Hkkjrh; df"k vuqla/kku if=dk] **35**(3): 143-150 DOI: 10.18805/BKAP229

dpvk vkj çHkkoh l{e thok ¼EM½ dh nk çtkfr;k l çHkkfor dkcfud vo'k"kk dh [kkn d nkjku Hkkfrd vkj jklk;fud ifjoruk ij ryukRed v/;;u

'ky'k ,e- vpk;*

ckyklkgc lkor dkd.k —f"k fo|kihB] nkikyh&415 712] egkjk"V

ikIr% fl rEcj 2020 Lohdr% vDrcj 2020

lkjk'k

tykbZ 2008 l Qjojh 2009 d nkjku tfod vo'k"kk dh jpuk ij dpvk vkj çHkkoh l{e thok ¼b,e½ dh nk çtkfr;k d çHkko dk eY;kdu dju d fy, dæh; çk;kfxd LV'ku] okdkoyh] egkjk"V e ,d ç;kx fd;k x;k FkkA [kkn dh vof/k dk de dju d fy, vkj bldh x.koÙkk e l/kkj] b,e lek/kku d lkFk dpvk dh blfu;k QfVMk vkj ;Mfjyl ;ftuhuh çtkfr;k dk mi;kx djd vke d iÙkk] dkt d iÙkk] f'kou d iÙkk vkj ,u dh ifÙk;k d vi?kVu dh çfØ;k dk fu;f=r dju oky fofHkUu Hkkfrd vkj jklk;fud ekinMk e cnyko dh fuxjkuh d fy, v/;;u fd, x,A ;g n[kk x;k g fd dkfLVx d vr e lcl de Fkkd ?kuRo 0-38 Mg m^{-3} dk f'kou d iÙkk e dpvk dh *Eudrilus eugineae* çtkfr;k d lkFk Vhdk yxk;k x;k FkkA [kkn d :i e Fkkd ?kuRo ekuk dk vkn'k nu d ckn] exk d iÙk> dkt d iÙkk dk n[kk x;kA ,u iÙk> f'kou d iÙkA [kkn cuku d 150 o fnu dh mPpre ty /kkj.k {kerk f'kou ifÙk;k ¼239-70%½ vkj dkt ifÙk;k ¼185-00%½ e lcl de nt dh xbA dp, dh çtkfr b QklfVMk d lkFk dEikLV ;ä exk dh ifÙk;k d ih,p e deh FkhA mud i.k fo?kVu d ckn lHkh vo'k"kk dh fo|r pkydrk e dkQh deh FkhA bu lHkh dkcfud vo'k"kk e dpvk dk Vhdkdj.k C:N vuikr e deh d ifj.kkeLo:i 150 fnuk dh vof/k e gvkA dfV;u fofue; {kerk e mYy[kuh; of) gb FkhA vkerkj ij vf/kdre CEC ¿36-83 c mol (p^+) kg^{-1}À dk ;Mhyl ;ftuh, d lkFk bykt fd, x, f'kou ifÙk;k e nt fd;k x;k Fkk vkj dkt e lcl de CEC ¿23-33 36-83 c mol (p^+) kg^{-1}À dk mYy[k fd;k x;k FkkA bA d lkFk bykt iÙkA blh rjg] [kkn d vr e] vf/kdre CEC ¿90-67 c mol (p^+) kg^{-1}À dk f'kou d iÙkk e *Eudrilus eugineae* vkj lcl de CEC ¿64-83 c mol (p^+) kg^{-1}À d lkFk b QfVMk nt fd;k x;k Fkk vkj dkt d iÙkk d lkFk bykt fd;k x;k FkkA

'kCn dth% [kkn] dpvk] çHkkoh l{eth o ¼b,e½] dkcfud vo'k"k] lhblhA

Bhartiya Krishi Anushandhan Patrika, **35**(3): 143-150

Comparative studies on physical and chemical changes during composting of organic residues as influenced by two species of earthworms and effective micro-organisms (EM)

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Received: September 2020 Accepted: October 2020

ABSTRACT

An experiment was undertaken at central experimental station, Wakawali, Maharashtra to evaluate the influence of two species of earthworms and effective micro-organisms (EM)" on compositing of organic residues during July 2008 to February 2009. In order to reduce the period of composting and improve upon its quality, studies were undertaken to monitor the changes in various physical and chemical parameters governing the process of decomposition of mango leaves, cashew leaves, *shivan* leaves and *ain* leaves using *Eisenia foetida* and *Eudrilus eugineae* species of earthworms along with EM solution. It was observed that at the end of composting significantly lowest bulk density 0.38 Mg m^{-3} was noted in Shivan leaves inoculated with E eugineae species of

