



A SYSTEMATIC REVIEW ON SOIL ORGANIC MATTER IN AGRICULTURE

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Abstract

Soil organic matter (SOM) is the frequently revealed trait and is picked as the most essential pointer of soil quality and agrarian manageability. In this audit, we compressed how development, crop revolution, buildup and culturing administration, treatment and monoculture influence soil quality, soil organic matter (SOM) and carbon change. The outcomes affirm that SOM isn't just a wellspring of carbon yet in addition a sink for carbon sequestration. Development and culturing can lessen soil SOM substance and prompt soil crumbling. Culturing hones majorly affect appropriation of C and N, and the rates of organic matter decay and N mineralization. Appropriate selection of crop turn can increment or keep up the amount and quality of soil organic matter, and enhance soil compound and physical properties. Sufficient utilization of composts joined with yard excrement could build soil nutrients, and SOM content. Excrement or crop deposit alone may not be satisfactory to keep up SOM levels. Crop composes impact SOM and soil work in consistent monoculture frameworks. SOM can be best saved by revolution with diminished culturing recurrence and with augmentations of synthetic composts and fertilizer. Information and appraisal of changes (positive or negative) in SOM status with time is as yet expected to assess the effect of various administration hones.

1. SOIL ORGANIC MATTER (SOM)

SOM is a segment that directs the physical, synthetic and organic properties of a soil which thusly to a great extent decides the soil ripeness, farming profitability and maintainability. It comprises of a blend of plant and creature deposits at different phases of decay, of substances integrated artificially and organically starting from the break items and of microorganisms and little creatures and their disintegrating remains. The exact structure or organization of SOM isn't surely known. SOM contains several organic compounds that are artificially and fundamentally unique. These compounds fluctuate in amount in various soils under different crops and administration hones. As the degree of impact of these distinctive compounds on soil physical, concoction or natural properties can contrast, soils with fluctuating SOM synthesis may work in an unexpected way. SOM is likely the most perplexing and slightest comprehended soil part. It is troublesome and lumbering to separate every last organic compound in soil and to examine their particular impact on different soil properties. Be that as it may, a few pools of organic compounds are characterized by their turnover rates and accessibility to microbial procedures.

As they eat the first plant tissues, they contribute squander items, and they leave their own bodies when they pass on. Worms, termites, ants, and compost insects likewise assume an imperative part in the fuse and translocation of organic buildups. The deterioration of plant litter is the essential system by which organic matter and nutrients are come back to the soil. The disintegration of organic materials is impacted by the asset quality, breaking down living beings and natural conditions (Benedeset al., 2003) [1].

Chemical composition of plant litter is species particular. Carbon to Nitrogen proportion was considered as a 11 general file of plant litter quality as ahead of schedule as 1920's. Be that as it may, over the most recent couple of decades, many papers have scrutinized its unwavering quality to anticipate C and N mineralization in soil.

The distinctive carbon compounds introduce in litter are shifting in nature and structure, and can't be dealt with as a solitary substance – add up to C, particularly when their associations with decomposer life forms broadly vary. For instance, decomposition rate is emphatically related with polysaccharides, hemicelluloses and pectin while contrarily associated with lignins and tannins in litter (Slapokas and Granhall, 2001) [2].

The carbon substance of plant deposits ranges from 40 to 58% while nitrogen content fluctuates from 1 to 6%. As the quality and amount of organic matter source in developed or characteristic frameworks are extraordinary, their rate of decomposition can likewise be unique, which thus will consider in this manner supplement discharge.

2. SOIL QUALITY AND SOIL HEALTH

The quality and strength of soil decide the horticultural supportability and natural quality and as an outcome, plant, creature and human wellbeing. In a more extensive point of view, soil quality or wellbeing can be characterized as the limit of a soil to play out its capacities, as an imperative living framework, inside the environment and land utilize limits that decides maintained organic efficiency, support of the quality of air and water and advancement of plant, creature and human wellbeing. Soil wellbeing is generally used to depict those parts of soil quality that mirrors the states of soil as communicated by administration delicate operations (Islam and Weil, 2000) [3]. The concept of soil quality refers to the suitability and capability of a soil to perform specific ecosystem functions (Karlenet al., 2001) [4]. In a horticulture biological community the significant environment forms interceded through soil can be gathered into four key, however to some degree covering capacities viz.,

- 1) Promotion of plant development;
- 2) Biogeochemical cycling of components particularly carbon and mineral supplement

- components;
- 3) Provision of living space for soil living beings; and
 - 4) Partitioning, capacity, translocation and purification of water.

The main soil segment which specifically or by implication impacts all these soil capacities is soil organic matter (SOM).

3. AGRICULTURE AND SOIL HEALTH

The strength of soil is changing after some time, because of human utilize and administration. The vertical ascent in populace requests for more nourishment and fiber, which has prompted extraordinary cultivating exercises in the previous couple of decades. Around the world, worry for supportable worldwide improvement and protection of soil assets is reflected in the topic of various universal meetings (Doran and Zeiss, 2000) [5]. Development is aggravating the common framework, which may acquire changes soil properties. Appropriate administration of the soil assets is of outrageous significance in maintaining crop and land profitability. Likewise checking the adjustments in soil properties is basic for appropriate appraisal of the effect of development on soil properties and to advance reasonable agro-environmental administration strategies.

