Effect of organic nutrient management onquality parameters and yieldof fodder cowpea varieties

ABSTRACT

The field experiment was conducted ~~during~~*Rabi*~~season of, 2022on sandy clay loam soils~~ at ~~a dry land farm in the S.V. Agricultural College in~~ Tirupati, Andhra Pradesh~~, India.To study the~~to determine~~Effect of~~organic nutrient management effect onquality ~~parameters~~ and yieldof fodder cowpea varietiesduring *Rabi* season of, 2022on sandy clay loam soils.Thetreatments were laid out in ~~Split~~split-plot design ~~of the study included~~in three replications.The ~~treatments~~ experimentconsisted of four varieties *viz.,* V_1: Vijaya, V_2: MFC-09-01, V_3: MFC-09-03, and V_4: MFC-08-14 assigned to main plots, four organic nutrient management practices *viz.,* F_1: Control, F_2 : 100 % organic source through (FYM) F_3: 75 % organic source through (FYM) + *Rhizobium* + PSB + KSB and F_4: 50 % organic source through (FYM) + *Rhizobium* + PSB + KSB~~allotted to sub plots~~. The soil was neutral in reaction (6.8 pH)low in available nitrogen (176kg ha^{-1}) and medium in available phosphorus (27kg ha^{-1}) and low in available potassium (219kg ha^{-1}) status.). The results revealed that ~~among the varieties tested,~~ higher quality parameters~~*i.e.,*~~ (Crude protein content, Total ash content and dry fodder yield) was recorded with variety MFC-09-01.~~(V_2)and dry~~Dry fodder yield (5.8 t ha^{-1}) as well as crude protein (15.1 %), ash content (12.5 %)were obtained with the application of 75 % organic source through (FYM) + *Rhizobium* + PSB + KSB. Furthermore, compared to all other treatments.

Keywords:Biofertilizers, fodder cowpea, *FYM*, quality parameters, ~~dry fodder yield , Sandy clay loam soils, quality parameters.~~

1. INTRODUCTION

~~Leguminous c~~Cowpea (*Vignaunguiculata*) is a popular tropical Leguminousannual fodder cropgrown during the warm and wet seasons.~~Because of~~due to its rapid growth~~, it can be grown during the warm and wet seasons. It may be raised on an annual basis.~~ It is raised for green-form feeding, hay production, or ensiling in combinations with sorghum or maize. Cowpea contains 20 per cent crude fibre and 16 per cent crude protein.

~~India's livestock~~ Livestock production is vital ~~to~~ inIndia's ~~the country's agricultural~~ agriculturesector and considerably boosts GDP. Green fodder and dry fodder availability are currently deficient by 35.6 percent and 10.95 percent, respectively [1]. ~~Looking ahead to 2050, the IGFRI Vision 2050 study~~ The country projects a demand for 1012 million tonnes of green fodder and 631 million tonnes of dry fodder by 2050.However, the lack of fodder and its poor quality ~~provide~~ isproblem~~s~~ for the livestock industry. The gap between the dry and green feed supply is typically 40%; by 2025, this disparity can increase to 45%. ~~To fulfil the vast animal population in India's high fodder demand, there~~ There is a need to boost forage crop output and productivity while maintaining soil health and environmental sustainabilityto fulfil high fodder demandof the vast animal population in India's. [2].

~~When compared to European nations, the~~The production and use of fodderin India paints a very different picturewhen compared with European nations. The country's current fodder resourcescan only supply between 45 and 50 per cent of the demand, and the severity ofthe fodder shortage varies from state to state. The situation is made worse by the expandinglivestock industry, particularly that of genetically modified animals and this isthescenario offodderproduction in India.

~~Leguminous cowpea (*Vigna unguiculata*) is a popular tropical fodder crop. Because of its rapid growth, it can be grown during the warm and wet seasons. It may be raised on an annual basis. It is raised for green-form feeding, hay production, or ensiling in combinations with sorghum or maize. Cowpea contains 20 per cent crude fibre and 16 per cent crude protein.~~

Organicnutrientsourcegivesmajoremphasisonrecoveryandmaintenance of soil fertility and for sustainable yield. Organic systems rely on the management of organicmatter to enhance thesoilfertilityandproductivity(Naik*etal*., 2014).Organicmatterhasanoverwhelmingeffectonalmostallsoilproperties.~~A~~The bestorganicnutrientsourcenotonlyprovidesorganicmatterbutalso add essential minerals to the soil . Organic manure when incorporated into thesoilhaspositiveeffectsonplantgrowth,yieldandsoilphysiochemicalproperties (Huang*etal*.,2007). Biofertilisers help in fixing atmospheric nitrogen and mobilizing fixedmacro-andmicronutrientsinthesoilintoplant-

