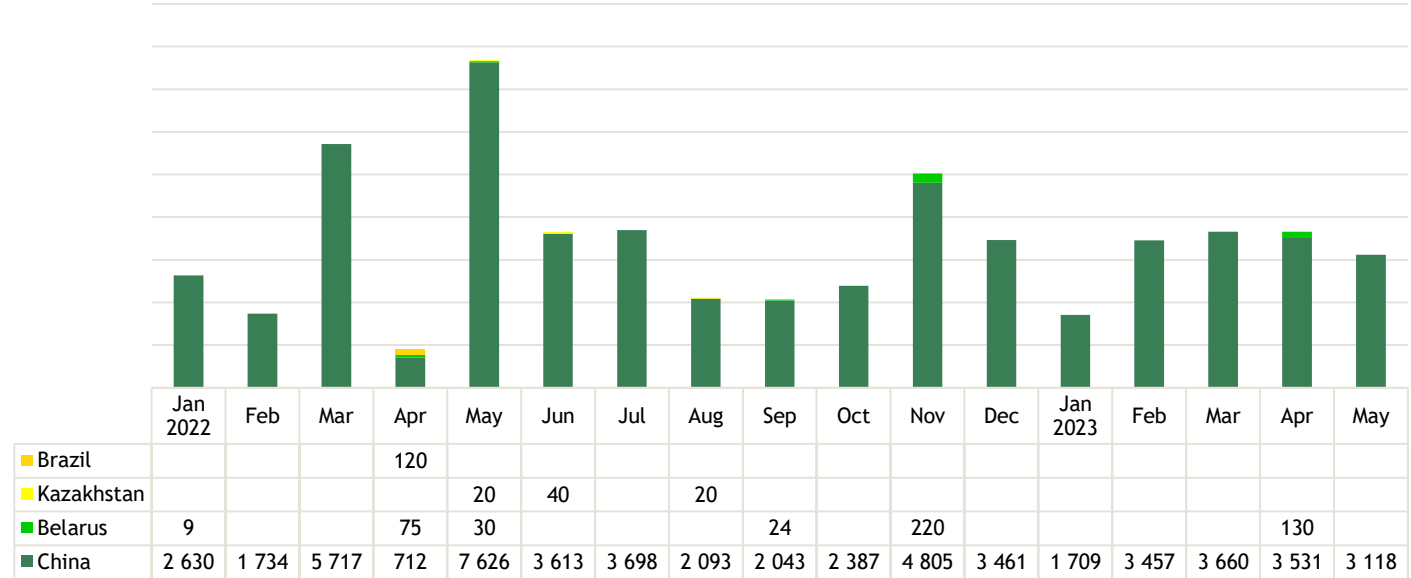
15 604 tons

1,35 \$



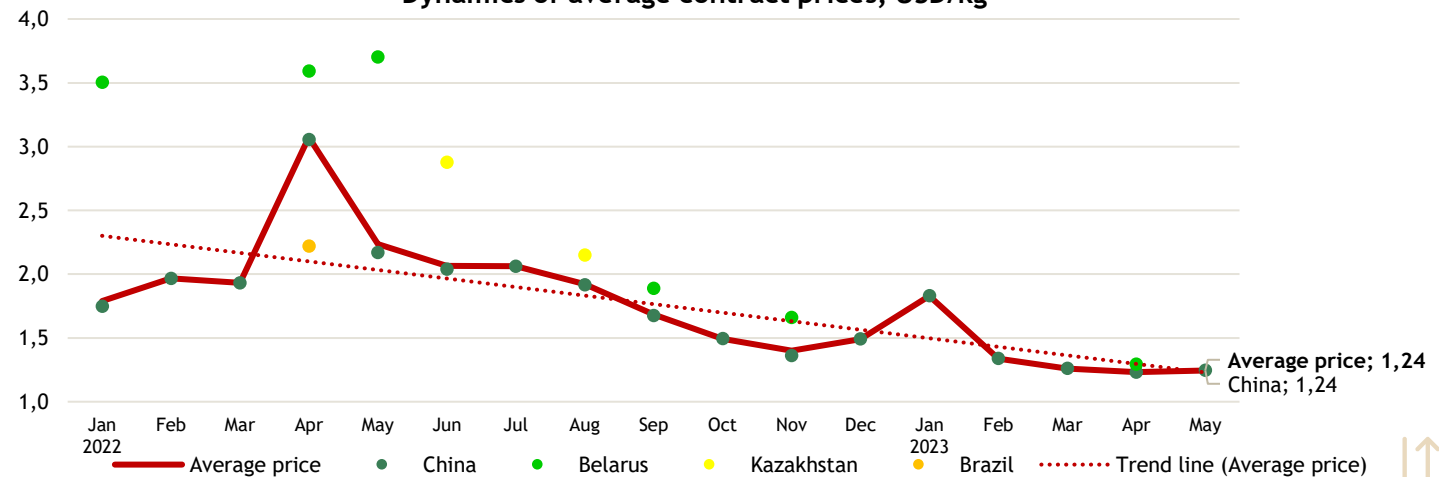
In the first five months of 2023 the volume of threonine imported to Russia decreased by 16% as compared to January-May last year to 15.6 thousand tons. The contract price for threonine during the analyzed period decreased by 38% to 1.35 USD/kg. Almost the entire volume of Russian imports of threonine falls on China, Belarus takes 1% of supplies. In May 2023, supplies decreased in monthly terms by 15% to 3.1 thousand tons. The average contract price for the same period increased by 1.0% to 1.24 USD/kg.

Dynamics of import volumes, tons



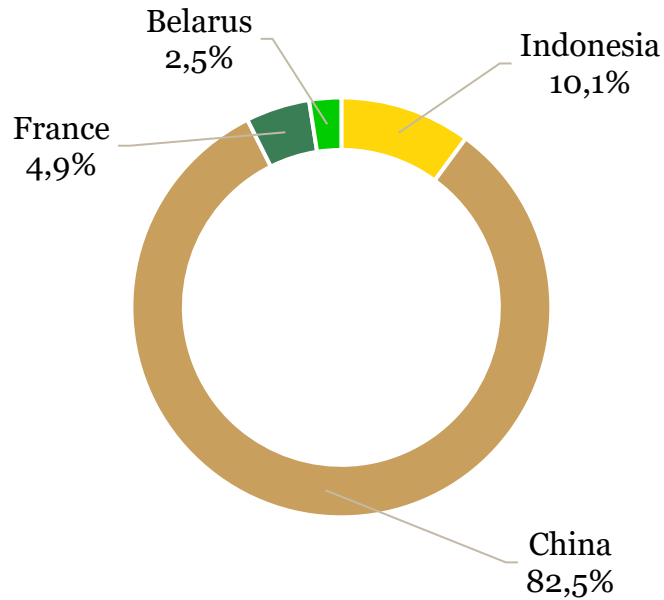
* including EAEU countries in January 22 - April 23

