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## **Carbon and nitrogen isotope compositions of organic fertilizers reveal contribution of nitrogen source in tributary**

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We investigated the distribution of nitrogen compounds in tributary through results of multiple stable isotopes values ( $\delta^{13}\text{C}$ ,  $\delta^{15}\text{N}$ ,  $\delta^{15}\text{N-NH}_4$ ,  $\delta^{15}\text{N-NO}_3$  and  $\delta^{18}\text{O-NO}_3$ ) for water and various kinds of fertilizers during March to November. The  $\delta^{15}\text{N-NH}_4$  and  $\delta^{15}\text{N-NO}_3$  values in tributary during March to May showed ranging from 2.3 to 32.5 ‰, from -2.1 to 7.9 ‰, respectively. While tributary are highly influenced by the nitrogen source from pigs and cattle breeding sites during July to November, due to observed the significantly enriched values in both  $\delta^{15}\text{N-NH}_4$  and  $\delta^{15}\text{N-NO}_3$ , ranged from 1.2 to 45.8 ‰, from 7.3 to 27.2 ‰, respectively. Thirty samples of synthetic fertilizer and twenty-five animal manures showed markedly different  $\delta^{13}\text{C}$  values, ranged from -9.7 to -40.2 ‰ and enriched  $\delta^{15}\text{N}$  values as expected, ranged from -1.9 to 19.6 ‰. These are preliminary data of the isotopic composition of fertilizer in Korea. Therefore, a wider survey of fertilizers for organic-animal manures and organo-mineral synthetic fertilizer production is needed to elucidate the natural isotope variation. We calculated the contribution rate of  $\text{NH}_4$  and  $\text{NO}_3$  from various kinds of fertilizer source according to the results of stable isotope. The contribution rates of  $^{15}\text{N-NH}_4$  and  $^{15}\text{N-NO}_3$  from animal organic manures source were significant that ranged between 55 and 98%, while those of synthetic fertilizer as the primary material of organo-mineral fertilizer source were not significant ranging from 8 to 36%. With the modeling approach we found a high range in the estimate proportion of fertilizer N, indicating that the mixing models is good tool to reveal contribution of N source. However, we should be chosen carefully end-member values. Better characterization of tributary  $\delta^{15}\text{N-DIN}$  by better measurements or a more detailed modeling approach will aid in understanding N-cycle dynamics in freshwater ecosystem.