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Estimation of organic matter of Rhizospheric and non-Rhizospheric soil with reference to *Lablab purpurens* (L).

Chavan VS[1] and Ambhore JS[2]

[1]Department of Botany, K.E.S. Anandibai Pradhan Science College, Nagothane, Roha -Raigad -402106. (M.S)
[2]Indraraj Arts, Commerce & Science College, Sillod,-431112 Dist Aurangbad (M.S.)
*Corresponding author Email : drvijaysc@gmail.com

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Abstract

Estimation of organic matter carried out for successive three years with respect to ***Lablab purpurens*** (L) crop of rhizospheric and non - rhizospheric region. For this estimation soil sample of four different localities was collected before and after the sowing crop. This crop cultivated during the rabbi season in konkan reagion. The estimation of organic matter was done by the modified Walkley and Black's method, (1934). During study it was observed that organic matter rhizospheric soil higher as compare to non-rhizospheric soil if all other physical parameters are constant. Organic matter improves quality of soil, enhances the water holding capacity and provides the suitable growth of microbes.

Key Words: Rhizospheric, non - rhizospheric, Organic matter, Soil etc

Introduction

Lablab purpurens (L) is largely cultivated as rabbi crop in Raigad district of konkan region which provide protein through their seeds and legumes. The roots of this plants help to enrich the nitrogen content of soil through root nodules. The estimation of organic matter was carried out in rhizosphere of ***Lablab purpurens*** (L) and non - rhizosphere soil sample of that area in different localities of Mahad taluka of Raigad district.

During study it was observed that organic matter in rhizospheric soil higher as compare to non-rhizospheric soil of defined area if all other physical parameters are constant. [1]. in this study estimation of organic matter was carried out for three successive rabbi seasons before and after the one month. The estimation of organic matter was done by the modified Weakley and Black method, (1934)

Methodology

For the estimation of organic matter rhizospheric and non- rhizosphoric soil sample collected from the defined area of different localities. The estimation of organic matter was performed by the modified Walkley and Black's method, (1934) for successive three years.

1)Weigh 1 gms of soil add it in a conical flask of 250 ml capacity. This is for experimental purpose.
2) To this flask add 5ml 1N $K_2Cr_2O_7$ solution and 10 ml con H_2SO_4 solution.
3) Plug the conical flask and mix it well.
4) Allow the stand for 30 min on asbestos sheet,
5) Add 50 ml distilled water, 5ml Orthophospheric acid and 6 to 8 drops of diphenile amine indicator.
6) Titrate the content of the flask against freshly prepared 1 N ferrous ammonium sulphate.
7) On titration initial blue color slowly change to dirty green.
8) Record the burette reading for experimental flask.
9) For the reagent black repeat the same procedure without soil sample. On titration the initial blue color slowly changes to parrot colour.
10) Recorded the reading for control flask.

Chemicals and Reagents used:

i. Strong acid like H_2SO_4, $K_2Cr_2O_7$ oxidising agent and oxidise organic carbon.
ii. 1 N ferrous ammonium sulphate solution.
iii. Orthophosphoric acid (85%) and / sodium fluoride chemically pure/pure grade.
iv. Diphenyl amine indicator.

Calculation:
1 N ferrous ammonium sulphate = 0.003gms of organic matter.The % of organic matter was carried out by following formula

% Organic carbon =X –Y /W*0.003*100

Organic matter content of soil sample = % C *Alison's factor = % C *1.72

Where,
X is the volume of 1 N ferous ammonium sulphate for control flask.
Y is the volume of 1 N ferous ammonium sulphate for experimental flask.
W is weight of soil taken.

Results and Discussions

The percentage of organic matter was categorized as: very low (<0.20), low (0.21-0.40), moderate (0.41-0.60), high (0.61-0.80) and very high (>0.81). % Organic matter estimation of Rhizospheric and Non-rhizospheric soil was carried out for three successive seasons I,e 2015,2016,and 2017 respectively. It was observed that percentage of organic matter was higher in rhizosphoric region of ***Lablab purpurens*** as compare to non-rhizospheric fields. During this study highest % Organic matter was recorded 98% and lowest 65 % [2]

Soil Organic matter is mainly composed of carbon, hydrogen and oxygen but also small amount of nutrients such as nitrogen, potassium, calcium and magnesium contained within organic residue. Organic matter contributes to nutrients turn over and cation exchange capacity, soil structure moisture retention and availability, degradation of pollutants, greenhouse gas emission and soil buffering.