Dynamics of average contract prices, USD/kg



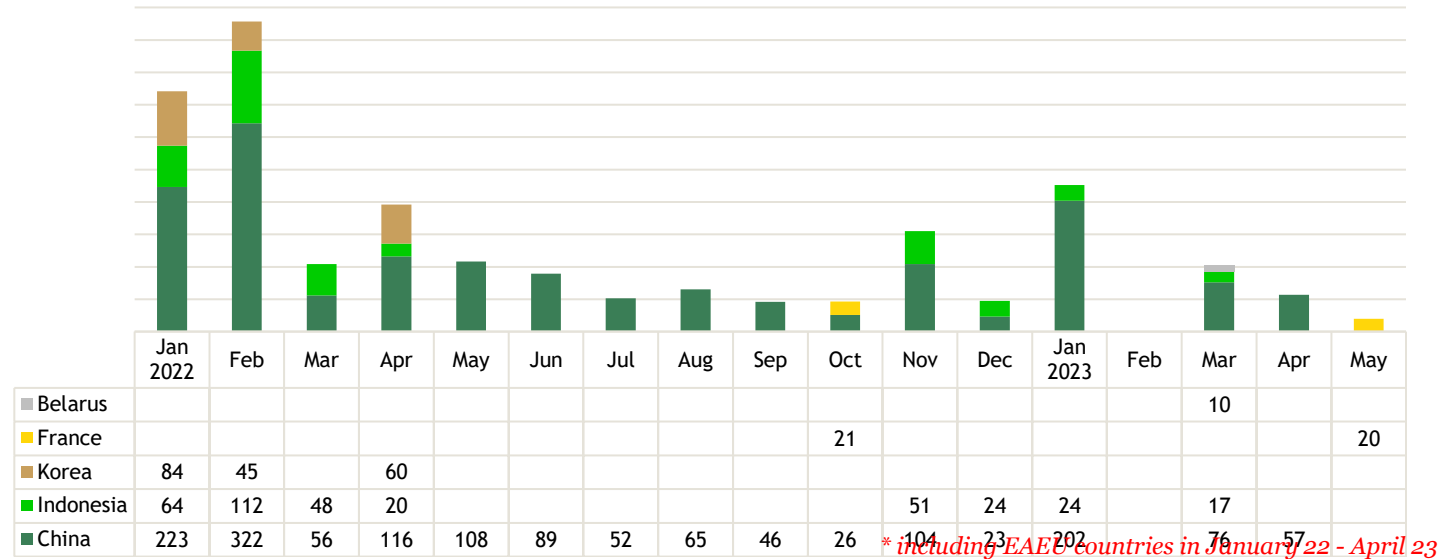
406 tons

7,19 \$

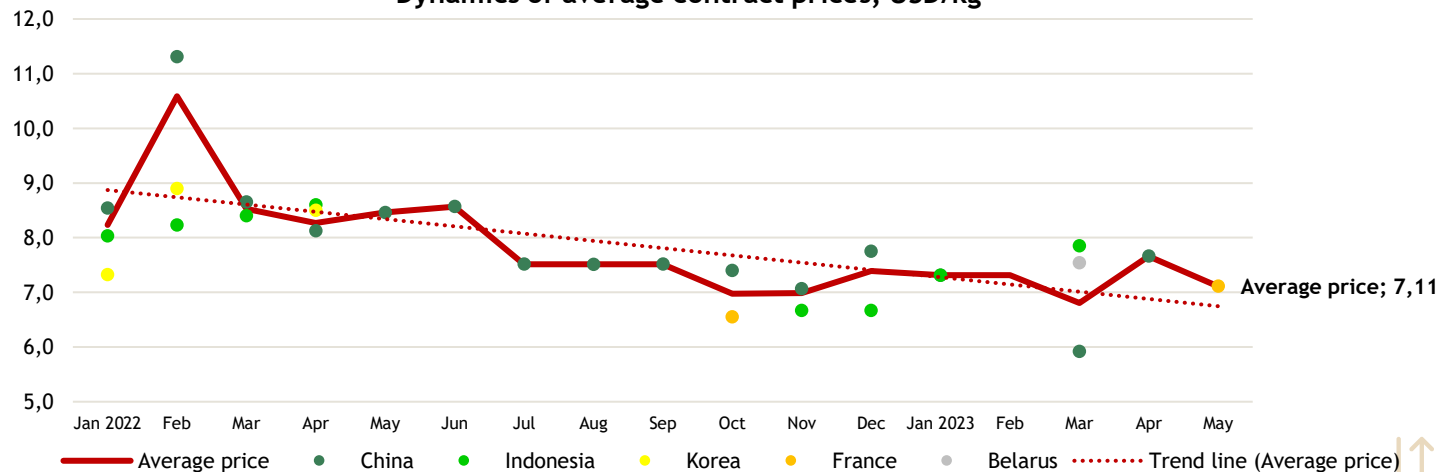


The volume of tryptophan shipments for January-May 2023 decreased by 68% compared to the previous year and amounted to 406 tons. The contract price in annual terms for the same period decreased by 21% to 7.19 USD/kg. China accounts for 83% of shipments, with Indonesia accounting for 10%. In May, imports amounted to 20 tons (-65% compared to April). The average contract price decreased by 7.2% over the month to 7.11 USD/kg.

Dynamics of import volumes, tons

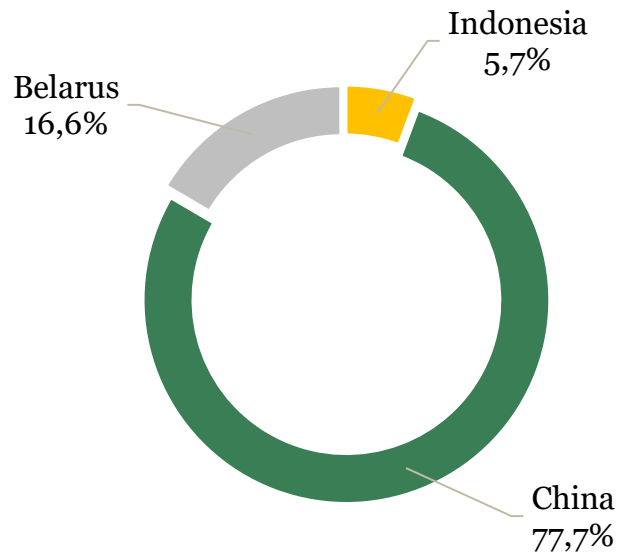


Dynamics of average contract prices, USD/kg



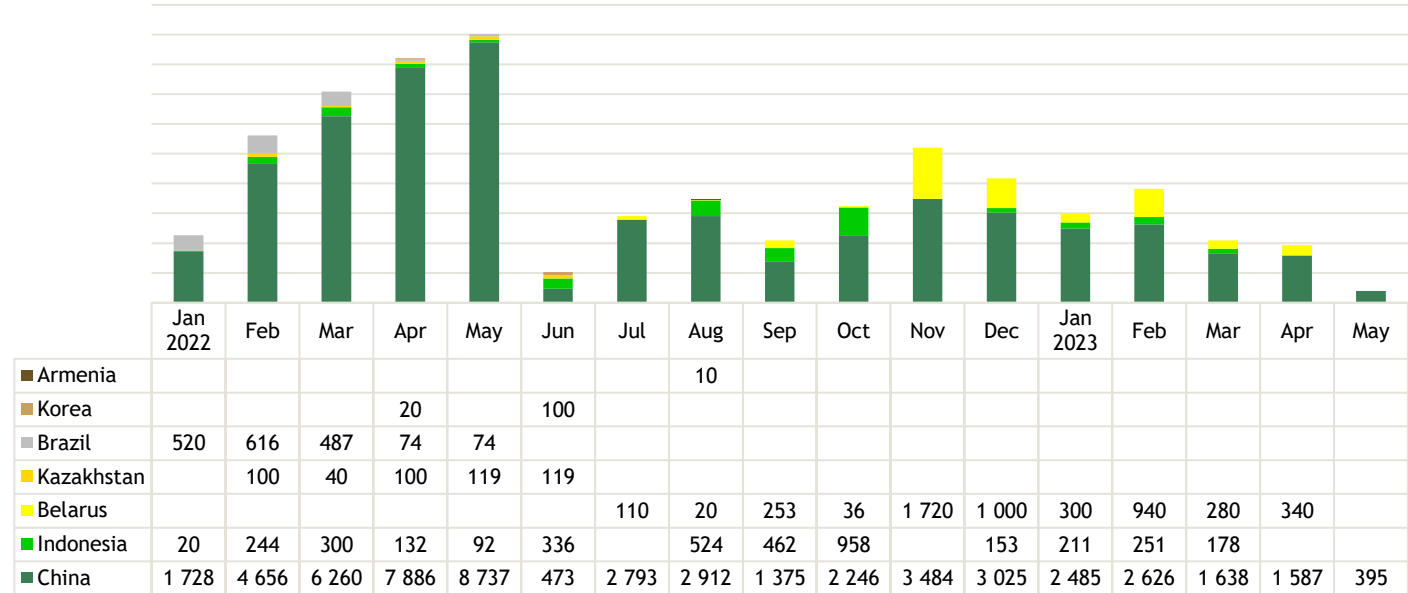
11 231 tons

1,51 \$



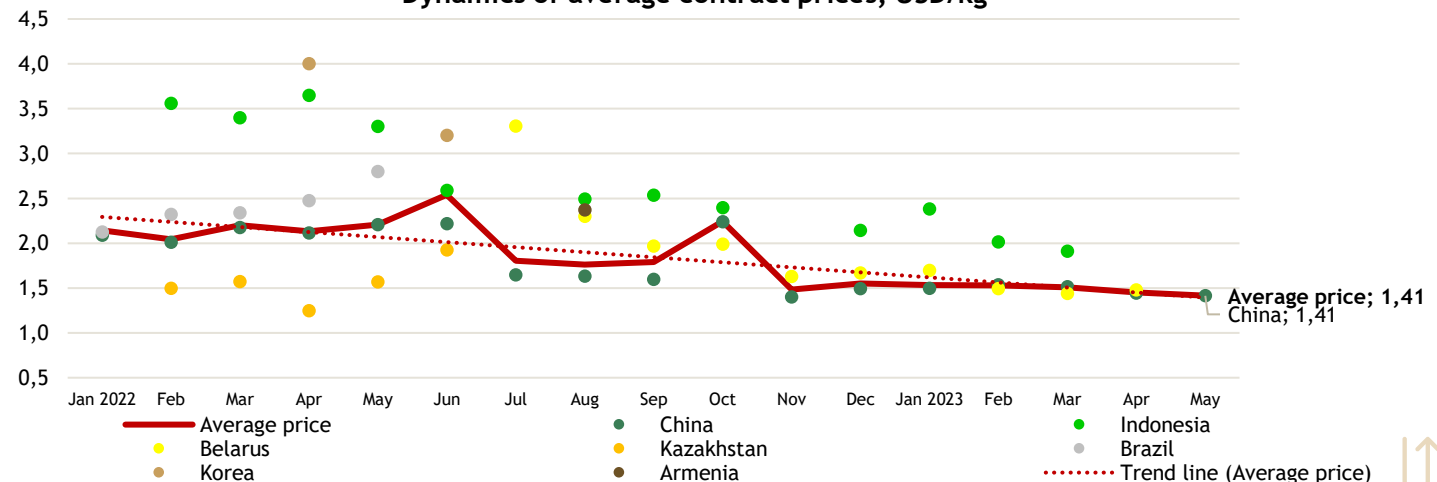
In January-May of this year, the import volume of lysine monohydrochloride decreased by 65%, if compared with the same period last year, and reached 11.2 thousand tons. The contract value for January-May fell by 30% for the year to 1.51 USD/kg. Imports during this period are mainly from China (78%). But it is worth noting that shipments from China decreased by 70% over the year. In May, total imports amounted to 395 tons, which is lower than imports in April by 80%. The average contract price for the month decreased by 2.5% in May to 1.41 USD/kg.

