

Interactive comment on “Characterization of soil organic matter by near infrared spectroscopy – determination of glomalin in different soils” by J. Zbíral et al.

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The problems associated with the definition of glomalin as a unique protein fraction has been mentioned in our paper (1). It was not our intention to discuss these issues and it was clearly stated in the paper (2). Our intention was to prepare a tool for an easy and cheap determination of GPRS and the goal was achieved. We think that the discussion concerning GPRS is often based on very few data due to serious difficulties with the analytical methodology. Both – extraction step and Bradford determination are not easy, not cheap and not fast. Therefore we suppose that application of NIRS could be very useful to improve discussion after more data are collected. Despite of co-extraction of various proteins and other compounds along with glomalin, GPRS

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extracted by means of the citrate buffer or citric acid is still used as an indicator of soil quality related to the presence of AMF (e.g. DOI 10.1007/s00572-014-0572-9). Analysis of extracted proteins based on the Bradford reagent has recently been shown to be linked to the content of glomalin (<http://dx.doi.org/10.1016/j.apsoil.2012.09.015f>). We wanted to provide an effective analytical tool which could facilitate determination of GRSP (and our goal was clearly stated in the paper). The anonymous reviewer 1 commented problems that were not in the scope of our work.

[1] “Characterizing glomalin as a separate and unique fraction of soil organic matter is a complicated task (Nichols, 2003; Nichols and Wright, 2005; Schindler et al., 2007). The link between glomalin and various protein fractions in soil is not clearly defined. Co-extraction of non-glomalin proteins cannot be avoided and glomalin-related soil protein (GRSP) was proposed as an operationally defined parameter correlating with the ecosystem parameters of interest (Rillig, 2004). Although GRSP is only operationally defined and influenced by the extraction procedure and the method of determination, it can be used as a parameter relating closely to soil quality.

[2] “Central Institute for Supervising and Testing in Agriculture (UKZUZ) has developed and optimized the NIRS method for determining carbon and nitrogen in soils and prepared this method for international standardization in ISO TC 190 Soil quality (ISO, 2014). It was assumed that more information, including information about GRSP content, could be retrieved from the NIRS soil spectra. We decided to focus our research mostly on these questions: Can the measurement and calibration procedure described in the ISO standard for carbon and nitrogen determination by NIRS also be applied for the determination of GRSP? Is the reference method and the NIRS method applicable for the whole range of agriculture and forest soils and contents of GRSP?