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Research Article

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Glucosodiene Polymer: A Novel Chemical Structure and Promising Cancer Targeting Agent Exploiting its Metabolic Activity

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ABSTRACT
Glucosodiene, a novel compound synthesized through the reaction between dextrose and sodium bicarbonate, is explored in this study. The main objective was to investigate its potential as a cancer-targeting agent by inhibiting glucose metabolism within tumors, also known as the Warburg effect. Previous studies have demonstrated its impact and safety in laboratory and human applications. However, the chemical and stereochemical formula of glucosodiene has not been confirmed. In this manuscript, we present the NMR and LC-MS results of the synthesized glucosodiene Polymer and describe the optimized method for its preparation. The reaction between dextrose and sodium bicarbonate resulted in the formation of glucosodiene, a Polymer compound with a similar structure to glucose. The NMR analysis confirmed the presence of the formula $C_{12}H_{22}O_{11}$, while LC-MS results validated its identity as 1-2-O-β-D-Glucopyranosyl-α-D-glucose. Glucosodiene is composed of monomers derived from glucose isomers connected through 1-2 linkages, represented as (1-2-O-β-D-Glucopyranosyl-α-D-glucose). The monomer's molecular mass is determined to be 178.9, and it shares structural similarities with trehalose but forms the polymer through self-association, resembling the molecular structure of sophorose.

Keywords: Glucosodiene Structure, Glucosodiene Polymer, Dextrose, Sodium Bicarbonate, Sophorose, Trehalose

Introduction

Glucose, a monosaccharide, serves as a primary energy source for living organisms [1]. In this study, our aim was to synthesize a new compound called glucosodiene through the reaction between dextrose and sodium bicarbonate. This reaction is based on the scientific fact that hydrogen and other first-row elements in the periodic table share a common atomic structure; characterized by the presence of one electron in the valence shell [2]. Glucosodiene is an isomer Polymer of glucose and is expected to exhibit similar properties due to its structural similarity, possibly with alkaline properties. Its impact has been recorded within a theory that targets tumors through its metabolic activity by inhibiting glucose metabolism inside the tumor, known as the Warburg effect. The Maher Akl Theory "Glucose Mutation" proposes a strategic approach to target cancerous tumors by inhibiting glucose metabolism and altering the tumor's microenvironment acidity using glucose isomer polymers [3-5]. Especially after safety confirmation, both in laboratory and human applications [6,7]. However, in previous manuscripts, the chemical and stereochemical formula of glucosodiene has not been confirmed. Here, in this manuscript, we attempt to explain this based on the NMR and LC-MS results of the compound known as glucosodiene Polymer and the optimized method for its preparation.

Material and Methods

The materials used in this study were dextrose monohydrate ($C_6H_{14}O_7$) and sodium bicarbonate ($NaHCO_3$). A reaction was carried out by dissolving 3.5 grams of dextrose and 2.5 grams of sodium bicarbonate in 100 mL of sterile water. The mixture was heated to 100 degrees Celsius for five minutes, and the formation of bubbles confirmed the release of carbon dioxide, indicating the occurrence of the reaction.

The resulting Polymer compound, 1-2-O-β-D-Glucopyranosyl-α-D-glucose named glucosodiene, was dried using a lyophilization apparatus and subjected to NMR analysis after dissolving it in DMSO.

Results and Discussion

The NMR analysis [Figure 1-3] confirmed the presence of formula $C_{12}H_{22}O_{11}$ LC-MS result [Figure 4-7] in the synthesized Polymer compound, indicating its identity as 1-2-O-β-D-Glucopyranosyl-α-D-glucose [Figure 8]. Further experiments are necessary to determine the exact structure and validate the proposed formula. The physical organic mechanism involves a reaction between dextrose and sodium bicarbonate, resulting in the formation of the desired compound. Glucosodiene shares structural components with glucose, suggesting potential similarities in properties and biological interactions.

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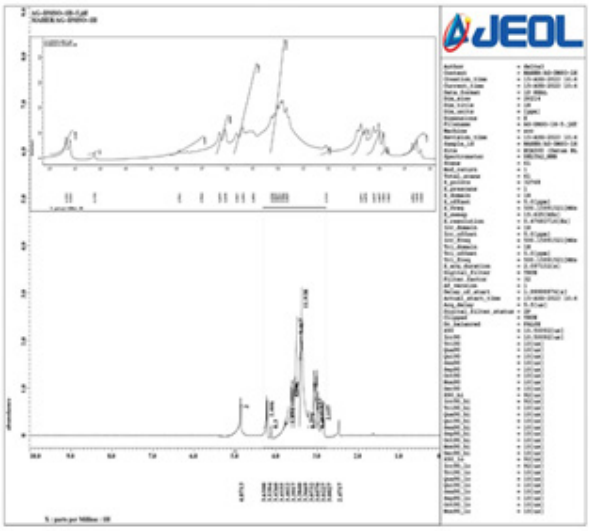