Dynamics of import volumes, tons



* including EAEU countries in January 22 - April 23

Dynamics of average contract prices, USD/kg





This research is a marketing analysis of the market of herbicides (*plant protection products*) in Russia.

FEEDLOT analysts have analyzed the industry in the current economic situation.

Analysis period: 2017-2022, Q1 2023.

Object of research: the herbicide market in Russia

The report consists of 85 slides
(170 charts, 26 tables, 2 figures).

Standard package – 79 000 rubles
(pdf report).

Extended package – 109 000 rubles
(pdf report + excel data)

Pro package - 129 000 rubles
(pdf report + excel data + extended statistics)

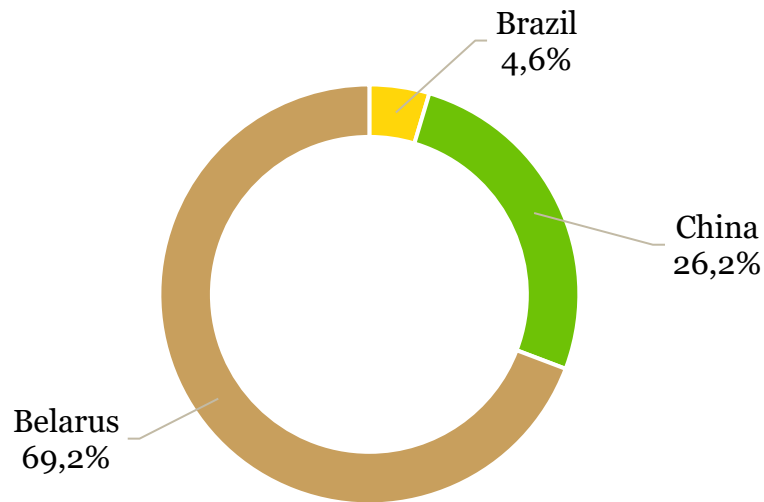
Service period – 1 to 3 working days after payment.

[DOWNLOAD A DEMOVERSION](#)

January-May 2023

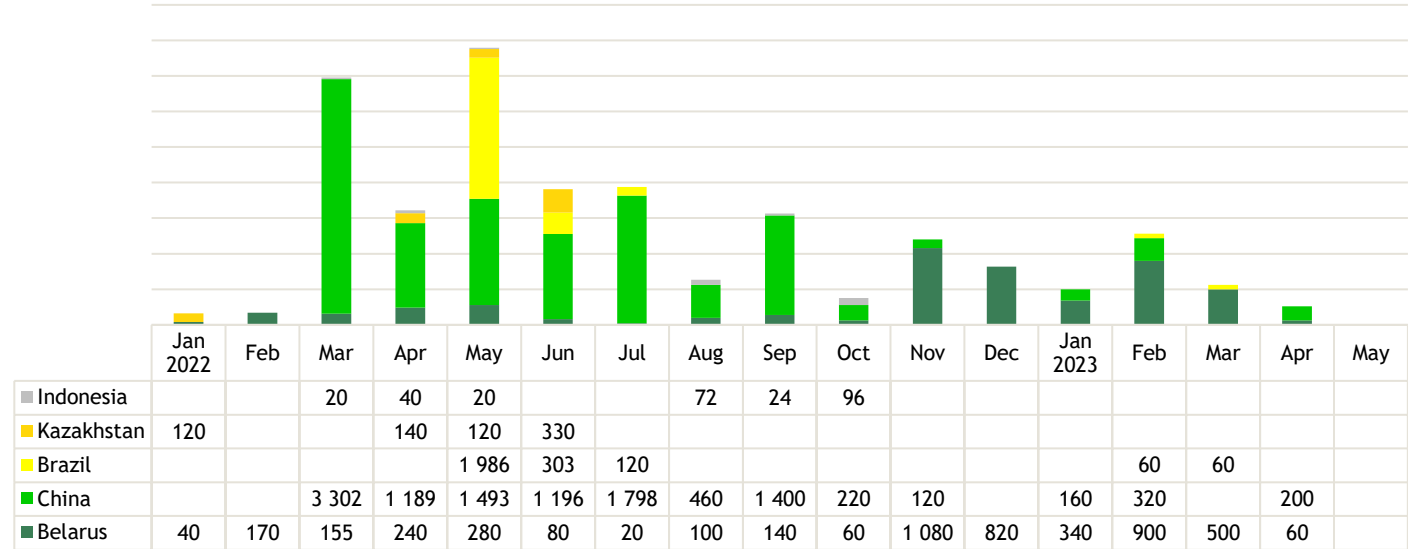
2 600 tons

1,10 \$

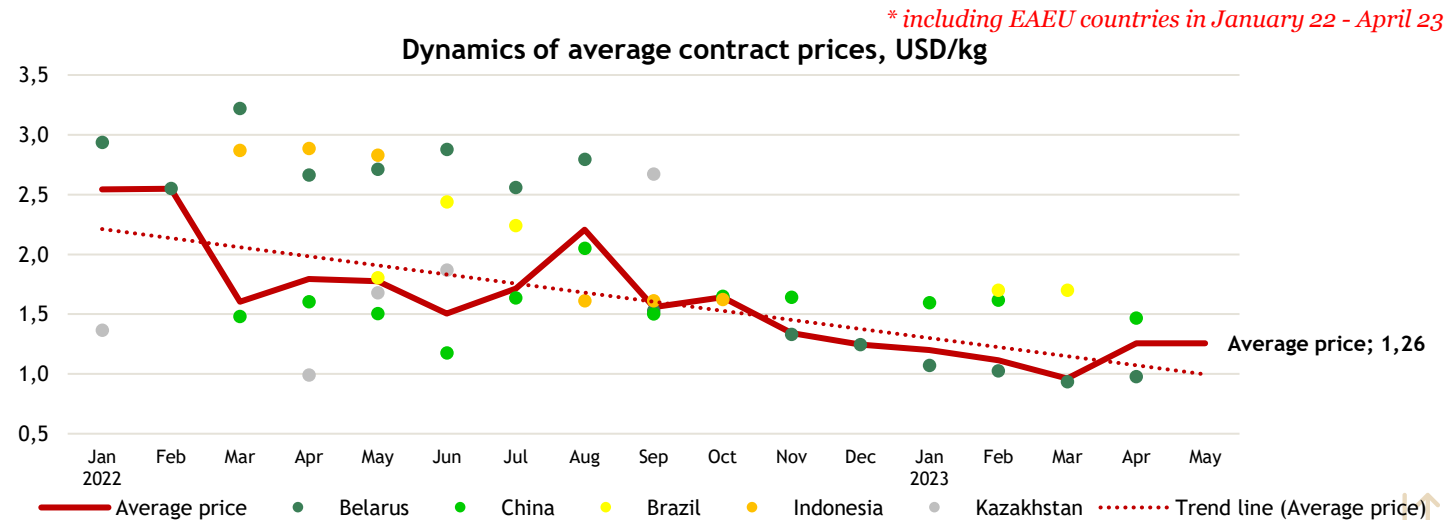


Imports of lysine sulfate 70% in Russia in January-May 2023 amounted to about 2.6 thousand tons. 69% of the deliveries came from Belarusian producers, 26% from Chinese producers. The last recorded average contract price for lysine sulfate 70% was about 1.26 USD/kg.