Comment [U1]: Bio-fertilizer and FYM effect…. At Tirupati

Comment [U2]: Present the background of the study, follow what to be determined. Show the treatments and layout in sequence. Then present the anova result and conclude the findings

The abstract lack this composition

Comment [U3]: Introduce the problem in brief ahead

Comment [U4]: Show the treatments/ factors tested

Comment [U5]: Write in separate line: The varieties tested as main plot treatment and organic nutrient management as sub plot treatment.
How much was the rate applied and how much is the share of the other organic source (Rhizobium+PSB+KSB… amount should be notified

Comment [U6]: remove the abbreviations and list the levels of each factors in parenthesis

Comment [U7]: Soil is not the factor tested, not customary to present as result of factors tested

Comment [U8]: Where is the recommendation or conclusion?

Comment [U9]: Not complete

Comment [U10]: Ok, but not stated any where

Comment [U11]: Cow pa background, importance as forage crop need to come first. But why this study is initiated should come around the end leading to the questions to be answered or nned for the study

== Hence correct the sequence of statements
== and supporting literatures required to strengthen the problem
== why this study is essential??
Where is the question?

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availableforms.Organicfarmingplaysacriticalroleinpreservinglongtermsoilfertilityandsustainability.

Keeping the above facts in view the present study was planned to investigate the effect of organic nutrient managementby applying FYM in combination with *Rhizobium* ,PSB and KSB~~organic nutrient management FYM~~, ~~*Rhizobium* ,PSB and KSB in combination~~ on the performance of fodder cowpea varieties under field conditions.

2. MATERIAL AND METHODS

The present investigation entitled "Effect of Organic nutrient managementon quality andyield of fodder cowpea varieties"wasconducteddur*ing rabi*,2022in drylandfarm of S.V.AgriculturalCollege,ANGRAU,Tirupati,whichisgeographicallysituatedat13°56'564"Nlatitudeand79°67'68 4"Elongitude,withanaltitudeof182.9mabovethemeansealevel.The soil was neutral in reaction (6.8 pH) low in available nitrogen (176 kg ha^{-1}) and medium in available phosphorus (27kg ha^{-1}) and low in available potassium (219kg ha^{-1}) status.The experiment was done using a The Split-plot design of the study included three replications.The treatments consisted of four varieties *viz.,* V_1: Vijaya, V_2: MFC-09-01, V_3: MFC-09-03, and V_4: MFC-08-14 assigned to main plots, four organic nutrient management practices *viz.,* F_1: Control, F_2 : 100 % organic source through (FYM) F_3: 75 % organic source through (FYM) + *Rhizobium* + PSB + KSB and F_4: 50 % organic source through (FYM) + *Rhizobium* + PSB + KSB allotted to sub plots). The crop was sown with a seed rate of 40 kg ha^{-1} at a spacing of 30 × 10 cm. Soil application of biofertilizers was done by mixing 1.25 l ha^{-1} of each bio inoculant in 500 kg of well-decomposed FYM and applied as basal dose (applied 24 hrs before sowing). Seed treatment of biofertilizers was done by mixing 10 ml of each bio inoculant with 1 kg of seed and drying for 10-15 minutes under shade before sowing. Irrigation and weeding were done as and when required. At 50% flowering, harvesting was completed. The data on various parameters were statistically analysed using the split-plot design method recommended by Panse and Sukhatme[6].

2.1Quality parameters

Crude protein: Totalnitrogencontent of plant samples was estimated by modified Micro kjeldhal method[7] and the crude protein content was estimated by using the following formula which was expressed in percentages.

Crude protein (%) = N (%) × 6.25

Crude fibre: Crude fibre content in whole plant was estimated by acid-alkali digestion method and was expressed in percentage.

$$\text{Crude Fibre}(\%) = \frac{\text{Weight before ashing - weight after ashing}}{\text{Weight of the sample taken}} \times 100$$

Total Ash content :Ashistheinorganiccomponentofthesampleleftaftercompleteignitionof the sample at 600°C in muffle furnace. Ash content was calculated by usingthefollowingformulaand expressedinpercentage

$$\text{Total Ash content } (\%) = \frac{\text{Weight of ash a}}{\text{Weight of oven dry sample}} \times 100$$

2.2Yield parameter

Dry fodder yield: After harvesting of fodder cowpea from net plot area, plants were left in the field for a period of one week for sun drying. Then dry fodder yield of cowpea was weighed in net plot area and total dry fodder yield was expressed in t ha^{-1}.

