DEFINITION OF SOIL ORGANIC MATTER (KONYA, TURKEY)
ОПРЕДЕЛЕНИЕ ОРГАНИЧЕСКОЙ МАТЕРИИ ПОЧВ (КОНЬЯ, ТУРЦИЯ)

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Agriculturist since ancient times have recognized significant benefits of soil organic matter (SOM) to crop productivity. These benefits have been the subject of controversy for centuries and some are still debated today. Many of the benefits of SOM have been well documented scientifically, but some effects are so intimately associated with other soil factors that it is difficult to ascribe them uniquely to the organic matter. In fact, soil is a complex, multicomponent system of interacting materials, and the properties of soil result from the net effect of all these interactions. One of the major problems in communicating in the field of humic substances is the lack of precise definitions for unambiguosly specifying the various fractions. Unfortunately, the terminology is not used in a consistent manner.

Агрономы с древних времен признавали значительные преимущества внесения органического вещества в почвы (ОВП) для повышения урожайности. Эти темы были предметом споров на протяжении многих веков, а некоторые из них до сих пор обсуждается и сегодня. Преимущества ОВП были исследованы с научной точки зрения, но некоторые эффекты настолько тесно связаны с другими почвенными факторами, что трудно однозначно их приписывать органическому веществу. Почва представляет собой сложную многокомпонентную систему взаимодействующих веществ, а ее свойства – следствие чистого эффекта всех этих взаимодействий. Одной из основных проблем, связанных связи с гуминовыми веществами, является отсутствие точных дефиниций для однозначного определения различных фракций. К сожалению, терминология не используется последовательно.

Keywords: humus, soil organic matter, soil, plant nutrition.

Ключевые слова: гумус, почвенное органическое вещество, почва, растительное питание.

The term **humus** is used by some soil scientists synonymously with **soil organic matter**, that is to denote all organic material in the soil, including humic substances. Contemporary, the term **humus** is frequently used to represent only the humic substances. The term SOM is generally used to represent the organic constituents in the soil, including undecayed plant and animal tissues, their partial decomposition products, and the soil biomass. Thus, this term includes:

1. identifiable, high-molecular-weight organic materials such as polysaccharides and proteins,
2. simpler substances such as sugars, amino acids, and other small molecules,
3. humic substances.

SOM is frequently said to consist of **humic substances** and **non humic substances**. Non humic substances are all those materials that can be placed in one of the categories of discrete compounds such as sugars, amino acids, fats and so on. Humic substances are the other, unidentifiable components. Even this apparently simple distinction, however, is not as clear cut as it might appear [1; 5].

Organic compounds of soil – live organisms and their un decomposed, partly decomposed and completely decomposed remains as well as products of their transformation [4].

Living organisms – alive-edafon

Soil organic matter – non-living components which are a heterogeneous mixture composed largely of products resulting from microbial and chemical transformations of organic debris. Soil organic matter can exist in different morphological patterns, which are the bases of the classification of so called forms and types of humus.

Un altered materials – fresh and non-transformed components of older debris.

Transformed products (humus) – bearing no morphological resemblance to the structures from which they were derived. These transformed components are referred to as the humification process products.

Humic substances – a series of relatively high-molecular-weight, Brown to black collared substances formed by secondary synthesis reactions. The term is used as a generic name to describe to collared material or its fractions obtained on the basis of solubility characteristics: Properties of humic substances (tabl. 1)

Humic acids – the fraction of humic substances that is not soluble in water under acidic conditions (pH < 2) but is soluble at higher pH values. They can be extracted from soil by various reagents and which is insoluble in dilute acid. Humic acids are the major extractable component of soil humic substances. They are dark brown to black in colour.

Fulvic acids – the fraction of humic substances that is soluble in water under all pH conditions. They remains in solution after removal of humic acid by acidification. Fulvic acids are light yellow to yellow-brown in colour.

Humin – the fraction of humic substances that is not soluble in water at any pH value and in alkali. Humin's are black in colour.

Many investigators now believe that all dark collared humic substances are part of a system of closely related, but not completely identical, high - molecular - weight polymers. According to this concept, differences between humic acids and fulvic acids, can be explained by variations in molecular weight, numbers of functional groups (carboxyl, phenolic OH) and extent of polymerization [4].

The low – molecular – weight fulvic acids have higher oxygen but lower carbon contents than the high - molecular - weight humic acids. Fulvic acids contain more functional groups of an acidic nature, particularly COOH. The total acidities of fulvic acids (900–1400 meq/100g) are considerably higher than for humic acids (400–870 meq/100g).

Nonhumic substances – compounds belonging to known classes of biochemistry, such as: ***Carbohydrates, lipids, amino acids***

The chemical and colloidal properties of SOM can be studied only in the free state, that is, when freed of inorganic matrix of sand, silt and clay.

Methods for the extraction of soil organic matter have evolved from the research and thinking of many scientists.

Although lignin is less easily attacked by microorganisms than other plant components, mechanisms exist in nature for its complete aerobic decomposition. Otherwise un decomposed plant remains would accumulate on the soil surface and the organic matter content of the soil would gradually increase until $CO_2$was depleted from the atmosphere.

In normally aerobic soils lignin may be broken down into low-molecular-weight products prior to humus synthesis. On the other hand, the fungi that degrade lignin are not normally found in excessively wet sediments. Accordingly, it seems logical to assume that modified lignin's may make a major contribution to the humus of peat, lake sediments, and poorly drained soils [2].

Table – Elemental composition of humic substances and several plant materials [3]

Substances	% dry ash-free basis			
	C	H	O	N
Fulvic acids	44–49	3,5–5,0	44–49	2,0–4,0
Humic acids	52–62	3,0–5,5	30–33	3,5–5,0
Proteins	50–55	6,5–7,3	19–24	15,0–19,0
Lignin	62–69	5,0–6,5	26–33	–

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COMPARISON OF METHODS USED IN MODELING OF SOIL THERMAL PROPERTIES UNDER GRASSLAND CANOPY IN SEMIARID ANATOLIA

СРАВНЕНИЕ МЕТОДОВ, ИСПОЛЬЗУЕМЫХ В МОДЕЛИРОВАНИИ ПОЧВЕННЫХ ТЕРМИЧЕСКИХ СВОЙСТВ НА ЛУГОПАСТБИЩНЫХ УГОДИЯХ В ПОЛУЗАСУШЛИВОЙ АНАТОЛИИ

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Shows a comparison of methods used in modeling of soil thermal properties under grassland canopy in semiarid Anatolia.