Dynamics of import volumes, tons

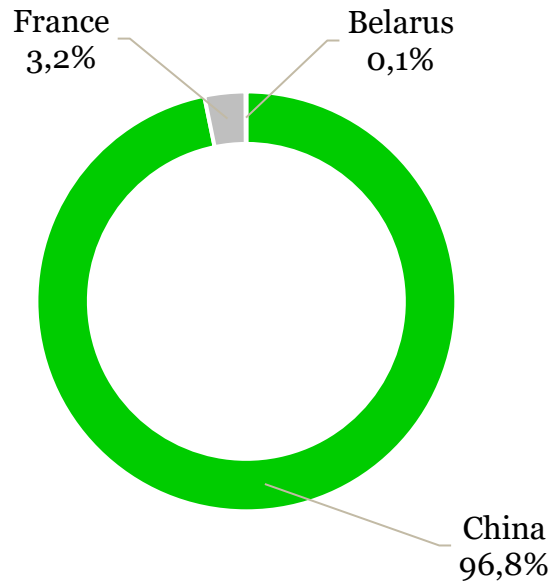


Dynamics of average contract prices, USD/kg



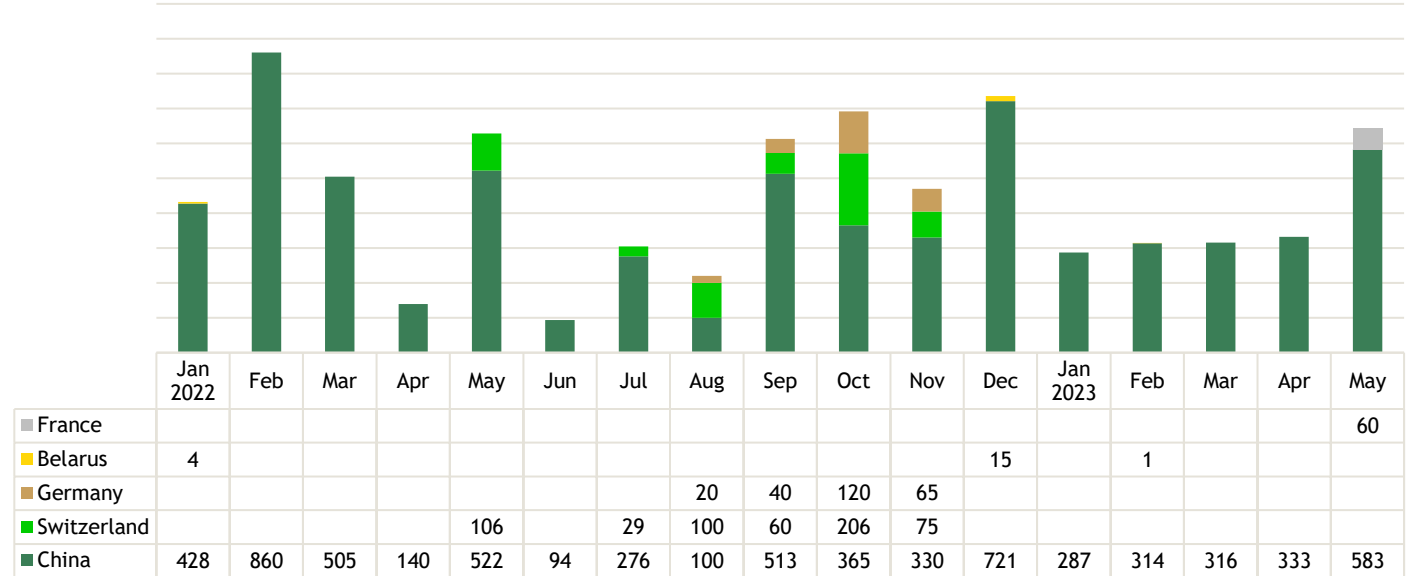
1 893 tons

3,60 \$



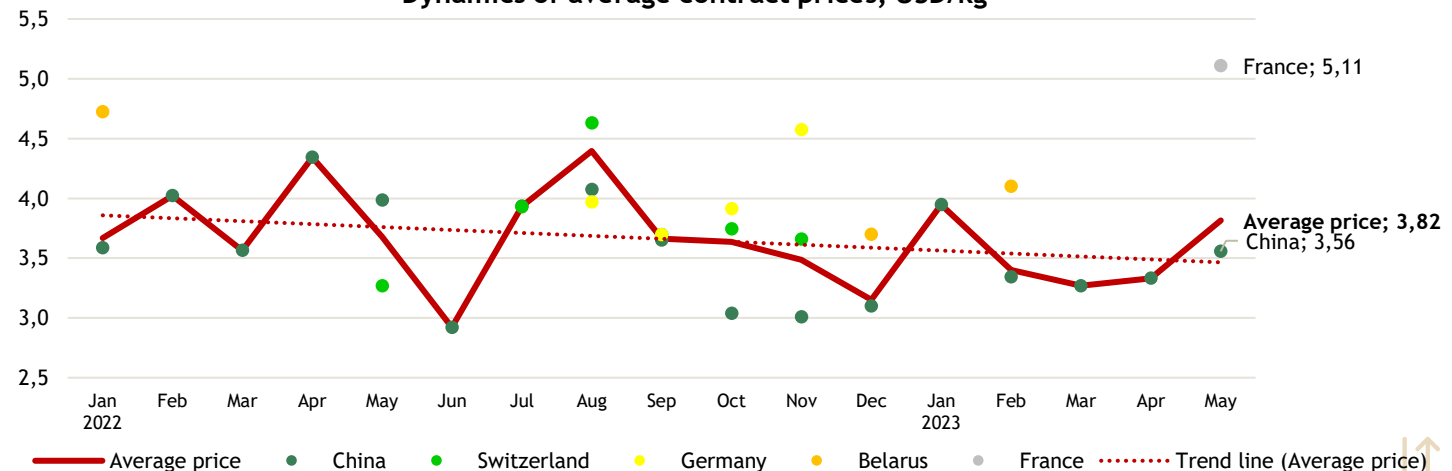
In the first five months of 2023, Russia imported 1.9 thousand tons of valine, which is 26% lower than the volume of imports for the same period in 2022. The contract price decreased by 5.6% over the year to 3.60 USD/kg. China accounted for 97% of shipments. In May, the import volume increased by 93% compared to April to 643 tons, the average contract price for the same period increased by 15% to 3.82 USD/kg.

Dynamics of import volumes, tons



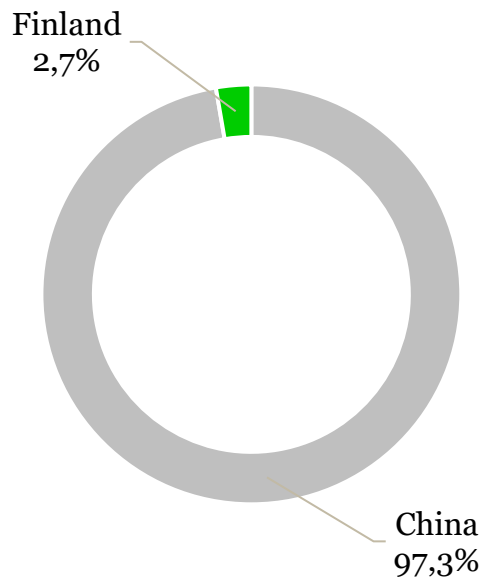
* including EAEU countries in January 22 - April 23

Dynamics of average contract prices, USD/kg



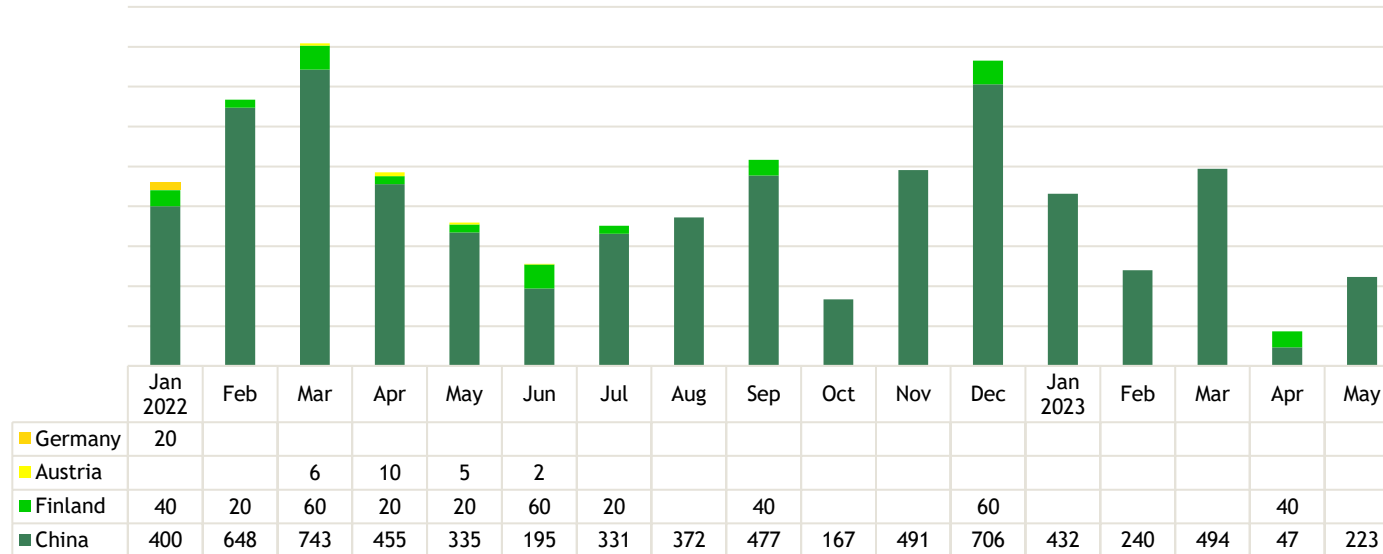
1 476 tons

1,87 \$

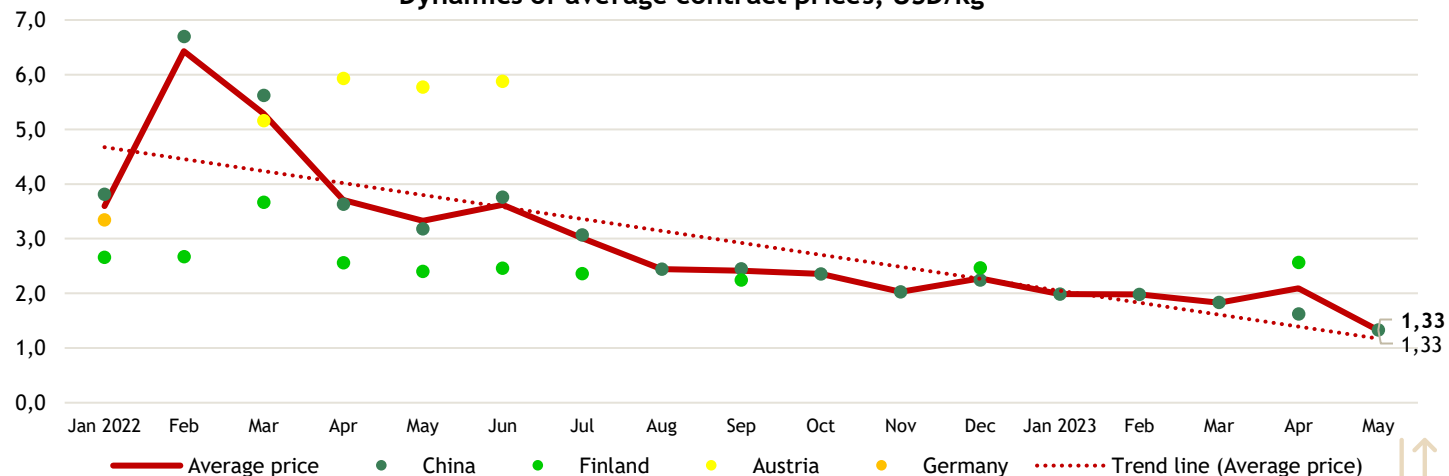


Import supplies of betaine in January-May of this year fell by 60% compared to the same period of the previous year to 1.5 thousand tons. The contract prices were on average at 1.87 USD/kg, which is 47% lower than last year's prices. China accounts for 97% of betaine supplies. In May, the volume of imports increased by 2.5 relative to April 2023 to 223 tons, the average contract price decreased by 37%.

