Nonlinear Stanford and Smith model in the description of soil degradation of oat straw: bayesian approach

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Abstract: In agriculture it is common practice to plant winter crops such as wheat and oats before the summer crops are established. Thus the knowledge of the decomposition of residues of oat straw is of fundamental importance for the correct management of the agricultural soils. Soil carbon mineralization can be described by the nonlinear model of Stanford and Smith, and it is important to note that the adjustment of this model by the frequentist theory requires large samples to be valid for the results. In studies that study carbon mineralization in the soil, in general, there are few observations. An alternative is the use of Bayesian methodology that is efficient even in small samples, besides allowing to incorporate information a *priori* in the study and to have direct interpretation to the interval of credibility. Thus the objective of the study was to use the bayesian methodology to adjust the Stanford and Smith model the percentage of mineralized carbon of the oat straw in the soil and to estimate the half-life time. The bayesian approach was efficient in adjusting the Stanford and Smith model the percentage of mineralized carbon from oat straw in the soil and the potentially mineralizable carbon half-life time was approximately 25 days.

Keywords: carbon mineralization; nonlinear regression; informative *priori*.

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