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earthworm.Descending order of bulk density values after the composting were observed as, Mango leaves>Cashew leaves> *Ain* leaves>Shivan leaves. The highest maximum water holding capacity on 150th days of composting was recorded in Shivan leaves(239.70%) and lowest in Cashew leaves(185.00%). There was reduction in pH of Mango leaves compost inoculated with earthworm species E foetida.There was a considerable reduction in electrical conductivity of all the residues after their complete decomposition. Inoculation of earthworms to all these organic residues resulted into reduction in C:N ratio with the advancement in period up to 150 days. There was significant increase in cation exchange capacity.Initially maximum CEC {36.83 c mol (p^+) kg^{-1} } was recorded in Shivan leaves treated with *Eudrilus eugineae and lowest* CEC {23.33 c mol (p^+) kg^{-1} } was noted in Cashew leaves treated with E. foetida. Similarly at the end of composting, maximum CEC{90.67 c mol (p^+) kg^{-1} } was recorded in Shivan leaves treated with *Eudrilus eugineae and lowest* CEC {64.83 c mol (p^+) kg^{-1} } was noted in Cashew leaves treated with E. foetida.

Key words: Composting, Earthworm, Effective microorganism (EM), Organic residues, CEC.

iLrkouk

;g rFk l egll fd;k tk jgk g fd [kkn ,d foLrr i;koj.kh; çfØ;k g tk fofHkUu çdkj d dpj dk dherh tfod [kkn e ifjofrr djrh g] tk vU;Fkk i;koj.k çn"k.k ink djrh gA vc ,d fnu] i;koj.k dk vkj vf/kd {kj.k l cpku d fy,] fofHkUu tfod vif'k"Vk d iupØ.k d fy, mi;ä rduhd fodflr djuk vkj i;koj.kh; ruko dk de dju d fy, Åtk dk nkgu djuk cgr vko';d gA oehVd,y,Fk ,d vk'kk tud rduhd gftlu [kk| mRiknu e of)] vif'k"V jhlkbfDyx] enk vif'k"V çc/ku vkfn ¼f=ikBh ,V vy 2005½ tl dN pukrhi.k {k=k e viuh {kerk fn[kkb gA

dpvk dh ,tlh d ek/;e l dkcfud vif'k"V inkFk d mi;kx u egRo xg.k fd;k g D;kfd oehdEikfLVx dh rduhd ljy] fdQk;rh vkj i;koj.k d vudy gA feêh dh mojrk dk cgrj cuku e dpvk dh egRoi.k Hkfedk dk —f"k dh lcg l gh tkuk tkrk jgk g] yfdu —f"k mRiknu vkj çn"k.k fu;=.k dh fn'kk e bld lHkkfor ;kxnku ij gky gh e /;ku fn;k x;k g ¼dky vkj —".kefr] 1981½A rkMu] ihlu] eFku vkj vkRelkr dju dh {kerk d lkFk] dpvk dpj d vnHkr duoVj lkfcr g, gA

Hkkjr ,d xkeh.k n'k g vkj ;gk i'kvk d vif'k"V] Qly vo'k"k] gjh [kkn] leæh vkj —f"k&vk|kfxd dpj d :i e ekuo lk/ku dh fo'kky lHkkouk gA bu lkrk d chp Qly vo'k"kk dk dkQh egRo fn;k x;k gA dkd.k {k= e LFkkuh; ?kkl] vke d l[k iÙk] dkt] ,u] f'kou] dVgy] lkxku vkfn vkj [kr d dpj tl pkoy vkj jkxh] exQyh] dkp vkfn d l[k ik/kA

bu vo'k"kk l [kkn cuku d fy, [kkn cuku dh ikjifjd fof/k e yxHkx 6&8 eghu dk yck le; yxrk gA bu vo'k"kk l r;kj [kkn ç—fr e ik"kd rRo lkexh vkj Hkkjh gA blfy,] bu vif'k"Vk dk çHkkoh l{ethok d mi;kx d lkFk ;fXer oehdEikfLVx d ek/;e l vPNh x.koÙkk dh [kkn d :i e çHkkoh :i l iuuohuhdj.k fd;k tk ldrk g tk [kkn dh vof/k dk de djxk vkj [kkn dh ik"kd fLFkfr dk c<k,xkA blfy, oehdEikfLVx vkj çHkkoh l{ethok d mi;kx d ek/;e l Qly vo'k"kk d vi?kVu dk v/;;u dju d fy, oreku tkp dh xbFkhA

