

CHEMICAL DISTRIBUTION OF ACETALDEHYDE IN ORION KL

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Despite the chemical richness of Orion KL, one of the ubiquitous aldehydes – acetaldehyde (CH_3CHO ; AA) – has been only tentatively identified toward this region. We have investigated an extensive ALMA archive dataset of which frequency coverage spreads between 142 GHz - 355 GHz to search for AA and other unexplored aldehydes. Four emission components of AA are clearly identified toward Orion KL, showing its main emission peak towards hot core-SW (HC-SW). The column densities of AA and its kinetic temperatures is estimated toward this main emission region, assuming molecular excitation under local thermodynamic equilibrium conditions. The distribution of acetaldehyde is compared with the other aldehyde-like (CHO-bearing) species from the literatures such as methyl formate (CH_3OCHO ; MF), glycolaldehyde (CH_2OHCHO ; GA) and formic acid (HCOOH ; FA). AA shows the abundance and the spatial distribution similar to that of FA, implying the chemical relation between them. The relative abundance ratios between the aldehyde-like species (hereafter, relative aldehydes ratios) towards HC-SW are investigated with a chemical model. The model shows that relatively longer collapsing timescale and the MF binding energy similar to water are needed to explain the observation. The relative aldehydes ratios estimated from the model sensitively depend on the assumed kinetic temperature. This explains the high spatial variability of the relative aldehydes ratios from the observations.