Figure 1

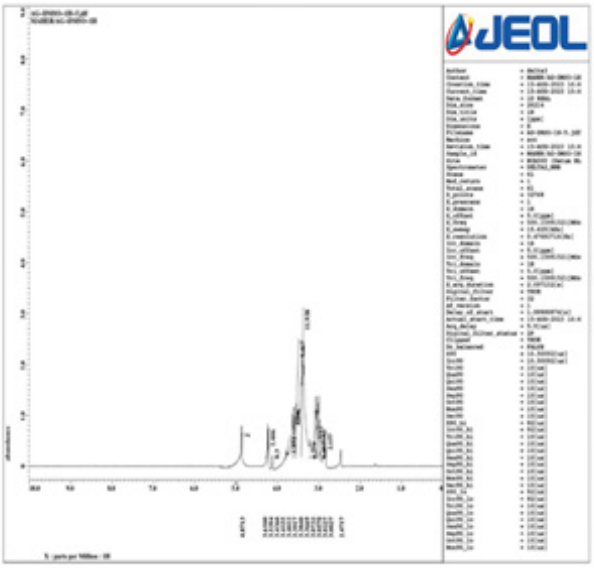


Figure 2

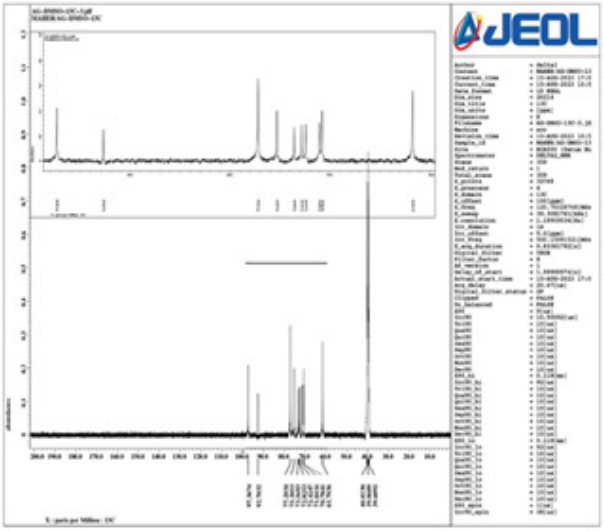


Figure 3

Figures 1, 2, 3: The NMR analysis of the synthesized compound showed the presence of $C_{12}H_{22}O_{11}$. Given the absence of aldehyde or ketone groups, the resulting compound can be identified as 1-2-O-β-D-Glucopyranosyl-α-D-glucose. The presence of $C_{12}H_{22}O_{11}$ confirms the formation of the desired compound.

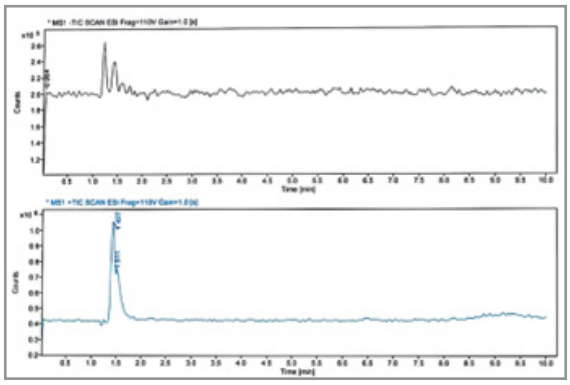
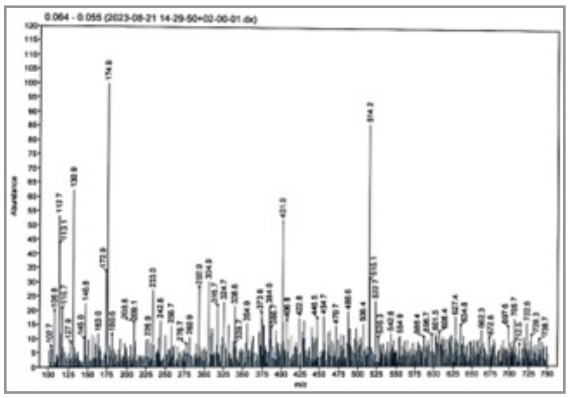


Figure: 4



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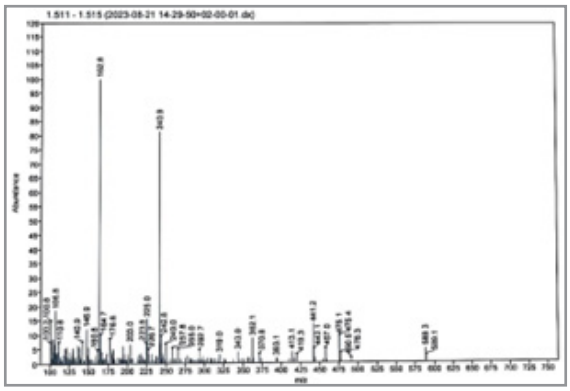

