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Glutathione Resin Market Assessment, By Packaging Type [Less Than 50 ml, 50-100 ml, Greater Than 100 ml], By Application [Protein Purification, Laboratories Research, Others], By Region, Opportunities and Forecast, 2016-2030F

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Abstracts

Global glutathione resin market size was valued at USD 451.3 million in 2022, which is expected to reach USD 792.9 million in 2030, with a CAGR of 7.3% for the forecast period between 2023 and 2030.

Protein purification processes are successively achieved using affinity chromatography, which offers high selectivity, resolution, and capacity in much less time. An effective design affinity chromatography, glutathione resin is a one-step purification process used for recombinant glutathione S-transferase (GST) fusion proteins and relevant binding proteins in insect cells, E. coli, and mammalian cells. Glutathione resin is widely considered an excellent compound for high-performance purifications, especially when high binding capacity is required for batch purification. Elevated glutathione (GSH) levels are significantly observed in several types of cancer cells that increase antioxidant capacity.

Glutathione affinity resins are designed to purify glutathione-S-transferase (GST)-tagged recombinant proteins rapidly. High binding capacity and yield of glutathione-S-transferase (GST) fusion proteins of 5-8 mg/ml settled resin is successfully developed by Merck KGaA, Darmstadt. Also, biological companies are successfully researching to develop cost-effective purification processes while reducing hinderance effect.

Glutathione Resin is Advancing the Affinity Purification of Proteins

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Glutathione is an essential compound that increases the immune system and provides a barrier to harmful diseases prone to humans. The rapid purification of glutathione-binding proteins from yeast, insect, bacteria, and glutathione-S-transferase (GST)-tagged recombinant proteins are accomplished by simply designing glutathione affinity resin.

The glutathione ligand is coupled to highly cross-linked 4% agarose beads to optimize and provide high binding capacity for GST-tagged proteins. Flow dependent characteristics is associated with binding of GST to glutathione and lower flow rates usually enhancing the binding capacity.

Merck KGaA, Darmstadt has introduced the trademark product GST. Bind Resins utilize a 14-atom spacer arm to covalently attach reduced glutathione by using sulfide linkage. The yield of glutathione-S-transferase (GST) fusion proteins of 5-8 mg/ml settled resin are achieved by a high degree substation of glutathione, ensuring high binding capacity. In November 2022, LTS Lohmann, a prominent producer of needle-free drug delivery systems, especially transdermal patches, had an investment of USD 14 million with the Global Health Investment Corporation. In addition to successive investment in June 2022, Evonik has partnered with the United States Government, by investing USD 220 million to build innovative drug delivery system for new lipid production facility for mRNA-based therapies.

Advancement in Glutathione-S-transferase (GST)-Tagged Proteins use Glutathione Resin

The solution for a cost-effective purification process for proteins is frequently explored where the glutathione compound is linked to agarose beads with a suitable number of atom spacers that reduces the hindrance effect while undergoing purification. The innovation to develop such cost-effective compounds is accelerating and companies are conducting research in the field. Thermo Fisher Scientific Inc. has successfully developed pierce glutathione where the glutathione compound is linked to agarose beads through 12-atom spacer that substantially minimizes steric hinderance.

The company provides pierce glutathione agarose products in prepacked chromatography cartridges for delivering FPLC applications. The product delivers high performance and capacity properties for affinity purification of GST-tagged fusion proteins from cellular lysates. The pierce glutathione resin is economically priced and can be used five times without compromising purification performance and binding

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capacity which makes the product cost-effective. The product is clinically validated for its effective use with company's cell lysis reagents to extract and purify from mammalian or bacterial cell cultures.

Bodily Glutathione Levels Have Increased Nutritional or Therapeutic Compositions

Immune activity can be enhanced using nutritional or therapeutic composition while performing treatment of mammals. Glutathione precursor comprises of mixtures of glutamic acid, cystine, and glycine along with essential active ingredients like selenium. Selenium is a prominent trace metal found in various food compositions and is significantly incorporated in several non-toxic, water soluble organic or inorganic. Enhancement in cellular and tissue concentrations of glutathione improves resistance to infective agents by improving the immune system. Nutritional requirements are not fulfilled due to limited functionality of bacterial pathogens and commensals to metabolites. Hence, glutathione (GSH) is recognized as an abundant sulfur-content antioxidant present in mammalian tissues and is an incredible source of nutrient sulfur for human pathogens like staphylococcus aureus.

The data published by the Good Food Institute states that, in 2020 the United States market for plant-based foods is around USD 7.4 billion. Plant-based eggs are a modest category that is growing exponentially reaching around USD 39 million in 2021. The growing plant-based products are attracting various biological industries to improve nutritional characteristics which is subsequently creating market opportunities for glutathione resin market.

Impact of COVID-19

The outbreak of COVID-19 has severely impacted numerous sectors and human livelihood where every person was vulnerable to infectious disease. The shutdown of research laboratories accompanied by lower investment in pharmaceutical research has deteriorated the economic stability. But the urgency to develop effective drug to combat COVID-19 has created multiple opportunities for glutathione resin to incorporate rapid purification of glutathione-S-transferase (GST)-tagged recombinant proteins while reducing hinderance effect. The pandemic situation has created enormous potential for the market to expand and derive companies to incorporate services.

Key Players Landscape and Outlook

The glutathione resin market is successfully growing with the increasing demand for

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advanced and optimized protein purification process. Cytiva has developed Glutathione Sepharose 4B product which is an affinity chromatography resin for performing batch purification of glutathione-S-transferase (GST)-tagged proteins for attaining high binding capacity. The glutathione resin is chemically stable with all commonly used aqueous buffers and substantially used to study protein-protein interactions. Cytiva is successfully offering other life sciences solutions for undergoing purification GST fusion properties.

In October 2023, Cytiva and RoosterBio successively collaborated improving the exosome purification process for promising gene therapies and other significant modalities and manufacturing exosomes in mass quantities. The effective collaboration is developing prominent platform to provide cost-effective manufacturing solutions.

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*Companies mentioned above DO NOT hold any order as per market share and can be changed as per information available during research work

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