3. RESULTS AND DISCUSSION

Data pertaining to Qualityparameters and productivity at harvest, as influenced by application of organic nutrient management in fodder cowpea varieties were presented in Table~~and discussed in different sections~~.

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Comment [U15]: No need

Comment [U16]: May be remove, geographical location description is enough

Comment [U17]: Applied the comment in abstract section

Comment [U18]: Preparation of each treatment: Describe the FYM rate and amount of bio fertilizer mixed for each treatment clearly

How large is the plot size
How the treatments were applied?
What are the parameters measured, and how analysed not presented
The procedures not sequentially presented
Language and flow or coherence need rewriting
When harvested?

Comment [U19]: Write after the data collection section

Comment [U20]: Title data collection and write under the sub section the parameters measured

Comment [U21]: How? Show the procedure applied and sample size too

Comment [U22]: Check the temperature

Comment [U23]: The result and discussion didn't close to the standard reporting in articles.
= 1. Show how the tested factors affected the variable measure.
=Show the presence of interaction
=Present the result data location
=Discuss how each factor affect the variable,
Concentrate on the main results
-show the confirming similar studies and discuss how it support the findings

Comment [U24]: In which Table?

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The study do not need any discussion

3.1 Quality parameters

Crude protein content

Crude protein ~~content ,~~content, was higher with the variety MFC-09-01 (V_2), which was followed by MFC-08-14 (V_4), which was however comparable with Vijaya (V_1). Thedifferencein quality parameters and dry fodder yield amongthevarietiesmightbedue its genetic potential of having profuse vegetative growth and dry matter accumulation which ultimately led to higher nutrient uptake especially nitrogen, an essential component of protein which might have resulted in more crude protein content in that variety (Iqbal *et al.*~~(~~1998).Among the various organic nutrient management practices tried, ~~higher~~ crude protein was higher with application of75 % N through organic source (FYM) + *Rhizobium* + PSB + KSB(F_3).The higher protein content in cowpea was mainly due to stimulatory effect of organic manure on efficiency of soil microbes and mitigates micronutrient deficiency besides supply of major nutrients and improving the physico-chemical properties of soil. These results consistent with findings of Meena *et al.* (2012),Ram *et al*, (2018)

Comment [U26]: If the abbreviations presented with the variables what is the need for use of symbols?
Present first the ANOVA effect/ the effect of main plot and sub plot factors

Comment [U27]: Beak the statement, and rewrite

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Crude fibre

Crude fibre contentwas higher with the variety MFC-09-03(V_3) followed by Vijaya (V_1) which was however, comparable with the variety MFC-08-14(V_4) whereas the lower fibre content was recorded with the variety MFC-09-01(V_2).Fodders containing low crudefibrecontentare an indication ofmorepalatabilitybyanimalsand they containdigestible nutrients.Thesimilarfindingsobserved by Kalra and ~~sharma~~ Sharma (2015), and Saptal*et al*.(2015).

Comment [U30]: Show the ANOVA effect before discussion

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Total ash content

Comment [U32]: the same comment

Total ash content , was higher with the variety MFC-09-01 (V_2), ~~which was~~ followed by MFC-08-14 (V_4), which was however comparable with Vijaya (V_1). Thedifferencein quality parameters and dry fodder yield amongthevarietiesmightbedue its genetic potential of having profuse vegetative growth and dry matter accumulation which ultimately led to higher nutrient uptake especially nitrogen, an essential component of protein which might have resulted in more crude protein content in that variety (Iqbal *et al.* (1998).Among the various organic nutrient management practices tried, higher crude protein was higher with application of75 % N through organic source (FYM) + *Rhizobium* + PSB + KSB(F_3).The higher protein content in cowpea was mainly due to stimulatory effect of organic manure on efficiency of soil microbes and mitigates micronutrient deficiency besides supply of major nutrients and improving the physico-chemical properties of soil. These results consistent with findings of Meena *et al.* (2012).Roy *et al*. (2015) and Sharma *et al* (2016).