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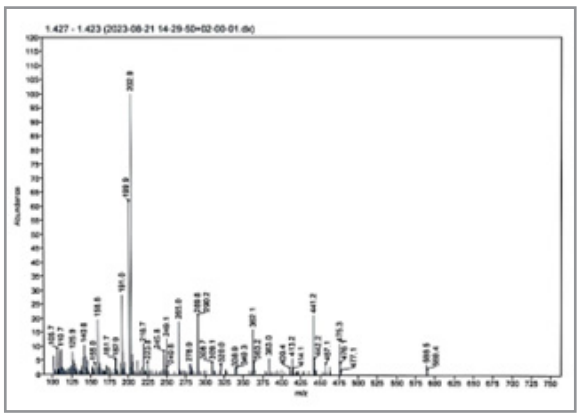

Figure: 7

Figures 4, 5, 6, 7: The molecular mass of the monomer was determined to be **178.9** based on the results obtained from LC-MS analysis. Interestingly, the monomer shares a similar structural arrangement to trehalose, but it undergoes self-association to form the polymer through 1-2 linkages, resembling the molecular structure of sophorose.

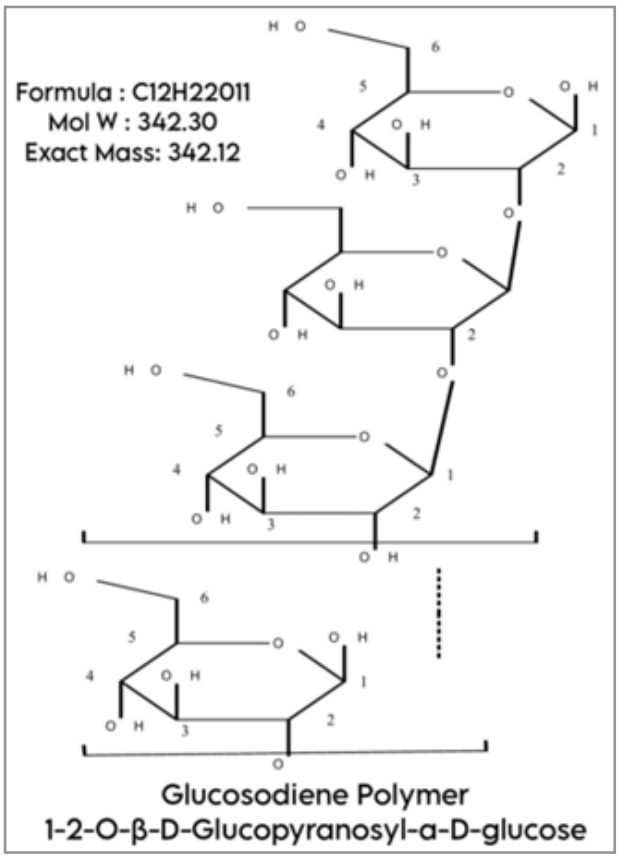

Figure 8: The structural configuration of the glucosodiene polymer is composed of monomers derived from glucose isomers that are connected through 1-2 linkages. Its molecular structure is represented as (1-2-O-β-D-Glucopyranosyl-α-D-glucose).

Based on the obtained results, glucosodiene can be defined as a polymer composed of monomers derived from glucose isomers that are connected through 1-2 linkages. The molecular structure of glucosodiene is represented as (1-2-O-β-D-Glucopyranosyl-α-D-glucose). The primary monomer responsible for the formation of the glucosodiene polymer is an isomer of glucose. According to the LC-MS results, the molecular mass of the monomer is determined to be 178.9. This monomer shares a similar structural arrangement to trehalose but undergoes self-association to form the polymer through 1-2 linkages, resembling the molecular structure of sophorose.

Conclusion

In summary, this study successfully synthesized and characterized glucosodiene, a polymer derived from glucose isomers connected through 1-2 linkages. The NMR and LC-MS analysis confirmed its molecular formula as $C_{12}H_{22}O_{11}$ with a mass of 178.9. Glucosodiene shows structural similarity to glucose and holds potential for applications in tumor targeting and glucose metabolism inhibition. Further research is needed to explore its exact structure, validate the proposed formula, and investigate its properties and potential therapeutic uses. This study contributes to the understanding and future development of glucosodiene as a novel polymer in various fields, including drug delivery systems and biomaterials.

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Competing Interest Declaration

The authors declare that there are no conflicts of interest.

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