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Feeding history of *Crotalus durissus terrificus* snakes by the analysis of carbon-13 ($\delta^{13}C$) isotope from the rattle

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ABSTRACT: *Crotalus durissus terrificus* snakes present triangular head, small eyes with slit pupils, loreal pit and rattle in the tail. Their poison is a complex mixture of metal cations, enzymes, peptides and toxins. Currently, accidents involving humans and these animals in São Paulo state, Brazil, are becoming more frequent. Moreover, the number of snakes that are captured and sent to research institutes is also increasing in spite of the environmental devastation. The question is: How these animals manage to adapt and to procreate despite the adverse environmental conditions? To answer this question, carbon-13 levels ($\delta^{13}C$) were evaluated, through mass spectrometry, in rattle segments of adult and young *Crotalus durissus terrificus* (Cdt) snakes and in their food. The present study was based on the knowledge that plants distributed throughout the globe present diverse biochemical routes, absorbing stable isotopes in their molecules, mainly carbon (^{12}C, ^{13}C), hydrogen (^{1}H, ^{2}H), oxygen (^{16}O, ^{17}O, ^{18}O), nitrogen (^{14}N, ^{15}N) and sulfur (^{32}S, ^{33}S, ^{34}S, ^{36}S). During sugar synthesis, if the vegetable first synthesizes an organic compound that contains three carbon atoms, it is called a C3-photosynthetic cycle plant. On the other hand, if the first formed sugar presents four carbon atoms, the plant present a C4-photosynthetic cycle. About 86% of vegetal species comprise the C3 group, including hardwoods, vegetables and fruit trees. In the C4 group, most notable species include grass, maize and sugar cane. The result analysis permitted the following considerations: *Crotalus durissus terrificus* snakes consume animals from C3 and C4 environments; the complete turnover tax of snakes born in captivity until reaching the balance level

varied between 18 and 24 months; the complete turnover tax of adult animals kept in captivity until reaching the balance level ranged from 33 to 37 months; and the primary rattles of young snakes reflected the mother feeding environment during the gestation period, which can be proven by isotope analysis of the last rattle segment near the body of the mother. Future studies will be able to answer totally or partially these observations, jointly with analyses of other stable isotopes, such as $\delta^{15}N$.

KEY WORDS: feeding, carbon-13, *Crotalus durissus terrificus*, stable isotopes.

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