

# Global Dithiothreitol Market Research Report 2021-2025

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## Abstracts

Dithiothreitol (DTT) is the common name for a small-molecule redox reagent known as Cleland's reagent. DTT's formula is  $C_4H_{10}O_2S_2$  and the molecular structure of its reduced form is shown at the right; its oxidized form is a disulfide-bonded 6-membered ring. Its name derives from the four-carbon sugar, threose. DTT has an epimeric ('sister') compound, dithioerythritol (DTE).

DTT is an unusually strong reducing agent, owing to its high conformational propensity to form a six-membered ring with an internal disulfide bond. It has a redox potential of  $-0.33$  V at pH 7. The reduction of a typical disulfide bond proceeds by two sequential thiol-disulfide exchange reactions and is illustrated below. The intermediate mixed-disulfide state is unstable (i.e., poorly populated) because the second thiol of DTT has a high propensity to close the ring, forming oxidized DTT and leaving behind a reduced disulfide bond. The reducing power of DTT is limited to pH values above  $\sim 7$ , since only the negatively charged thiolate form  $-S^-$  is reactive (the protonated thiol form  $-SH$  is not); the  $pK_a$  of thiol groups is typically  $\sim 8.3$ .

A common use of DTT is as a reducing or "deprotecting" agent for thiolated DNA. The terminal sulfur atoms of thiolated DNA have a tendency to form dimers in solution, especially in the presence of oxygen. Dimerization greatly lowers the efficiency of subsequent coupling reactions such as DNA immobilization on gold in biosensors. Typically DTT is mixed with a DNA solution and allowed to react, and then is removed by filtration (for the solid catalyst) or by chromatography (for the liquid form). The DTT removal procedure is often called "desalting."

DTT is frequently used to reduce the disulfide bonds of proteins and, more generally, to prevent intramolecular and intermolecular disulfide bonds from forming between

cysteine residues of proteins. DTT can also be used as an oxidizing agent. Its principal advantage is that effectively no mixed-disulfide species are populated, in contrast to other agents such as glutathione.

The global Dithiothreitol Market is expected to grow at a CAGR approximately 3.5% from 2015 to 2021. Currently Asia is the largest market of Dithiothreitol, and the next five years will always remain. The European and American countries is still the DTT main import region.

In the context of China-US trade war and global economic volatility and uncertainty, it will have a big influence on this market. Dithiothreitol Report by Material, Application, and Geography – Global Forecast to 2025 is a professional and comprehensive research report on the world's major regional market conditions, focusing on the main regions (North America, Europe and Asia-Pacific) and the main countries (United States, Germany, United Kingdom, Japan, South Korea and China).

The report firstly introduced the Dithiothreitol basics: definitions, classifications, applications and market overview; product specifications; manufacturing processes; cost structures, raw materials and so on. Then it analyzed the world's main region market conditions, including the product price, profit, capacity, production, supply, demand and market growth rate and forecast etc. In the end, the report introduced new project SWOT analysis, investment feasibility analysis, and investment return analysis.

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