Soil organic matter is basis of soil fertility. It releases nutrients for plant growth. Promotes the structure, biological and physical health of soil and is buffer against the harmful substances.

Table 1: Percentage Organic matter of Rhizospheric and Non-rhizospheric soil .(Year 2015)

Sr. No.	Locality	% Organic matterof Rhizospheric and Non-rhizospheric soil											
		Oct		Nov		Dec		Jan		Feb		Mar	
		R	NR	R	NR	R	NR	R	NR	R	NR	R	NR
1	L-1	0.94 H	0.74 H	0.96 H	0.87 H	0.97 H	0.89 H	0.98 H	0.92 H	0.68 H	0.65 H	0.68 H	0.65 H
2	L-2	0.41 L	0.48 L	0.41 L	0.45 L	0.43 L	0.42 L	0.42 L	0.47 L	0.44 L	0.44 L	0.43 L	0.46 L
3	L-3	0.94 H	0.89 H	0.95 H	0.88 H	0.97 H	0.96 H	0.96 H	0.79 H	0.82 H	0.77 H	0.79 H	0.67 H
4	L-4	0.36 L	0.38 L	0.36 L	0.37 L	0.37 L	0.46 L	0.36 L	078 H	0.36 L	0.37 L	0.37 L	0.40 L

Table 2: Percentage (%)Organic matter of Rhizospheric and Non-rhizospheric soil. (Year 2016)

Sr. No.	Locality	% Organic matterof Rhizospheric and Non-rhizospheric soil											
		Oct		Nov		Dec		Jan		Feb		Mar	
		R	NR	R	NR	R	NR	R	RN	R	NR	R	NR
1	L-1	0.94 H	0.92 H	0.96 H	0.94 H	0.97 H	0.94 H	0.98 H	0.94 H	0.98 H	0.97 H	0.64 H	0.77 H
2	L-2	0.41 L	0.46 L	0.41 L	0.45 L	0.43 L	0.42 L	0.42 L	0.36 L	0.44 L	0.45 L	0.43 L	0.45 L
3	L-3	0.94 H	0.78 H	0.95 H	0.94 H	0.97 H	0.92 H	0.96 H	0.94 H	0.92 H	0.92 H	0.93 H	0.95 H
4	L-4	0.36 L	0.40 L	0.36 L	0.39 L	0.37 L	0.39 L	0.36 L	0.39 L	0.37 L	0.37 L	0.37 L	0.33 L

Table 3: Percentage % Organic matter of Rhizospheric and Non-rhizospheric soil. (Year 2017)

Sr. No.	Locality	% Organic Carbon matter of Rhizospheric and Non-rhizospheric soil											
		Oct		Nov		Dec		Jan		Feb		Mar	
		R	NR	R	NR	R	NR	R	RN	R	NR	R	NR
1	L-1	0.94 H	0.95 H	0.96 H	0.98 H	0.97 H	0.85 H	0.98 H	0.78 H	0.98 H	0.70 H	0.69 H	0.68 H
2	L-2	0.41 L	0.45 L	0.41 L	0.45 L	0.43 L	0.42 L	0.42 L	0.38 L	0.44 L	0.34 L	0.43 L	0.49 L
3	L-3	0.94 H	0.97 H	0.95 H	0.94 H	0.97 H	0.86 H	0.96 H	0.82 H	0.92 H	0.74 H	0.70 H	0.66 H
4	L-4	0.36 L	0.42 L	0.36 L	0.37 L	0.37 L	0.39 L	0.36 L	0.39 L	0.37 L	0.39 L	0.37 L	0.38 L

The organic matter content or it is also called humus [3]. It plays a very crucial role in the soil composition and ultimately its water holding capacity. In this procedure there was a complete oxidation of organic matter and so it was multiplied by 1.3 on the assumption that there was 77% recovery. Organic matter content is the measure of the amount of organic carbon content in soil. It is equilibrium between input of humus by plants, animal dead bodies, other debris and its degradation by soil microorganisms [4]. It plays an important role in soil composition and ultimately its water holding capacity. In the present study, organic matter was measured for each soil sample to study the quality of rhizosphere and non- rhizosphere soil of Sweet bean plant and its effect on the AM fungi [5]. Organic matter act as fertilizer it improves the quality of soil, reduce the soil erosion, water holding capacity, diversity of organisms, it also helps pest control etc.

Conclusion

During estimation of organic matter it was observed that rhizospheric soil sample contain higher organic matter then non rhizosphoric soil sample. Organic matter helps to improve the quality of soil which enhance the productivity of ***Lablab purpurens*** (L)

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