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Abstract
Carbon is essential for plant growth, due to its effects on other soil properties like aggregation. Knowledge of dynamics of organic matter in different locations in the soil matrix can provide valuable information which affects carbon sequestration and soil the other soil properties. Extraction of soil organic matter (SOM) fractions has been a long standing approach to elucidating the roles of soil organic matter in soil processes. Several kind fractionation methods are used and all provide information on soil organic matter function. Physical fractionation capture the effects on SOM dynamics of the spatial arrangement of primary and secondary organomineral particles in soil while chemical fractionation can not consider the spatial arrangement but their organic fractions are suitable for advanced chemical characterization. Three method of physical separation of soil have been used, sieving, sedimentation and densitometry. The distribution of organic matter within physical fractions of the soil can be assessed by sieving. Sieving separates soil particles based strictly on size.
The study area is located on north central Iran, between 35° 41´- 36° 01´ N and 50° 42´- 51° 14´ E. Mean annual precipitation about 243.8 mm and mean annual air temperature is about 14.95 [U+25E6]C. The soil moisture and temperature regime vary between aridic-thermic in lower altitudes to xeric-mesic in upper altitudes. More than 36 surface soil samples (0-20 cm) were collected according to land-use map units. After preliminary analyzing of samples 10 samples were selected for further analyses in five size fractions and three different time intervals in September, January and April 2008. Fractionation carried out by dry sieving in five classes, 1-2 mm, 0.5-1 mm, 270 µm-0.5mm, 53-270 µm and <53 µm. Organic matter and C/N ratio were determined for all fractions at different time intervals. Chemical fractionation of organic matter also carried out according to Tan (2003), also Mineralogical studies were carried out to illustrate the relationship between clay mineral series and organic matter. According to the results the amount of organic carbon increases by decreasing size fractions and reaches to its maximum in <250µ classes, also 2:1 and expanding clays which have the ability to maintain larger amounts of organic carbon were the dominant clay minerals. Chemical fractionation of soil organic matter to humic acid and fulvic acid shows that there is a better correlation between humic acid contents and soil organic matter (R2 = 0.86) than fulvic acid and organic matter (R2=0.5). The amount of humic and fulvic acids varies in different size fractions and reaches to its minimum in the E fraction in all three stages. The relationships between fulvic and humic acids with organic matter content, demonstrating that at the lower organic matter content, humification is slow, thus humic acid content is rather low than the fulvic acid content. By increasing the organic matter content biological activity increases and followed by humification process proceeds so that the humic acid content locates over the fulvic acid content.