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# Synthesis of Rare Sugar Molecules: Utilizing Fermentation Biotechnology for the Production of L-Ribose

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**SYNTHESIS OF RARE SUGAR MOLECULES: UTILIZING FERMENTATION  
BIOTECHNOLOGY FOR THE PRODUCTION OF L-RIBOSE**

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Carbohydrate-based molecular research for biochemical and pharmaceutical companies is becoming increasingly important due to the involvement of carbohydrates in numerous biological functions; including cellular recognition, signaling, and even the development of disease states. The need to access consistent, pure and inexpensive carbohydrate starting materials is also an important factor to consider. This research is focused on the synthesis of one such rare glycochemical L-ribose due to its use in nucleoside-based pharmaceuticals. Zuchem, a biochemical company, has proposed a new synthetic route for the production of L-ribose which utilizes the NAD-dependent mannitol dehydrogenase (MDH) from *Apium graveolens* (garden celery) by specifically converting ribitol to L-ribose through the means of enzymatic oxidation using proprietary fermentation biotechnology. To increase optimization and purity of the L-ribose product through this synthetic route, Zuchem research parameters involve varying MDH zinc dependency, fermentation salt concentrations, and utilizing numerous inexpensive starting materials. In conclusion, this process produced about 90% pure L-ribose fractions for marketing.