

P124a Survey of  $\text{NH}_2\text{CHO}$ ,  $\text{HNCO}$ ,  $\text{H}_2\text{CO}$ , and  $\text{CH}_3\text{CN}$  toward high-mass protostars by the DIHCA Project

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Formamide ( $\text{NH}_2\text{CHO}$ ), the simplest possible amide, has been known as a pre-biotic precursor containing a peptide bond that connects amino acids to form proteins. Although its presence in the interstellar medium has been known for a long time, its formation processes are still under discussion. We have analyzed data of molecular lines from  $\text{NH}_2\text{CHO}$ ,  $\text{HNCO}$ ,  $\text{H}_2\text{CO}$ , and  $\text{CH}_3\text{CN}$  in ALMA Band 6 toward 30 high-mass star-forming regions obtained by the Digging into the Interior of Hot Cores with ALMA (DIHCA) project. Forty-five continuum cores and hot molecular cores (HMCs) are identified in the target regions, and we derived fractional abundances of the target molecular species at each core. We have conducted statistical analyses for investigation of chemical links among the molecular species. To exclude the lurking third variable, we applied the partial correlation test. Strong positive correlations between  $\text{NH}_2\text{CHO}$  and  $\text{HNCO}$  and between  $\text{NH}_2\text{CHO}$  and  $\text{H}_2\text{CO}$  are found. These results suggest chemical relationships between them. The observational results are consistent with our chemical simulations including dual-cyclic hydrogen addition and abstraction reactions between  $\text{HNCO}$  and  $\text{NH}_2\text{CHO}$  and gas-phase formation of  $\text{NH}_2\text{CHO}$  from  $\text{H}_2\text{CO}$ .