# Antioxidant Evaluation and Anti-adhesive Properties of Milk Oligosaccharides from Indigenous Rathi Cow Milk

# ABSTRACT

Milk, a cornerstone of neonatal nutrition and human health, harbors various components with antioxidant capabilities, including oligosaccharides. In this study, we explored the antioxidant potential of acetylated milk oligosaccharides (A-MOs) and deacetylated oligosaccharides (D-MOs) sourced from Rathi cow milk through assays, with a focus on their comparative efficacy. Concurrently, we evaluated the antioxidant activity of Ascorbic Acid (AA) for comparison. Results revealed significant dynamics within the antioxidant profiles of A-MOs and D-MOs. A-MOs demonstrated concentration-dependent antioxidant activity, with higher concentrations correlating with increased efficacy, while D-MOs displayed a distinct pattern, with varying antioxidant potential across concentrations. Notably, both A-MOs and D-MOs exhibited promising antioxidant activity, suggesting their potential as natural antioxidants. In contrast, AA exhibited a decline in antioxidant activity with increasing concentration, indicating a differing pattern from oligosaccharides. These findings underscore the significance of acetylation in modulating the antioxidant properties of milk oligosaccharides. Further investigation is warranted to elucidate the mechanisms underlying these observations and to explore the practical implications of A-MOs and D-MOs as functional food components or potential therapeutic agents. Overall, our study contributes to the understanding of milk oligosaccharides' antioxidant properties and highlights the potential of acetylated and deacetylated oligosaccharides from Rathi cow milk as valuable sources of natural antioxidants with diverse applications in nutrition and healthcare.

### NTRODUCTION

oligosaccharides (CMOs) bioactive Cow milk are compounds found in cow milk, known for their diverse health benefits and medicinal properties. The extraction process involved initial fat and protein removal, followed by chromatographic techniques for oligosaccharide enrichment. Repeated column chromatography was employed to achieve high purity. Isolated pooled milk oligosaccharides were characterized for compositional diversity, aiming to advance their utilization in functional foods and nutraceuticals, particularly in promoting gut health and overall well-being. We investigated the antioxidant capacity of Rathicow milk's acetylated (A-MOs) and deacetylated (D-MOs) milk oligosaccharides.

### METHODS



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# METHODS (SCHEME)





### **Lyophilized** material Supernatant **O**Supernatant (Mixture of was filtered through Was precipitated oligosaccharides) micro filter (0.2µ) to by addition of Was then fractionated on a remove remaining 68% C2H5OH sephadex G-25 lactose. It was then and separated by column, eluted with triple lyophilized. centrifugation. distilled water at flow rate 3ml/min. Fractions were analyzed for sugars by phenol-sulphuric acid \_reagent. Analytical HPLC **Chemical transformation** The carbohydrate fractions Oligosaccharide mixture were eluted with TDW will be acetylated with (containing 0.1%TFA & $Ac_2O$ and pyridine Carbohydrate CH<sub>3</sub>CN) at a flow rate converting free sugar into 1ml/min., to check containing fractions non-polar acetyl Fractions were homogeneity of the oligopooled, lyophilized and derivatives. saccharide mixture. The elution was monitored by analyzed by HPLC).

UV absorbance at 220 nm.



# RESULTS



Scavenging DPPH of AA, A-MOs & D-MOs



# CONCLUSION

The findings showed that A-MOs had concentration-dependent antioxidant activity, but D-MOs showed different antioxidant potential at different doses. Comparing A-MOs and D-MOs to ascorbic acid (AA), which shown decreasing activity with increasing concentration, the antioxidant activity of the former showed promise.

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