Dynamics of import volumes, tons

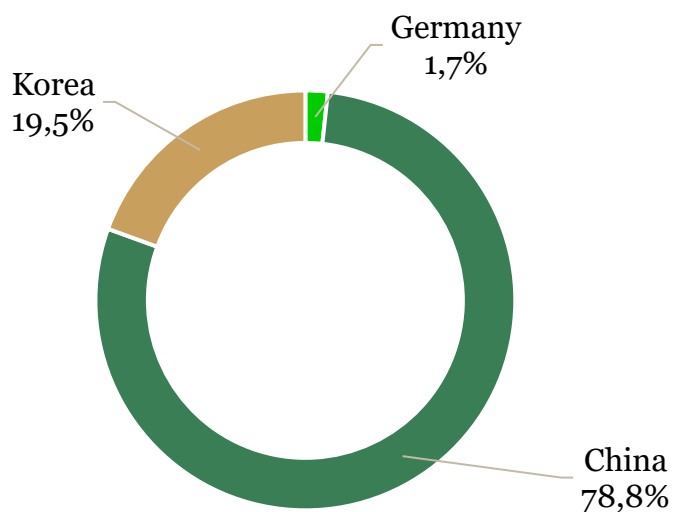


Dynamics of average contract prices, USD/kg



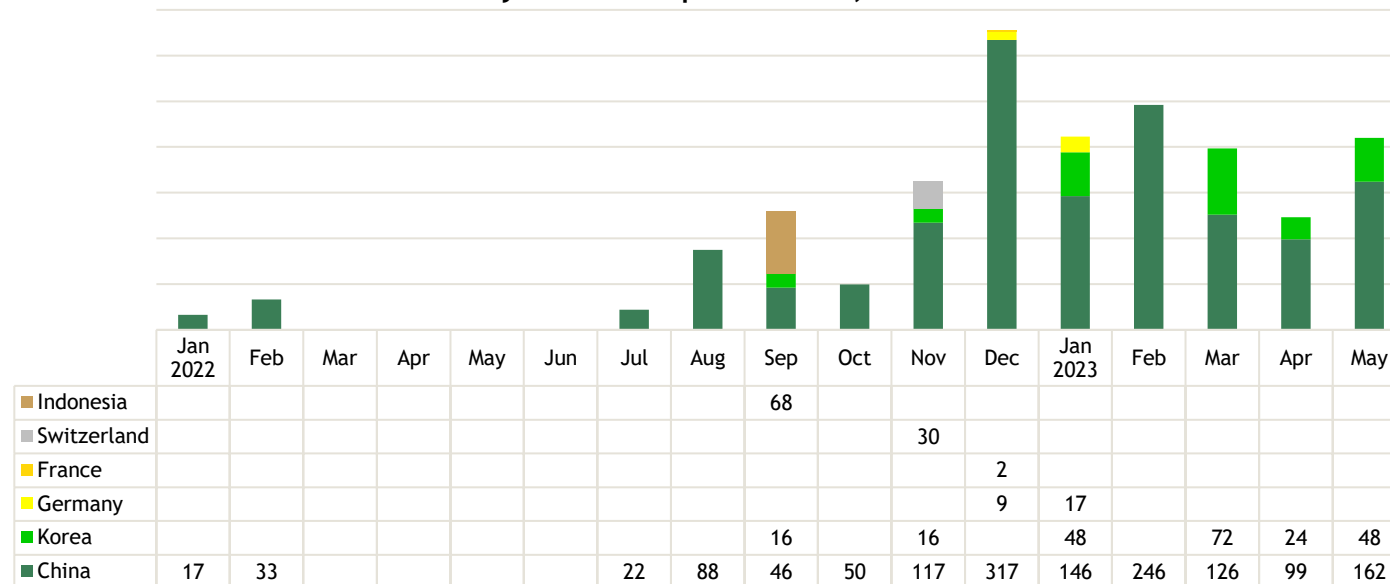
989 tons

4,41 \$

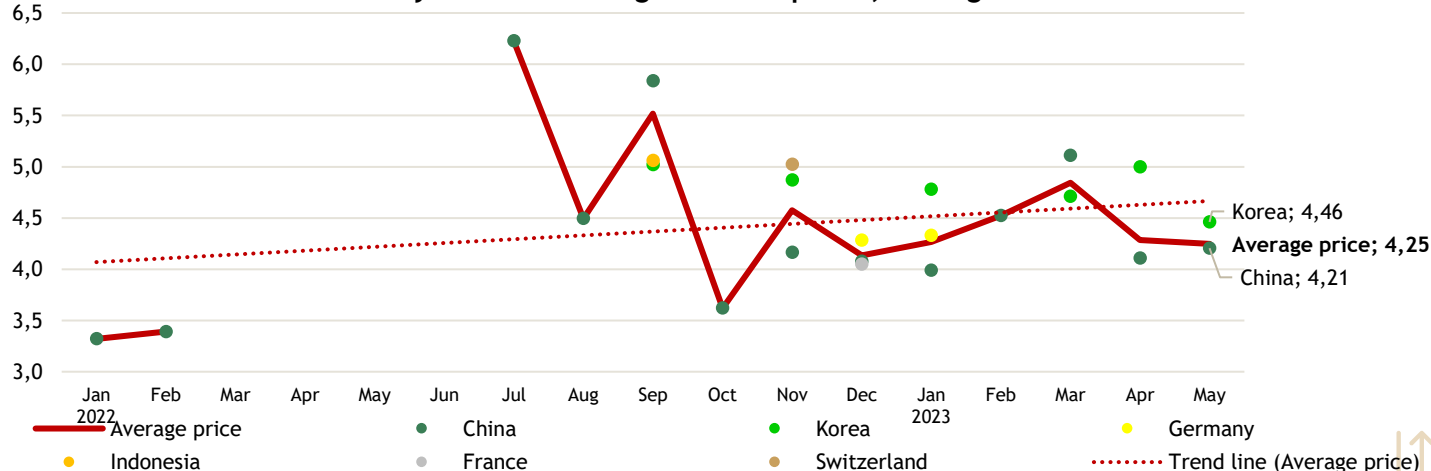


In January-May 2023, arginine imports to Russia reached 989 tons, 20 times higher than in January-May last year. China accounted for 79% of imports, while the Republic of Korea and Germany accounted for a combined 21%. The average contract price for the same period was 4.41 USD/kg. In May, imports increased by 71% to 210 tons relative to April, and the average contract price decreased by 0.9% to 4.25 USD/kg.

Dynamics of import volumes, tons



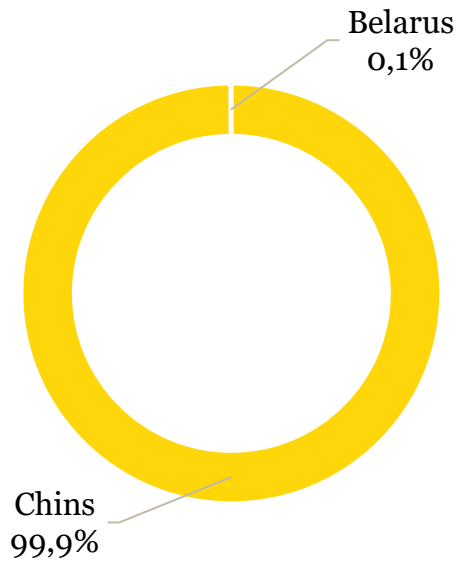
Dynamics of average contract prices, USD/kg



