

Study on the Transfer Accumulation of Carbon in Beef Cattle

Tsuyoshi MASUDA, Masanao ISHIOKA, Yasuhiro TAKO, Yuji NAKAMURA

Department of Environmental Simulation

Abstract

The radiation dose due to ^{14}C released from a spent nuclear fuel reprocessing plant is delivered to the neighboring population mainly through intake of agricultural and daily products. In the vicinity of the reprocessing plant in Rokkasho, Aomori, Japan, stock-farming is widely undertaken, including cattle-breeding. Then, it is important to clarify experimentally how fast ^{14}C is transferred and how much it accumulates in cattle. In the experiment described here, a stable isotope of carbon (^{13}C) was used as a substitute tracer for ^{14}C .

Changes in ^{13}C isotopic ratio were measured in breath air, urine, feces, muscle and serum of beef cattle (n=3) which had been given ^{13}C -labeled grass feed for 28 days. The ^{13}C ratios in breath air, urine and feces very rapidly decreased within 3 days after cessation of the administration of ^{13}C -labeled feed. However, a slow decrease in ^{13}C ratio was observed in muscle and serum with decreasing half-times of 55.5 and 18.8 days, respectively.

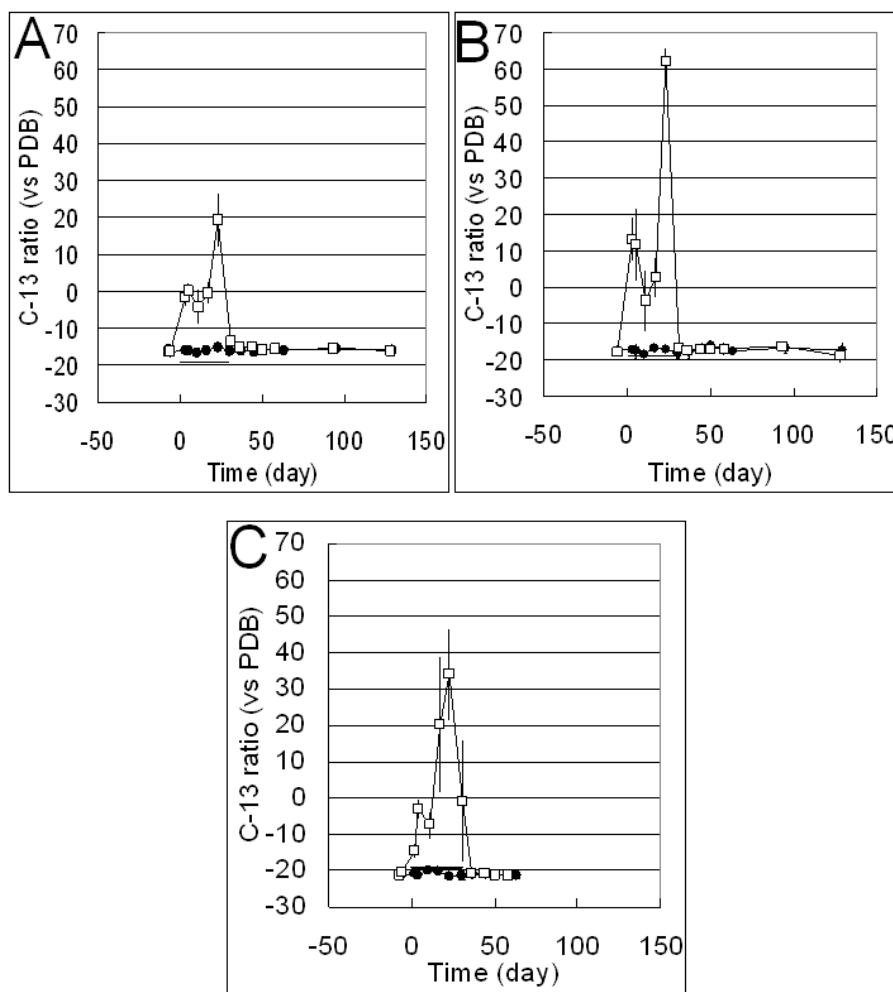


Fig. 1 Changes of ^{13}C ratio in carbon excretion pathways.
X axis: time (day), Y axis: ^{13}C relative abundance (% vs. PDB, \pm S.D.). A: breath, B: urine, C: feces.
 \square : Experiment group (n=3), \bullet : Control group (n=3). Horizontal bar (0 to 28 days): ^{13}C -labeled grass feeding period.

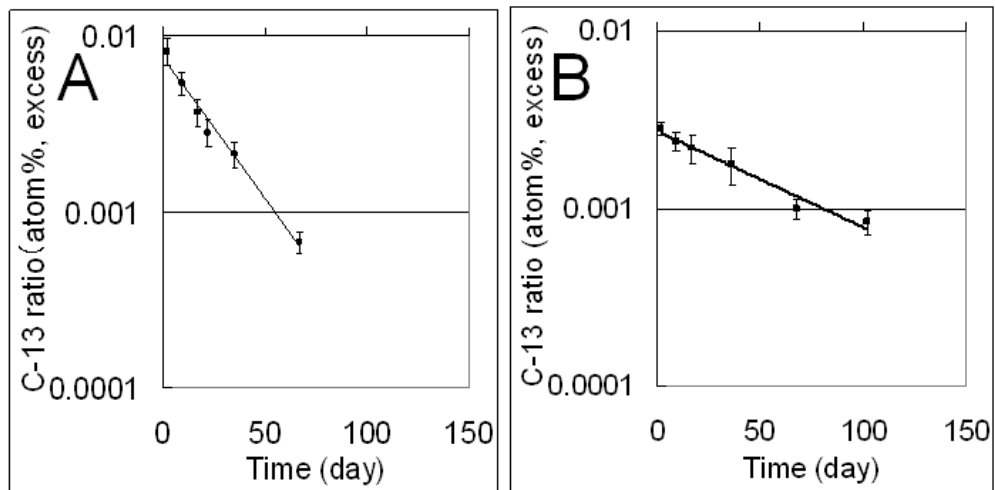


Fig. 2 ^{13}C enrichment in body composition (n=3)
X axis: time (day), Y axis: ^{13}C ratio (atom% excess, \pm S.D.). A: serum, B: muscle.