

MILLIMETER AND SUBMILLIMETER SPECTRUM OF GLYCOLIC ACID AND GLYCOLAMIDE: INVESTIGATION OF ORGANIC ACID AND AMIDE PREBIOTIC TARGET MOLECULES IN THE INTERSTELLAR MEDIUM.

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Organic acids and amides make up much of the necessary material a planet needs to support life. The simplest forms of these molecular classifications have previously been detected in the interstellar medium (ISM); both formic acid ( $\text{CH}_2\text{O}_2$ ) and formamide ( $\text{CH}_3\text{NO}$ ) are well-known interstellar molecules. In this study we chose to look for the next step in molecular complexity, carbonic acid ( $\text{H}_2\text{CO}_3$ ) and glycolic acid ( $\text{C}_2\text{H}_4\text{O}_3$ ) in addition to the amide counterparts carbamic acid ( $\text{CH}_3\text{NO}_2$ ) and glycolamide ( $\text{C}_2\text{H}_5\text{NO}_2$ ). All of these molecules are predicted to form via grain-surface reactions in the ISM. While some spectroscopic information for carbonic acid and glycolamide is available, it is of limited frequency coverage. No spectroscopic information is available for glycolic acid and carbamic acid. We have therefore undertaken experiments to collect spectra in the millimeter and submillimeter regime so as to compare with observational results. We will report on the current status of assigning spectra of glycolic acid and glycolamide. We will also report on the current progress towards formation of carbonic and carbamic acid via  $\text{O}(^1\text{D})$  insertion reactions with formic acid and formamide, respectively. The laboratory spectra of these molecules will provide many insights into if and how the building blocks of life find their start in the ISM.