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3.2 Dry fodder yield

Comment [U34]: eg. The analysis of variance showed that Dry fodder was significantly affected due to cow pea varieties and organic nutrient application. The interaction of the factors was not or was significant. The mean dry fodder yield ranged from… to….. and the maximum dry fodder yield recorded from variety… and the minimum from variety… The result suggested that….
…..do the same for the other factors

Rewrite

Dry fodder ,was higher with the variety MFC-09-01 (V_2), which was followed by MFC-08-14 (V_4), which was however comparable with Vijaya (V_1). Thedifferencein quality parameters and dry fodder yield amongthevarietiesmightbedue its genetic potential of having profuse vegetative growth and dry matter accumulation which ultimately led to higher nutrient uptake especially nitrogen, an essential component of protein which might have resulted in more crude protein content in that variety (Iqbal *et al.* (1998).Among the various organic nutrient management practices tried, dry fodder yield, (tha^{-1})was higher with application of75 % N through organic source (FYM) + *Rhizobium* + PSB + KSB(F_3), which wasfollowed by 50% N through organicsource + *Rhizobium* + PSB + KSB (F_4) which was at par with100 % N throughorganic source (FYM)(F_2),whereas shorterplantswerenoticed in control(F_1). FYMcouldbeattributedtothestimulatedactivitiesof microorganisms and synchronized release of nitrogen, which might havestimulated the cellular activity, useful for the process of cell division. Theresultsareincloseconformitywiththefindingsof Zalate*etal*.(2009),Verma and Munshi (2003).

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Table 1Quality parameters and Yield of fodder cowpea as influenced by varieties and organic nutrient management practices

Treatments	Crude protein content %	Crude fibre content %	Ash content %	Dry fodder yield (t ha^{-1})
Varieties(V)				
V_1: Vijaya	13.7	16.9	11.2	4.9
V_2: MFC-09-01	15.7	15.3	13.0	5.3
V_3: MFC-09-03	12.4	18.1	10.1	3.8
V_4: MFC-08-14	14.1	16.3	11.4	5.1
SEm±	0.44	0.61	0.25	0.178
CD(P=0.05)	1.3	1.7	0.7	0.52
Organic nutrient management practices (F)				
F_1: Control	12.9	18.3	10.1	3.6
F_2: 100 %N through FYM	13.8	16.6	11.5	4.8
F_3: 75 % N through organic source(FYM) +*Rhizobium* + PSB +KSB	15.1	15.3	12.5	5.8
F_4: 50% N through organic source (FYM) +R*hizobium* + PSB + KSB	14.1	16.4	11.6	4.9
SEm±	0.42	0.46	0.31	0.291
CD (P=0.05)	1.2	1.3	0.9	0.85
Varieties (V) x Organic nutrient managementpractices (F)				
V at F				
SEm±	0.848	0.924	0.620	0.528
CD(P=0.05)	NS	NS	NS	NS
F at V				
SEm±	0.824	0.953	0.577	0.526
CD(P=0.05)	NS	NS	NS	NS

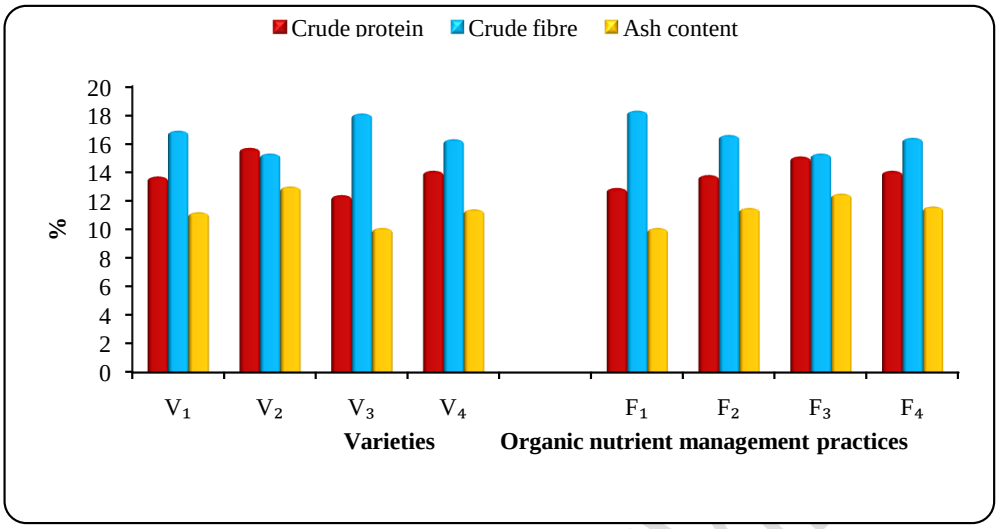

Fig. 1.Quality parametersof fodder cowpea as influenced by varieties and organic nutrient management practices

4. CONCLUSION

In conclusion the study revealed that cultivation of genotype MFC-09-01 with 75 % of N through FYM + *Rhizobium* + PSB + KSB enhanced theyield, quality and economic returns of fodder cowpeain Southern Agro Climatic zone of A.P during *rabi*

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The style of citation not uniform. It is mixed Some cited as number other cited as name of the author

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