

Chelating Agents

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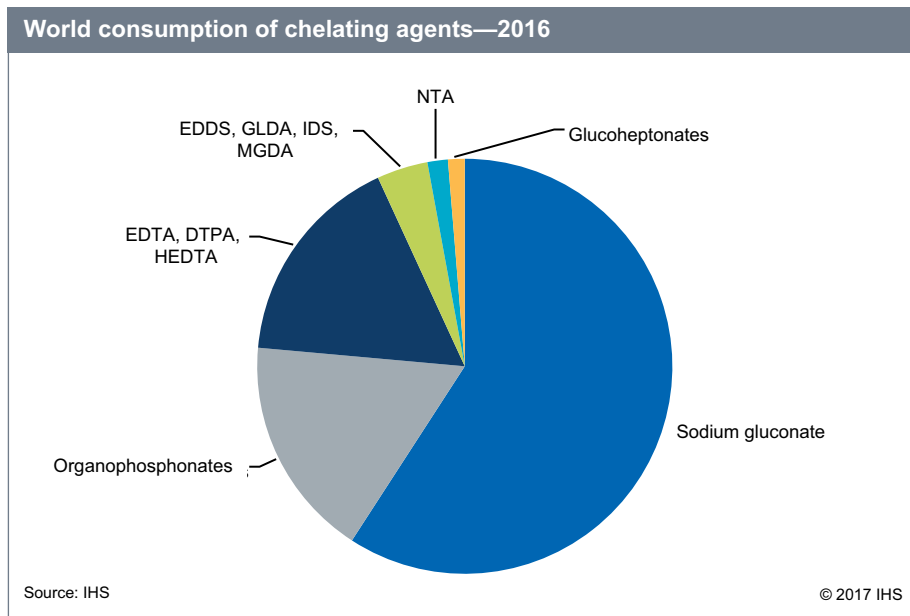
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Abstract

This report discusses the applications and major markets for traditional chelating agents, including aminopolycarboxylic acids and salts, hydroxycarboxylic acids and salts, and organophosphonates. In addition, particular attention is drawn to the continued growth of more environmentally acceptable chelating agents that show enhanced biodegradability and are able to replace traditional aminopolycarboxylates such as EDTA (ethylenediaminetetraacetic acid) and NTA (nitrilotriacetic acid), or to replace phosphate builders such as STPP in detergent formulations. Some chelating agents also perform other functions. Organophosphonates, for example, are largely used as scale inhibitors in industrial water processes where they act to disturb the crystal structure and keep the scale particles small, versus chelating agents that keep everything soluble.

The principal function of chelating agents is to solubilize metal ions that would otherwise have detrimental impact on systems or other products that are being used. Applications for chelating agents are as varied as the product types, with some products finding multiple applications, while others fulfill specific purposes, depending on the chemical conditions in which they need to perform and the required cost-to-efficacy ratio.

The following pie chart shows world consumption of chelating agents:



Consumption of the new biodegradable chelating agents, such as MGDA (methylglycinediacetic acid and salts), GLDA (L-glutamic acid, N,N-diacetic acid sodium salts), EDDS (ethylenediaminedisuccinic acid and salts), and IDS (iminodisuccinic acid and salts), continues to show higher-than-average growth, accounting for approximately 18% of total

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aminopolycarboxylate consumption, although consumption is still confined primarily to Europe and the United States. Consumption in Europe is being driven by new legislation on the use of phosphates for automatic dishwasher formulations, which came into force in January 2017.

Organophosphonates are used principally in industrial water treatment, but also in I&I cleaners and oil field applications. China is the largest market for organophosphonates, accounting for over 60% of global consumption in 2016, and will drive global consumption growth at about 4% per year through the forecast period.

Production capacity and consumption of gluconates in China have risen dramatically over the last five years, to support the growth in the construction industry as concrete admixtures.

Global consumption of NTA is predicted to continue to decline at a rate of 1.9% per year over the forecast period, particularly in Europe, where producers have voluntarily agreed to label formulations containing more than 5% NTA as an active ingredient with R40 risk phrase (Category 3). Demand for NTA in other regions where it is used particularly in heavy-duty industrial and institutional (I&I) cleaners has remained relatively stable.

Global consumption of all chelating agents is expected to grow at an average annual rate of about 4% during 2016–21.

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