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Distribution of carbohydrate pools within water-stable aggregates of an Ultisol in Southern Nigeria

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abstract This study was undertaken to evaluate the effects of different organic and inorganic amendments on carbohydrate distributions in water-stable aggregates of a degraded tropical Ultisol at Nsukka in Southern Nigeria. All the amendments improved the aggregate stability (AS) over the control at all the sampling periods. In each aggregate size fraction, carbohydrate concentrations at all the sampling periods varied in the order of R-chot > R-CHOH > R-CHOc, irrespective of the type of amendment. The distribution of the carbohydrate fractions within the water-stable aggregates generally decreased with increasing time of sampling. At the 3rd and 6th months of sampling all the carbohydrate fractions decreased with decreasing aggregate diameter up to 0.5-0.25 mm, beyond which there was an increase in those fractions in the microaggregates (< 0.25 mm). At the 12th month, the decrease ranged from 49 to 55% for all the treatments. The RW+F, PM and RW+PM treatments had the highest concentration of carbohydrates up to the 6th month, after which there was a decline. Generally, the correlations between the carbohydrate fractions and WSA were low at all the sampling periods. This signifies that these labile organic matter pools are not contributing much to the aggregation and stabilization of soil particles.

keywords carbohydrate concentrations, water-stable aggregates, Nigerian Ultisol