



## **A simple method to quantify labile and stable carbon in temperate agricultural soils**

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Many different fractionation schemes were developed throughout the last decades with the goal to separate soil organic matter (SOM) pools of different turnover and composition. This led to a large variety of procedures that are often limited by operational parameters and which are not comparable to each other. Moreover, most fractionation methods are expensive, labour-intensive and time-consuming.

The aim of this study is to develop an indicator for quantifying potentials of soils to sequester organic carbon. Our method is based on a simplified fractionation method that i.) separates fractions related to their specific turnover times; ii.) is easy and cheap to process; iii.) allows processing a large number of samples in a short time. On this basis, we aim to isolate and quantify labile and stable SOM pools. The stable fraction allows us to estimate soil potentials for organic carbon sequestration. The labile fraction provides information about short-term SOM changes that may be used as an indicator to evaluate the influences of agricultural management on SOM dynamics, e.g. C-input and N-mineralization.

In a first step, the efficiency of different dispersing methods to break up soil aggregates were analyzed. Four different dispersing methods were compared: (1) shaking with H<sub>2</sub>O, (2) physical dispersion with H<sub>2</sub>O and glass beads, (3) physical dispersion with ultrasonication at different levels of energy, and (4) chemical dispersion with sodium-hexametaphosphate (NaPO<sub>3</sub>)<sub>6</sub>.

Agricultural soils from experimental sites with a change from C3 to C4 vegetation at a specific time and adjacent control sites without changes were used in order to determine the turnover rate of the isolated fractions. Moreover, accuracy on isolating labile and stable SOM pools as well as time and cost efficiency will be criteria to evaluate the developed methods. We will present first results of our study.

In the long run, our goal is to optimize and adjust the new method to different soil parameters, e. g. soil texture, cultivation management and intensities, fertilization, etc. Therefore, a large number of long-term field experiments in Germany with a wide range in soil texture and C input will be sampled and fractionated.