January-May 2023

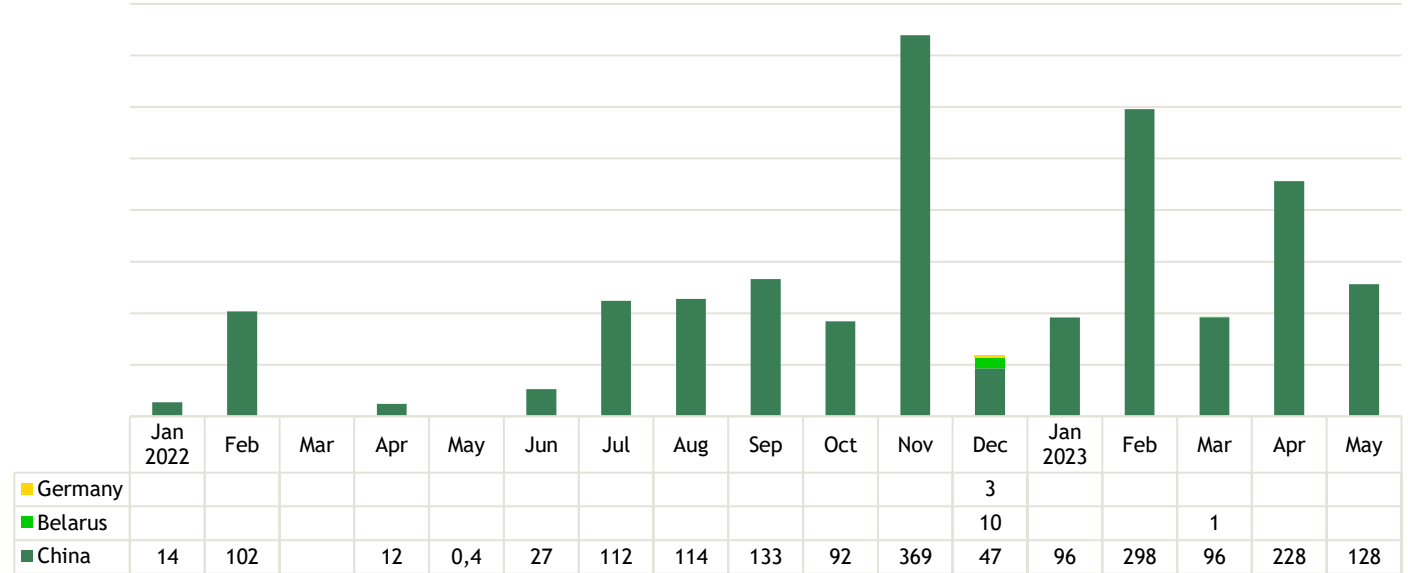
846 tons

7,29 \$



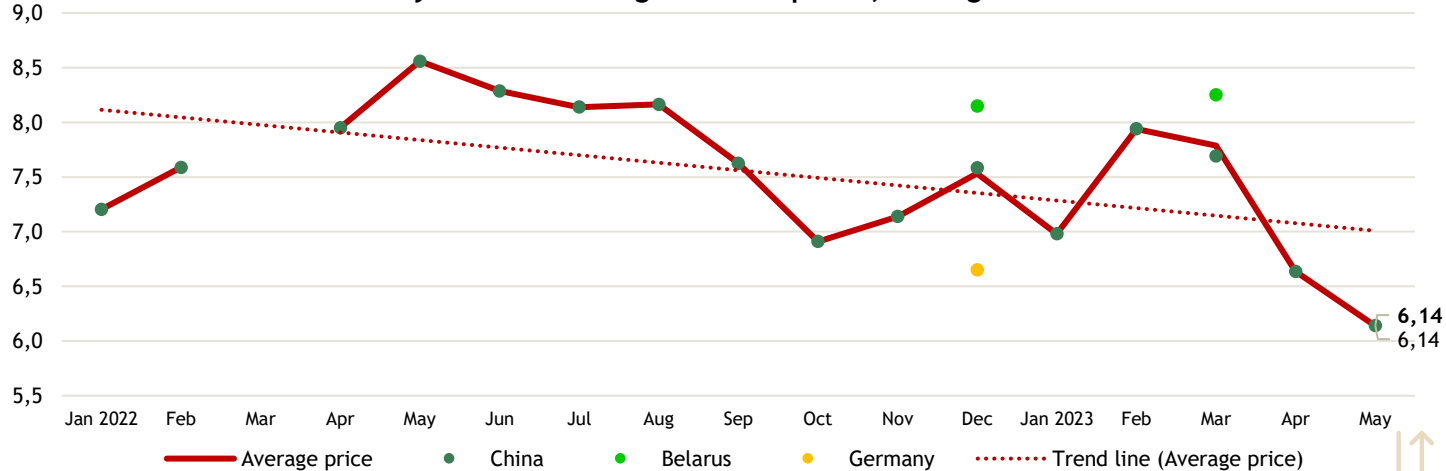
Almost all the volume of isoleucine is imported from China. In January-May 2023 the volume of imports was 846 tons (6.6 times higher year-on-year). The average contract price decreased by 4.7% over the year to 7.29 USD/kg. Relative to April, shipments in May fell by 44% to 128 tonnes. The average contract price decreased by 7.5% over the same period to 6.14 USD/kg.

Dynamics of import volumes, tons



* including EAEU countries in January 22 - April 23

Dynamics of average contract prices, USD/kg



02

PRICE DYNAMICS

Methionine

Lysine HCL

Lysine sulfate 70%

Threonine

Tryptophan

Valine

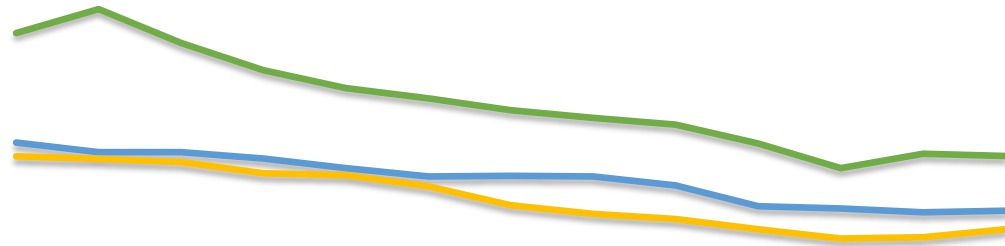
Arginine

Isoleucine

Betaine

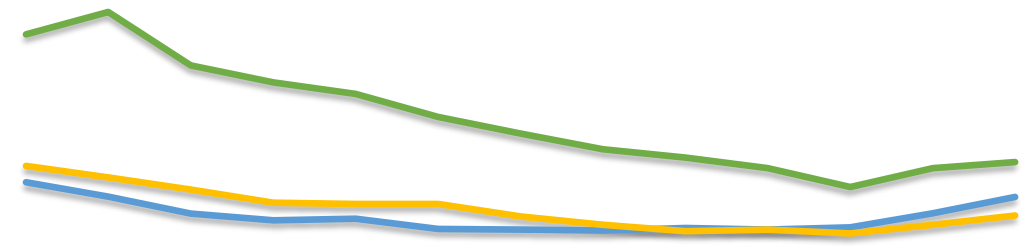


METHIONINE



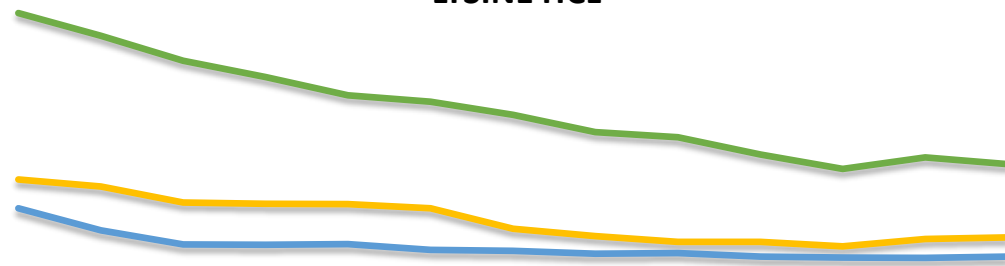
| USD/kg | Jun 2022 | Jul 2022 | Aug 2022 | Sep 2022 | Oct 2022 | Nov 2022 | Dec 2022 | Jan 2023 | Feb 2023 | Mar 2023 | Apr 2023 | May 2023 | Jun 2023 |
|--------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Russia | 4,39 | 4,67 | 4,27 | 3,95 | 3,74 | 3,62 | 3,49 | 3,39 | 3,32 | 3,09 | 2,81 | 2,97 | 2,95 |
| China | 3,11 | 2,99 | 2,99 | 2,92 | 2,81 | 2,71 | 2,72 | 2,71 | 2,60 | 2,36 | 2,33 | 2,29 | 2,31 |
| EU | 2,95 | 2,91 | 2,88 | 2,75 | 2,72 | 2,59 | 2,37 | 2,27 | 2,21 | 2,09 | 1,98 | 2,00 | 2,09 |

THREONINE



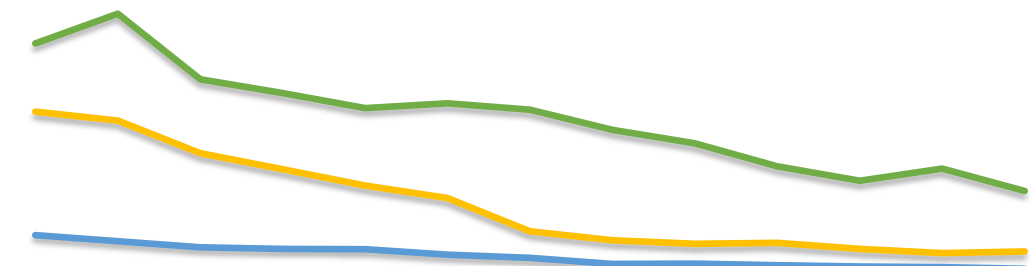
| USD/kg | Jun 2022 | Jul 2022 | Aug 2022 | Sep 2022 | Oct 2022 | Nov 2022 | Dec 2022 | Jan 2023 | Feb 2023 | Mar 2023 | Apr 2023 | May 2023 | Jun 2023 |
|--------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Russia | 3,09 | 3,30 | 2,79 | 2,63 | 2,52 | 2,31 | 2,15 | 2,00 | 1,93 | 1,83 | 1,65 | 1,83 | 1,88 |
| China | 1,69 | 1,56 | 1,40 | 1,34 | 1,35 | 1,25 | 1,25 | 1,24 | 1,26 | 1,25 | 1,27 | 1,40 | 1,55 |
| EU | 1,85 | 1,74 | 1,63 | 1,50 | 1,49 | 1,49 | 1,37 | 1,29 | 1,23 | 1,25 | 1,21 | 1,29 | 1,38 |

