

Science Project Title: Indole Glycoside Synthesis

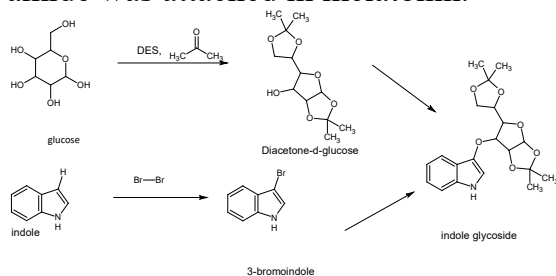
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(Q1) Research Question

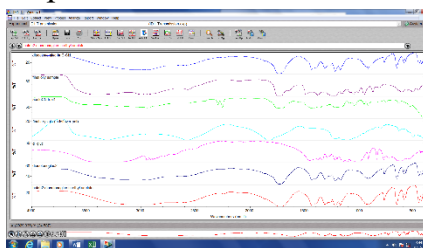
- Melatonin has its applications in sleep regulation and cancer prevention.
- A chemical with similar structure was of interest to make.
- It was attempted to attach glucose to indole, like how an amide was attached in melatonin.



(Q3) Data Analysis & Results

	Brominated Indole Melting Point (°C)
Attempt 1	107
Attempt 2	140
Attempt 3	170
Expected	60

The melting point tests for the brominated indole tests are listed in the table to the left. The higher melting points indicate that the indole brominated at more locations than the expected C3.



The FTIR spectra to the right are a result of multiple attempts of glucose protection. None resulted in the wanted product but all were identified to be malonic acid.

(Q2) Methodology

- Substituting Indole to Create a Reactive Site
 - Prepare indole in a test tube.
 - Add bromine to test tube.
 - Use melting point apparatus to confirm product identity.
- Creating Deep Eutectic Solvent (DES)
 - Measure out choline chloride and malonic acid in a 2:3 mass ratio.
 - Mix and heat in a beaker for 5 hours.
- Protecting Glucose
 - Combine glucose and acetone in DES
 - Heat in reflux for 20 minutes at 50°C
 - Wash solution with organic polar solvent and collect the new layer.
 - Vacuum distill ethyl acetate and retrieve white powder.
 - Use FTIR analysis to identify product.

(Q4) Interpretation and Conclusions

- The wrong products were likely resulting from procedural error.
- Over-brominated indole was result of high reactivity. Other procedures for generating 3-bromoindole should be reviewed to improve results.
- Malonic acid's prevalence indicated DES made were of bad quality. Time didn't allow for improvements, so more of that might have helped.
- Due to neither intermediate product being made, there was no attempt for the indole glycoside to be synthesized.
- If it were to be made, similar chemicals, notably indican, are being used in color dyes. Medical applications may be available too.

Project ID: