

Controlled- and Slow-Release Fertilizers

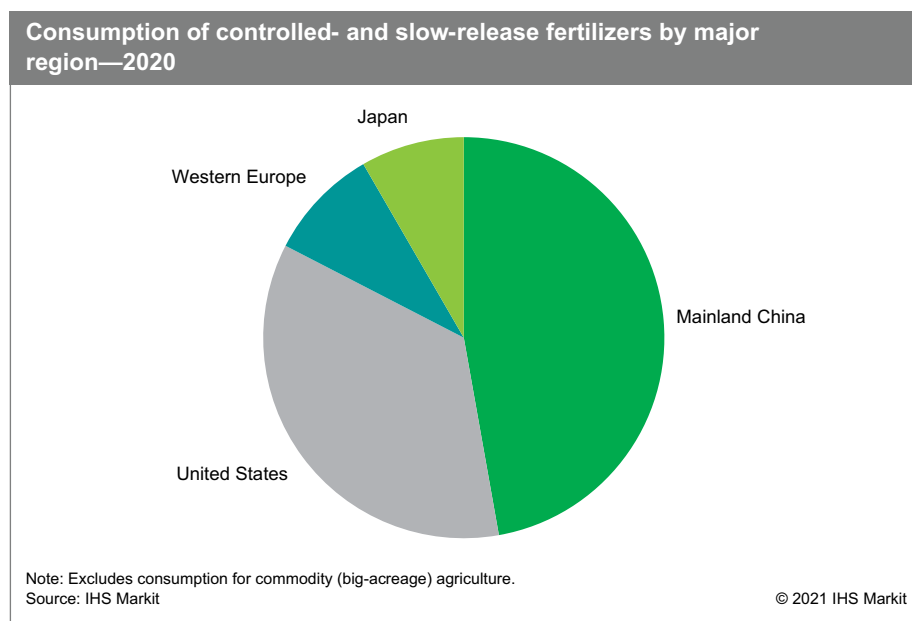
June 2021

Abstract

Controlled-release (CRF) and slow-release (SRF) fertilizers belong to the larger group of enhanced-efficiency fertilizers, which also include nitrogen stabilizers, nitrification inhibitors, urease inhibitors, and stabilized fertilizers. Controlled-release fertilizers are generally coated products. Slow-release fertilizers are noncoated products in which the nutrient release is uncontrolled but slow; these are mainly urea-aldehyde reaction products but also include other slowly soluble products such as fertilizer spikes and ion exchange resin fertilizers. Whereas the bulk of the market belongs to the stabilizers and inhibitors categories, CRFs and SRFs are used in much smaller volumes and therefore might be considered specialties.

Although controlled- and slow-release fertilizers have been shown to have efficacy, their use is still relatively limited as they are much more expensive than the commercial fertilizers in the market. For this reason, they are used primarily in niche markets such as golf courses, landscaping, and nurseries and greenhouses.

The following pie chart shows consumption of controlled- and slow-release fertilizers by major region; the data exclude consumption in the United States and mainland China for commodity (big-acreage) agriculture:



The global market is expected to grow at about 2.6% per year during the forecast years (excluding commodity agriculture), helped by increases in efficiency, reduced quantities of waste due to runoff, and also by increases in food demand by the growing population, especially among the third-world nations that are shifting to a more protein-based diet and away from traditional carbohydrate-based diets.

Contacts

IHS Markit Customer Care • CustomerCare@ihsmarkit.com

Controlled- and slow-release fertilizers have become one of the fastest-growing fertilizers in mainland China in the last five years, fueled by the rapid growth of the Chinese economy and the need to improve fertilizer efficiency, increase crop yield, and reduce the impact of fertilizers on the environment. As a result, mainland China has become the major market for CRFs and SRFs for both the commodity agriculture and agricultural crop markets.

The United States has also been a significant market for CRFs and SRFs. Nonagricultural applications are the leading demand segment in the United States, followed by the rapidly rising agricultural commodity and agricultural crop markets. Smaller volumes of CRFs and SRFs are produced and consumed in Western Europe and Japan, as well as in other regions such as Canada, Central and Eastern Europe, the Middle East, and Africa.

CRFs and SRFs are an efficient alternative to conventional fertilizers because of their environmentally friendly, resource-saving, and labor-saving characteristics. However, because of their high price relative to conventional fertilizers, their use is still limited primarily to ornamental, horticultural, and turf applications. As larger production scales of these materials are achieved, the costs will continue to decline from current values, making them more attractive for commodity/open-field/broad-acre crops such as corn, wheat, and potatoes. Another factor that will drive CRF and SRF demand is the regulations and penalties that encourage growers to minimize fertilizer runoff in water streams.