4. SOIL ORGANIC MATTER POOLS

To maintain the strength of agrarian terrains, it is fundamental to legitimately oversee SOM in arable soils. Expectedly, humus has been compared with inborn soil fruitfulness and can be proficiently extricated from mineral soils in antacid. The subsequent humic or fulvic corrosive portions of SOM had been broadly examined. Nonetheless, late advancements in organic matter research had demonstrated that these parts are 'procedural ancient rarities' current just in lab and have not ended up being valuable advisers for versatile administration or contribute altogether in understanding the SOM elements or soil quality. Nonetheless, upon recharged enthusiasm for soil organic matter research in the previous couple of decades, many had turned out with quantifiable SOM divisions that give essential attributes to soil.

SOM can be comprehensively sorted to labile and stubborn pools relying upon their decomposition or turnover rates (Six et al., 2002) [6]. Labile division essentially comprises of effortlessly oxidizable parts, for example, starches, sugars, cellulose and so on., which are acceptable to organisms while lignin and tannin compose materials fall under the obstinate gathering, which are impervious to rot. Labile or dynamic pool of SOM is accounted for to be in charge of building soil total structure, micronutrient chelation and supplement mineralization and is extremely delicate to changes in administration rehearses or social operations (Blair and Crocker, 2000) [7]. Dynamic portion or labile pool of SOM is more critical factor in controlling changes in soil properties than the aggregate SOM. Conversely, the aloof pool, with half-life period estimated in hundreds of years, is made out of hard-headed compounds that are impervious to rot and has a tendency to collect in soil after

some time (Weil and Magdoff, 2004) [8].

5. SOM – SIGNIFICANCE OF LABILE POOL

Learning about the nature and turnover of SOM is an essential for understanding the structure, chemical reactivity and intrinsic fruitfulness of soils and for foreseeing the destiny of mineral composts, creature excrements and crop buildups added to the soil. SOM is profoundly delicate and helpless to changes contingent upon the land utilize example and asSOMiated administration rehearses (Wander, 2004) [9].

Changes in all out organic matter substance in light of changes in arrive utilize or soil administration rehearses that happen over moderately brief periods are hard to identify as a result of high foundation carbon substance and normal soil fluctuation (Haynes and Beare, 2006) [10]. Recognizing and measuring the reasonable markers that are sufficiently delicate to mirror the adjustments in SOM quality and amount is vital to create appropriate supplement administration methodologies for a maintainable supplement administration framework.

The labile portions of organic matter, for example, particulate organic matter, solvent organic matter or microbial biomass can react all the more rapidly to arrive utilize or soil administration changes and are proposed as early pointers of SOM changes. It has been accounted for that higher amount of organic matter need not really keep up or increment crop yield. The supplement accessibility in a framework is more impacted by the measure of the labile or dynamic SOM portion as opposed to the aggregate amount of SOM. It has additionally revealed that the labile segment of SOM assumes the most vital part in the transient turnover of nutrients.

6. PLANT LITTER AND CROP RESIDUES AS SOM SOURCES

Real wellsprings of organic matter in normal and in addition a large number of the developed soil frameworks, for example, that of manor crops are plant litter and crop deposits (Kogel-Knabner, 2002) [11]. The decomposition and supplement discharge examples of organic materials are controlled by the asset quality, breaking down life forms and natural conditions (Berg et al., 2000) [12]. Since litter quality impacts the decomposition procedure of soil organic matter, the quality of SOM fluctuates in various land utilize frameworks.

7. SOM QUALITY AND DECOMPOSITION

Mineralization of soil organic matter has a key part in the accessibility of nutrients. With changes in the quality and amount of SOM, the capability of a soil to supply or sequester carbon and nutrients is modified through changes in mineralization– immobilization rates. Decomposition of organic matter in a soil is predominantly administered by soil microorganisms. Be that as it may, the decomposition rate changes with the quality and physical accessibility of substrate, which are the

vitality sources to soil organisms. Consequently the organic matter decomposition or organic carbon mineralization example may shift with the land utilize sort and soil administration. Understanding the decomposition energy of soil organic matter under various land utilize frameworks or administration practices can give helpful data on the carbon adjustment capability of the frameworks too.

8. CONCLUSION

The dynamic procedures that impact soil quality are perplexing, and they work through time at various areas and circumstances. Soil organic matter is both a wellspring of carbon discharge and a sink for carbon sequestration. Development and culturing can diminish and change the conveyance of SOC while a fitting crop revolution can increment or keep up the amount and quality of soil organic matter, and enhance soil chemical and physical properties. The arrival of crop deposits and the use of compost and manures would all be able to add to an expansion in soil nutrients and SOC content, yet would should be joined into an administration framework for greater change. The negative conspicuous effects of monoculture are affected by crop write with fauna impoverishment, an expanded number of crop bugs, a decrease in exercises of dehydrogenase and phosphatase, and expanded levels of phenolic acids in the soil. SOC must be protected by utilizing crop revolutions with decreased culturing recurrence and augmentations of chemical composts, crop deposits or potentially fertilizer. Nonstop checking of long haul changes in the SOC and soil quality under preservation culturing in various agro-biological zones is fundamental. There is likewise a need to acquire more information on longterm impacts of various culturing frameworks on carbon and nitrogen mineralization and immobilization in different field circumstances. The issue engaged with understanding soil quality and the plan of crop and soil frameworks for farming manageability ought to be more comprehensive, and it needs promote examination.

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