**INTRODUCTION**

Human rhinovirus (HRV) is a respiratory viral infection that is responsible for more than half of all common colds. Symptomatic infections exacerbate existing illnesses, contribute to early mortality, and cause work/school absenteeism. Asymptomatic infections increase in the likelihood of acquiring a bacterial infection. To cause an infection, HRV must bind to a host cell. Dichloromethane extract from *B. Fruticosum* leaves was shown to have a compound (5) that inhibits HRV binding and replication. Compound 5 binds to the capsid proteins in the HRV’s cleft and blocks attachment to the host cells. These findings have been used to support research on other capsid binders that can inhibit rhinovirus activity.

**OBJECTIVE AND APPROACH**

Objective: Develop a total synthesis pathway for the biologically active phenylpropenoid found in *Bupleurum fruticosum* and explore diversification of substituents.

The target phenylpropenoid (compound 5) was divided into two sections to be joined via Fischer esterification (Scheme 2). A synthetic pathway was designed for one section of the phenylpropenoid (compound 2) by designing a retrosynthetic pathway. Two possible synthetic pathways are shown in Scheme 1, starting from either compound 2a or 2b. Literature was examined to confirm reaction mechanisms, purification procedures, and possible yields. Starting reagents selected based on being commercially available and within reasonable prices.

When synthesis is performed in the lab:
- Reactions would be monitored via TLC, IR spectroscopy, and liquid chromatography-mass spectrometry (LC-MS).
- Full characterization data would be collected on compounds 3, 4, and 5 to confirm the hypothesized synthesis and add data to the chemical compound library.
- NMR data would be collected on compounds 1 and 2.
- Safety precautions for in-lab synthesis during reactions i and ii:
  - Reactions would be run under inert atmosphere and anhydrous conditions.
  - All glassware would be dried and flushed with nitrogen before use.
  - If a glove box is not available, airtight glassware would be used.

Diversification of substituents was explored based on potential bioactivity and availability of starting material. Substituents chosen to alter polarity, size, shape, and bonding capabilities. When synthesis is performed in the lab:
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**PROPOSED SYNTHESIS**

**RETROSYNTHESIS**

**DERIVATIVES**

**CONCLUSION AND NEXT STEPS**

We developed total synthesis pathways for a biologically active phenylpropenoid and derivatives using commercially available reagents and common laboratory techniques.

After these compounds are successfully synthesized, their antiviral capabilities can be determined through further experiments in collaboration with external research groups.

The synthesis and diversification of this bioactive phenylpropenoid and derivatives expands on the chemical library and assists in the development of various potential antiviral compounds towards the prevention of HRV infection and the common cold.

**ACKNOWLEDGEMENTS**

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**REFERENCES**