The trend toward increasing use of coated controlled-release fertilizers is expected to continue. Coated fertilizers, particularly polymer-coated products, have been the fastest-growing segment of the CRF and SRF market, and will continue to grow at a faster rate than other CRF and SRF types. The advent of less-expensive polymer coating technology has led to increased consumption of CRFs in commodity (big-acreage) agriculture, especially in North America (the United States and Canada) and mainland China. Overall global demand for CRFs and SRFs will continue to increase for all applications, including horticultural and turf and agricultural crop applications, and commodity (big-acreage) agricultural applications in North America and mainland China.

For more detailed information, see the table of contents, shown below.

IHS Markit's Chemical Economics Handbook – *Controlled- and Slow-Release Fertilizers* is the comprehensive and trusted guide for anyone seeking information on this industry. This latest report details global and regional information, including



Global summary;
regional coverage



Producers with
annual capacities
and plant sites



Production figures
and trends



Consumption and
forecasts by end use
application



Manufacturing
processes and
environmental issues



Trade – imports
and exports

Key Benefits

IHS Markit's Chemical Economics Handbook – *Controlled- and Slow-Release Fertilizers* has been compiled using primary interviews with key suppliers, organizations and leading representatives from the industry in combination with IHS Markit's unparalleled access to upstream and downstream market intelligence, expert insights into industry dynamics, trade and economics.

This report can help you:

- Identify trends and driving forces influencing chemical markets
- Forecast and plan for future demand

- Understand the impact of competing materials
- Identify and evaluate potential customers and competitors
- Evaluate producers
- Track changing prices and trade movements
- Analyze the impact of feedstocks, regulations, and other factors on chemical profitability

Contents

| | |
|--|-----------|
| Executive summary | 7 |
| Summary | 9 |
| Introduction | 16 |
| Product characteristics | 16 |
| – Urea-formaldehyde reaction products | 17 |
| – UF concentrates | 19 |
| – Ureaform | 20 |
| – Methylene ureas | 20 |
| – Methylene diurea/dimethylene triurea | 21 |
| – UF solutions | 21 |
| – Urea-triazone solutions | 21 |
| – Isobutylidene diurea | 22 |
| – Crotonylidene diurea | 23 |
| – Other synthetic organic products | 24 |
| – Oxamide | 24 |
| – Guanylurea sulfate | 24 |
| – Melamine (triaminotriazine) | 24 |
| – Coated fertilizers | 25 |
| – Sulfur-coated fertilizers | 25 |
| – Polymer-coated sulfur-coated fertilizers (PCSC) | 26 |
| – Polymer-coated fertilizers | 27 |
| – Other slowly soluble fertilizers | 29 |
| – Metal ammonium and potassium phosphates | 29 |
| – Spikes, stakes, tablets, and briquettes | 30 |
| Supply and demand by region | 31 |
| United States | 31 |
| – Producing companies | 31 |
| – Producer profiles | 37 |
| – ICL Specialty Fertilizers | 37 |
| – Koch Agronomic Services LLC | 38 |
| – Nutrien | 39 |
| – Salient statistics | 40 |
| – Consumption | 42 |
| – Commodity agriculture | 44 |
| – Agricultural crop markets | 45 |
| – Nonagricultural markets | 47 |
| – Consumer | 47 |
| – Golf courses | 49 |
| – Professional lawn care and landscape maintenance | 53 |
| – Nurseries and greenhouses | 55 |

| | |
|---|----|
| – Other professional turf | 57 |
| – Landscape | 58 |
| – Price | 60 |
| – Trade | 60 |
| – Imports | 60 |
| – Exports | 61 |
| Canada and Mexico | 61 |
| South America | 62 |
| Europe, Middle East, and Africa (EMEA) | 63 |
| – Overview | 63 |
| – Definition of market coverage | 63 |
| – Coverage by product type | 63 |
| – Coverage by market | 63 |
| – Market summary | 64 |
| – Western Europe | 66 |
| – Producing companies | 67 |
| – Supply channels | 73 |
| – Urea-aldehyde reaction products (slow-release fertilizers) | 75 |
| – Coated fertilizers (controlled-release fertilizers) | 75 |
| – Other slowly soluble fertilizers | 76 |
| – Nitrification inhibitor–and urease inhibitor–containing fertilizers | 76 |
| – Rules and regulations | 79 |
| – Concept of nutrient use efficiency (NUE) and impact on enhanced efficiency fertilizers demand | 80 |
| – Microplastics regulation | 80 |
| – Fertilizer regulation | 80 |
| – Nitrates Directive | 81 |
| – Water Framework Directive (WFD) | 82 |
| – Groundwater Directive | 82 |
| – National Emissions Ceilings (NEC) Directive | 82 |
| – Salient statistics | 83 |
| – Production | 84 |
| – Consumption | 84 |
| – Consumption by market | 86 |
| – Consumption by product type | 89 |
| – Price | 91 |
| – Trade | 92 |
| – Imports | 92 |
| – Exports | 92 |
| – Central and Eastern Europe | 93 |
| – Producing companies | 93 |
| – Salient statistics | 94 |
| – Consumption | 95 |
| – Price | 96 |

| | |
|---|-----|
| – Trade | 96 |
| – Middle East | 97 |
| – Producing companies | 97 |
| – Salient statistics | 99 |
| – Consumption | 100 |
| – Price | 101 |
| – Trade | 101 |
| – Africa | 102 |
| – Producing companies | 102 |
| – Salient statistics | 102 |
| – Consumption | 103 |
| – Price | 104 |
| – Trade | 104 |
| Indian Subcontinent | 104 |
| – Overview | 104 |
| – Producing companies | 104 |
| – Production | 105 |
| – Consumption | 106 |
| Northeast Asia | 106 |
| – Mainland China | 106 |
| – Producing companies | 106 |
| – Salient statistics | 110 |
| – Production | 111 |
| – Urea-formaldehyde reaction products | 111 |
| – Coated fertilizers | 111 |
| – Sulfur-coated urea | 112 |
| – Polymer-coated urea/complex fertilizers | 112 |
| – Other | 112 |
| – Consumption | 112 |
| – Price | 113 |
| – Trade | 113 |
| – Japan | 113 |
| – Producing companies | 113 |
| – Salient statistics | 116 |
| – Production | 116 |
| – Consumption | 117 |
| – Urea-aldehyde reaction products | 118 |
| – Other synthetic organic products | 119 |
| – Coated fertilizers | 119 |
| – Processed natural organic fertilizers | 119 |
| – Price | 120 |
| – Trade | 121 |
| – Imports | 121 |

| | |
|-----------------------------|------------|
| – Exports | 121 |
| – Other Northeast Asia | 121 |
| – Producing companies | 121 |
| – South Korea | 122 |
| – Taiwan | 122 |
| Southeast Asia and Oceania | 122 |
| – Southeast Asia | 122 |
| – Indonesia | 124 |
| – Malaysia | 124 |
| – Vietnam | 125 |
| – Oceania | 125 |
| Additional resources | 126 |
| Revisions | 127 |
| Data Workbook | 128 |

IHS Markit Customer Care

CustomerCare@ihsmarkit.com

Asia and the Pacific Rim

Japan: +81 3 6262 1887

Asia Pacific: +604 291 3600

Europe, Middle East, and Africa: +44 (0) 1344 328 300

Americas: +1 800 447 2273

Disclaimer

The information contained in this report is confidential. Any unauthorized use, disclosure, reproduction, or dissemination, in full or in part, in any media or by any means, without the prior written permission of IHS Markit or any of its affiliates ("IHS Markit") is strictly prohibited. IHS Markit owns all IHS Markit logos and trade names contained in this report that are subject to license. Opinions, statements, estimates, and projections in this report (including other media) are solely those of the individual author(s) at the time of writing and do not necessarily reflect the opinions of IHS Markit. Neither IHS Markit nor the author(s) has any obligation to update this report in the event that any content, opinion, statement, estimate, or projection (collectively, "information") changes or subsequently becomes inaccurate. IHS Markit makes no warranty, expressed or implied, as to the accuracy, completeness, or timeliness of any information in this report, and shall not in any way be liable to any recipient for any inaccuracies or omissions. Without limiting the foregoing, IHS Markit shall have no liability whatsoever to any recipient, whether in contract, in tort (including negligence), under warranty, under statute or otherwise, in respect of any loss or damage suffered by any recipient as a result of or in connection with any information provided, or any course of action determined, by it or any third party, whether or not based on any information provided. The inclusion of a link to an external website by IHS Markit should not be understood to be an endorsement of that website or the site's owners (or their products/services). IHS Markit is not responsible for either the content or output of external websites. Copyright © 2021, IHS Markit®. All rights reserved and all intellectual property rights are retained by IHS Markit.