LYSINE HCL



| USD/kg | Jun 2022 | Jul 2022 | Aug 2022 | Sep 2022 | Oct 2022 | Nov 2022 | Dec 2022 | Jan 2023 | Feb 2023 | Mar 2023 | Apr 2023 | May 2023 | Jun 2023 |
|--------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Russia | 3,57 | 3,35 | 3,10 | 2,95 | 2,77 | 2,71 | 2,58 | 2,41 | 2,36 | 2,20 | 2,06 | 2,17 | 2,10 |
| China | 1,67 | 1,46 | 1,32 | 1,32 | 1,33 | 1,27 | 1,26 | 1,23 | 1,24 | 1,21 | 1,20 | 1,19 | 1,21 |
| EU | 1,95 | 1,89 | 1,73 | 1,72 | 1,72 | 1,67 | 1,48 | 1,41 | 1,35 | 1,35 | 1,31 | 1,38 | 1,39 |

LYSINE SULFATE 70%

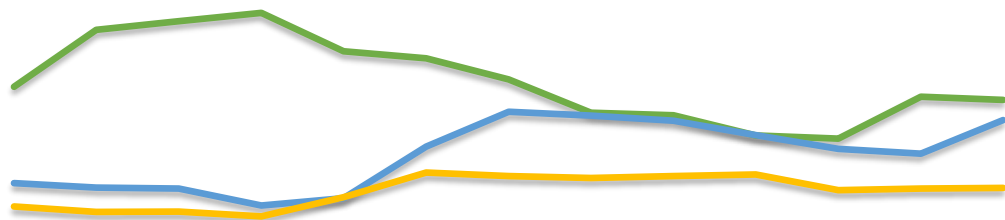


| USD/kg | Jun 2022 | Jul 2022 | Aug 2022 | Sep 2022 | Oct 2022 | Nov 2022 | Dec 2022 | Jan 2023 | Feb 2023 | Mar 2023 | Apr 2023 | May 2023 | Jun 2023 |
|--------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Russia | 2,47 | 2,70 | 2,20 | 2,10 | 1,98 | 2,02 | 1,97 | 1,81 | 1,71 | 1,53 | 1,43 | 1,52 | 1,35 |
| China | 1,01 | 0,96 | 0,92 | 0,90 | 0,90 | 0,86 | 0,84 | 0,79 | 0,79 | 0,78 | 0,77 | 0,76 | 0,75 |
| EU | 1,95 | 1,89 | 1,64 | 1,51 | 1,39 | 1,29 | 1,04 | 0,97 | 0,94 | 0,95 | 0,90 | 0,87 | 0,88 |



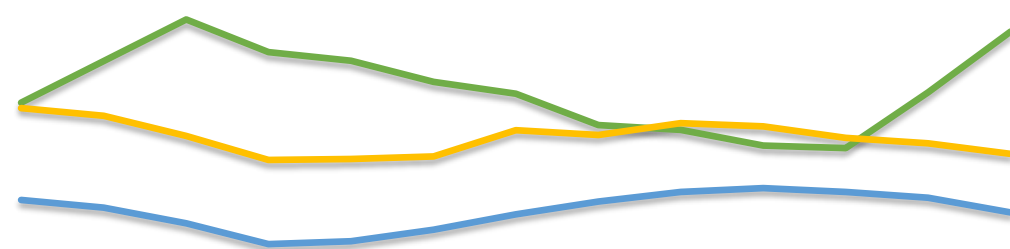


TRYPTOPHAN



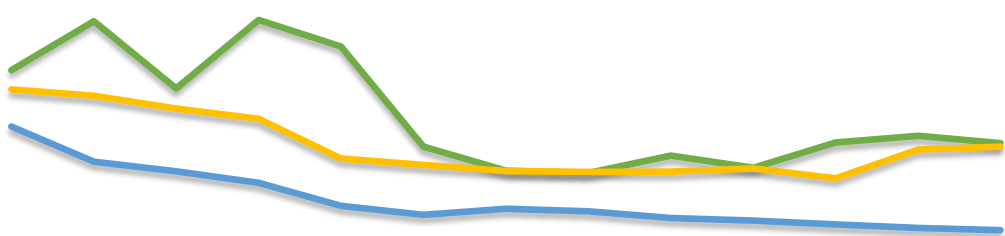
| USD/kg | Jun 2022 | Jul 2022 | Aug 2022 | Sep 2022 | Oct 2022 | Nov 2022 | Dec 2022 | Jan 2023 | Feb 2023 | Mar 2023 | Apr 2023 | May 2023 | Jun 2023 |
|--------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Russia | 9,55 | 10,6 | 10,8 | 11,0 | 10,2 | 10,1 | 9,69 | 9,05 | 9,00 | 8,61 | 8,55 | 9,36 | 9,30 |
| China | 7,70 | 7,61 | 7,59 | 7,27 | 7,41 | 8,40 | 9,07 | 9,00 | 8,90 | 8,62 | 8,35 | 8,27 | 8,91 |
| EU | 7,25 | 7,15 | 7,15 | 7,06 | 7,43 | 7,90 | 7,83 | 7,80 | 7,84 | 7,87 | 7,56 | 7,59 | 7,61 |

VALINE



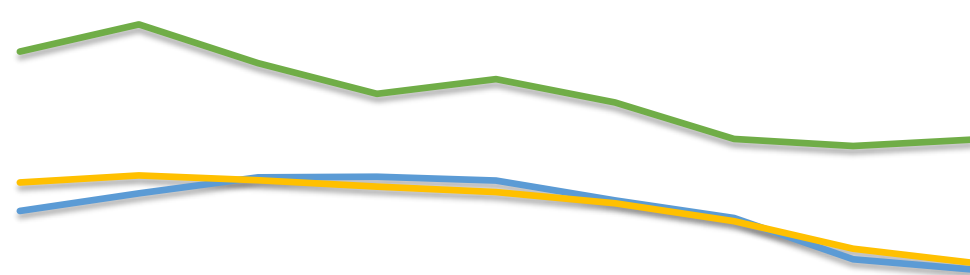
| USD/kg | Jun 2022 | Jul 2022 | Aug 2022 | Sep 2022 | Oct 2022 | Nov 2022 | Dec 2022 | Jan 2023 | Feb 2023 | Mar 2023 | Apr 2023 | May 2023 | Jun 2023 |
|--------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Russia | 4,90 | 5,51 | 6,13 | 5,65 | 5,52 | 5,21 | 5,03 | 4,57 | 4,50 | 4,26 | 4,22 | 5,05 | 5,95 |
| China | 3,46 | 3,34 | 3,11 | 2,80 | 2,85 | 3,01 | 3,25 | 3,43 | 3,58 | 3,63 | 3,58 | 3,49 | 3,27 |
| EU | 4,82 | 4,70 | 4,40 | 4,05 | 4,07 | 4,10 | 4,49 | 4,42 | 4,60 | 4,55 | 4,38 | 4,30 | 4,14 |

ARGININE



| USD/kg | Jun 2022 | Jul 2022 | Aug 2022 | Sep 2022 | Oct 2022 | Nov 2022 | Dec 2022 | Jan 2023 | Feb 2023 | Mar 2023 | Apr 2023 | May 2023 | Jun 2023 |
|--------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Russia | 7,50 | 8,31 | 7,20 | 8,32 | 7,89 | 6,25 | 5,85 | 5,82 | 6,10 | 5,90 | 6,31 | 6,42 | 6,30 |
| China | 6,58 | 6,00 | 5,84 | 5,65 | 5,28 | 5,13 | 5,23 | 5,18 | 5,08 | 5,03 | 4,97 | 4,91 | 4,88 |
| EU | 7,18 | 7,08 | 6,87 | 6,70 | 6,05 | 5,95 | 5,84 | 5,83 | 5,83 | 5,89 | 5,72 | 6,20 | 6,24 |

ISOLEUCINE



| USD/kg | Oct 2022 | Nov 2022 | Dec 2022 | Jan 2023 | Feb 2023 | Mar 2023 | Apr 2023 | May 2023 | Jun 2023 |
|--------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Russia | 10,6 | 11,2 | 10,4 | 9,65 | 9,99 | 9,46 | 8,62 | 8,46 | 8,61 |
| China | 6,97 | 7,38 | 7,74 | 7,75 | 7,67 | 7,21 | 6,81 | 5,86 | 5,63 |
| EU | 7,62 | 7,79 | 7,68 | 7,52 | 7,40 | 7,14 | 6,73 | 6,11 | 5,78 |



Marketing research by FEEDLOT

MARKET ANALYSIS OF ESSENTIAL OILS IN RUSSIA



@FEEDLOT_RU

 FEEDLOT



This research is a marketing analysis of the market of essential oils in Russia. **FEEDLOT** analysts have analyzed the industry in the current economic situation.

Analysis period: 2017-2022

 FEEDLOT

Object of research: essential oils market in Russia

The report consists of 47 slides (61 charts, 12 tables).

