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Sommario/riassunto

One of the most important tools to investigate the chemical history of our Galaxy and our own Solar System is to measure the isotopic fractionation of chemical elements. In the present study new astronomical observations devoted to the study of hydrogen and nitrogen fractionation (D/H and $^{14}\text{N}/^{15}\text{N}$ ratios) of molecules, towards massive star-forming regions in different evolutionary phases, have been presented. Moreover, a new detailed theoretical study of carbon fractionation, $^{12}\text{C}/^{13}\text{C}$ ratios, has been done. One of the main results was the confirmation that the $^{14}\text{N}/^{15}\text{N}$ ratio increases with the galactocentric distance, as predicted by stellar nucleosynthesis Galactic chemical evolution models. This work gives new important inputs on the understanding of local chemical processes that favor the production of molecules with different isotopes in star-forming regions.

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