Standard package – 49 000 rubles (pdf report).

Extended package – 69 000 rubles (pdf report + excel data)

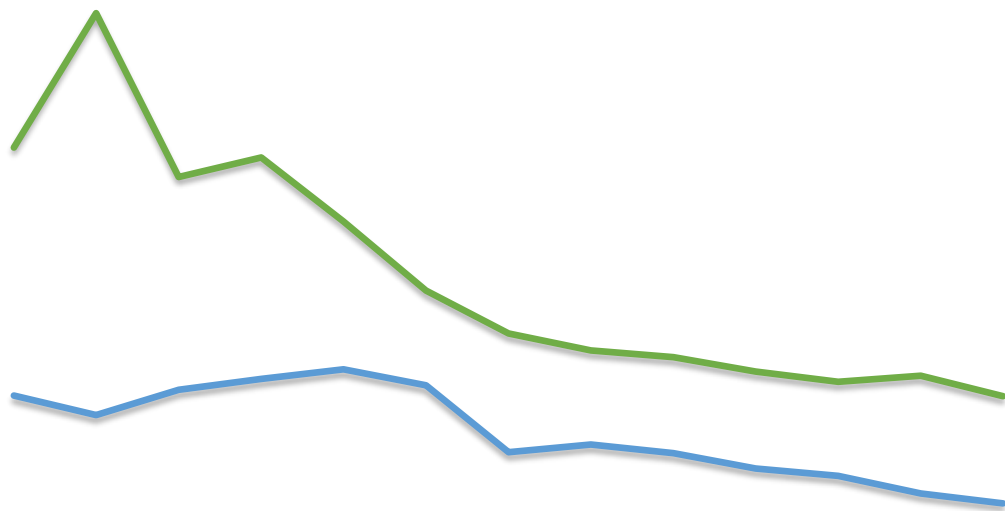
Service period – 1 working day after payment.

 FEEDLOT

[DOWNLOAD A DEMOVERSION](#)



BETAINE



| USD/kg | Jun 2022 | Jul 2022 | Aug 2022 | Sep 2022 | Oct 2022 | Nov 2022 | Dec 2022 | Jan 2023 | Feb 2023 | Mar 2023 | Apr 2023 | May 2023 | Jun 2023 |
|--------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Russia | 5,16 | 6,68 | 4,83 | 5,05 | 4,33 | 3,55 | 3,07 | 2,87 | 2,80 | 2,64 | 2,52 | 2,59 | 2,36 |
| China | 2,36 | 2,14 | 2,43 | 2,55 | 2,66 | 2,48 | 1,73 | 1,81 | 1,71 | 1,54 | 1,46 | 1,26 | 1,15 |

Main trends in the amino acid market:

- In January-May 2023 total imports of feed amino acids in Russia is estimated at 38.5 thousand tons, which is 51% lower than the same period in 2022. 86% of feed amino acids in January-May were supplied by Chinese manufacturers, 10% - by Belarusian producers. In May there were supplies of valine and tryptophan from French producers.
- In Russia, prices for amino acids in June were more varied, the range of prices for the month fluctuated at 1%-3%. The most intensive growth as compared with May prices was noted for valine (+18%). Lysine sulfate (-11%) and betaine (-9%) showed the most considerable reduction.
- Prices of feed amino acids in China were also multidirectional. There was a significant increase in threonine and tryptophan (+8%). Valine and biotin, on the other hand, fell in price by an average of 6% from May. In Europe, methionine and threonine rose in price by 6.6%. Only valine and isoleucine declined by 4.5% on average.
- Lysine production at the Daesang plant in Gunsan, South Korea, will not resume until July. The plant can produce 10,000 tons of HCl lysine /month and 7,000 tons of liquid lysine /month when it reaches full capacity.
- The completion date for the new 150,000-ton/year methionine line in Weifang, Shandong Province, has been delayed until August due to a delayed arrival of equipment. Completion of the plant was originally scheduled for June, according to NHU's latest financial report.
- Adisseo's methionine plant in Commentry, France, remains inoperable. Production at the plant was halted in late October because of high energy and raw material costs.



03

**REGISTERED FEED
ADDITIVES IN RUSSIA**



| Additive name | Stellar G | Bio-Cit Active | Appetite | Acid Mix C Dry | Septecit |
|--------------------------------------|---|---|--|---|---|
| Date of additive registration | 02.06.2023 | 02.06.2023 | 02.06.2023 | 02.06.2023 | 02.06.2023 |
| Manufacturer | SHANDONG LONCT ENZYMES CO., LTD. | - | - | - | - |
| Country | China | - | - | - | - |
| Type of feed additive | G | F | F | F | G |
| Area of application | To increase the digestibility of nutrients by breaking down glucan from plant feed ingredients in swine and poultry diets | To increase productivity and safety of growing and fattening piglets, broiler chickens, turkeys and laying hens | To improve the eatability of feed for cattle, pigs and farm poultry, and pigeons | To reduce the level of pathogenic microflora in feed and feed raw materials, as well as to optimize the digestive processes in pigs and poultry | To reduce the growth and development of pathogenic bacteria in feed, as well as to increase the safety and productivity of growing and fattening piglets, broiler chickens, turkeys and laying hens |

A - an animal-derived supplement without milk proteins
B - animal origin additive containing milk proteins
C - animal origin additive containing vegetable components
F - a chemical and/or microbiological synthesis additive
G - a chemical and/or microbiological synthesis additive containing plant derived components
E - vegetable enrichment





| Additive name | Benefit to living creatures | GreenLeko Bio | Fidacid Plus | Proactive Poultry R | Lactoferm Lag Pro |
|--------------------------------------|--|---|--|--|--|
| Date of additive registration | 02.06.2023 | 06.06.2023 | 06.06.2023 | 06.06.2023 | 16.06.2023 |
| Manufacturer | | | | | BIOCHEM SRL |
| Country | | | | | Италия |
| Type of feed additive | F | F | F | G | G |
| Area of application | To increase safety and productivity in broiler chickens, laying hens, fattening steers, lactating sows and young sheep, normalization of metabolism in steers, cows and sport horses | To normalize digestive processes, increase safety and productivity of growing pigs and fattening pigs | To reduce pathogenic microflora in feed and water for watering, increase productivity and safety of pigs and poultry | To increase productivity and optimize digestive processes in laying hens, turkeys and broiler chickens | To increase the safety and productivity of poultry |

- A - an animal-derived supplement without milk proteins
- B - animal origin additive containing milk proteins
- C - animal origin additive containing vegetable components
- F - a chemical and/or microbiological synthesis additive
- G - a chemical and/or microbiological synthesis additive containing plant derived components
- E - vegetable enrichment



04

**INVESTMENT
PROJECTS IN THE
INDUSTRY**



The following industry investment projects were reported in June 2023:

| Investor | Region, district | Total investment in the project | Design capacity | Notes |
|---|------------------|---------------------------------|-----------------|--|
| Lemniscata JSC (Viet-Nga LLC) | Tambov region | 1 bln rub | - | It is supposed to produce food for cats, dogs and other pets. Initially 200 people will work in the shops, then up to 500. Shift work around the clock is planned. |
| Ag-Tech and Ruskormgroup companies | Ryazan region | 600 mln rub | - | They will launch a plant for the production of finished fodder. The company will create 150 jobs. |
| Fava Company | Leningrad region | 775 mln rub | - | The company will expand production of cat and dog food, which is made from Russian ingredients, including natural meat. |
| JSC Ekooil | Tambov region | 2,5 bln rub | 250 thnd tons | Agroholding plans to build an elevator. |
| Informbio, LLC | Moscow region | 2 bln rub | - | Production of protein concentrates for the feed industry and high-protein components for the food industry is planned to be launched in the city district. At the first stage about 60 jobs will be created at the production, in the future the staff will increase up to 200 people. |





The following industry investment projects were reported in June 2023:

| Investor | Region, district | Total investment in the project | Design capacity | Notes |
|-------------------------------|------------------------|---------------------------------|--------------------|---|
| VAA-Agro LLC | Yamalo-Nenets District | 15 mln rub | - | A complex for growing green fodder for animals is being built in Aksarka in the Urals region. The fodder is planned to be grown using hydroponics. |
| Krasnodar Starch Factory Ltd. | Krasnodar Region | 28 mln rub | 250 thnd tons/year | They will build a plant for the production of mixed fodder and products of deep processing of grain. |
| - | Smolensk region | 2,1 bln rub | - | The county will begin to produce fish mixed fodder. |
| Biotroph LLC | Leningrad region | 500 bln rub | 1,3 thnd tons/year | The new production complex will include an administrative building, a production-laboratory and production-warehouse buildings with an area of more than 5,800 square meters. The enterprise will produce feed additives, inoculants and preservatives for silage production, sorbents, biopreparations for cows, pigs, poultry and fish. It is also planned to create 50 new jobs. |





FEEDLOT

News and Analytics
of the Feed Market



Feed industry analytics

- Monitoring of prices for feed amino acids, vitamins and soybean meal
- Market review of feed additives, compound feeds, premixes, and grains
- Monthly selling prices of feed ingredients
- Analysis of feed markets in Russia, USA, Southeast Asia, European Union and Latin America
- Market research and mini-market reports, feed additives, enzymes and other feed ingredients
- Market forecasting
- Evaluation of new investment projects in the industry
- Interviews with leading livestock producers
- Business planning and marketing strategies
- Analysis of related industries



@FEEDLOT_RU