lkexh ,o ijh{k.k fof/k

oreku v/;;u 2008&09 d nkjku odoyh e QDVfj;y jMekbTM fMtkbu e nk dkjdk d lkFk fd;k x;k Fkk] ftle QDVj I lClVV Fkk ftle pkj Lrj 'kkfey FkA blfu;k QfVMk vkj ;Mfjyl ;ftuh, ogk 8 mipkj l;ktu rhu ckj nkgjk;k x;kA dkcfud vo'k"kk d oehdEikfLVx dk lheV Vd e 2 ehVj x 1 ehVj x 1 ehVj d vk;ke d rgr fd;k x;k FkkA fo?kfVr xkcj dh ,d 15 leh ijr Vd d ry ij Qyh gb Fkh vkj vkf'kd :i l fo?kfVr xkcj dh ijr d 'kh"k ij vkf'kd :i l fo?kfVr ifÙk;k dh 15 leh ijr Qyh gb FkhA 50 çfr'kr ueh Lrj cuk, j[ku d fy, bl fu;fer :i l ikuh fiyk;k x;kA *Eisenia foetida* vkj *Eudrilus eugineae* çtkfr;k d yxHkx 200 dpvk dk çR;d Vd d oehcM e ,d b"Vre bupkftx ?kuRo d :i e i'k fd;k x;k FkkA bl ijr dk oehcM ;kfu vLFkkb fuokl LFkku dpvk d fy, ijklk tkrk gA çHkkoh l{ethok ¼b,e½ dk mi;kx fofHkUu çdkj d tfod dpj dk [kkn d fy, ,d funk"k

d :i e cMh lQyrk d lkFk fd;k tk jgk gA ,d 20 feyhyhVj EM lek/kku dk 1 yhVj ikuh e iryk fd;k x;k vkj çR;d Vd e leku :i l Qyk;k x;kA rjy :i e miyC/k b,e e ih&lkyfcykbftx cDVhfj;k] yfDVd ,flM cDVhfj;k] ,fDVukekblVl] ,u fQfDlx cDVhfj;k] lY;ykt fMxfMx cDVhfj;k vkj [kehj ¼dQ 1x10^{8}½ d miHkn gkr gA çR;d Vd l lkexh dk ,d eghu d vrjky ij eU;vy :i l pky fd;k x;k FkkA lkjxh vkj ykek ¼2013½ }kjk nh xb çfØ;k dk ikyu djd [kkn dh ifjiDork dk Bgjk;k x;k FkkA Åij l uhp rd feêh Vîc cjek dh enn l ueu 150 o fnu ,d= fd, x, Fk vkj ekud çfØ;kvk dk ikyu djd fofHkUu x.kk d fy, fo'y"k.k fd;k x;k FkkA

ifj.kke ,o foopuk

Fkkd ?kuRo e ifjoru% 150 fnuk d fy, vieku dh vof/k d nkjku fofHkUu dkcfud vo'k"kk d Fkkd ?kuRo e ifjoru ij MVk rkfydk 1 e çLrr fd;k x;k g

rkfydk 1 d vkdMk l] ;g n[kk x;k fd fofHkUu dkcfud vo'k"kk l çkIr vfre [kkn mRikn d Fkkd ?kuRo eY;k e egRoi.k vrj FkkA ;g n[kk x;k fd dikfLVx d vr e dkQh de Fkkd ?kuRo 0-43 Mg m^{-3} dk f'kou d iÙkk e ukV fd;k x;k FkkA blu [kkn cuku d nkjku Fkkd ?kuRo dk de dju d fy, vU; lHkh tfod vo'k"kk ij f'kou d iÙkk dh J"Brk dk ldr fn;kA nlj 'kCnk e] Fkkd ?kuRo e deh d lc/k e vU; lHkh mipkjk l f'kou d iÙk dkQh cgrj ik, x,A Fkkd ?kuRo e deh tk dkcfud inkFkk d vykok gk ldrh g ftl oehdEikLV d Fkkd ?kuRo e deh d fy, tkuk tkrk FkkA lkYoh ¼2007½ }kjk f'kou yhQ dM [kkn d vfrfjä Fkkd ?kuRo e deh dh lpuk Hkh nh xb FkhA [kkn d ckn Fkkd ?kuRo eY;k d vojkgh Øe dk exk d iÙkk> dkt d iÙkk> ,bu d iÙkk> f'kou d iÙkk d :i e n[kk x;kA tfod vo'k"kk d [kkn mRiknk d Fkkd ?kuRo ij dpvk dk çHkko [kkn d 150 o fnu egRoi.k ik;k x;kA dpvk çtkfr;k d çHkko dk [kkn cuku d ckn Fkkd ?kuRo dk de dju d lc/k e dpvk çtkfr;k bA QkIfVMk dh ryuk e bA ;thu dk lkf[;dh; :i l egRoi.k ik;k x;kA

;g rkfydk 1 e çLrr fd, x, vkdMk l Hkh n[kk x;k Fkk] fd ckrphr d çHkko [kkn d 150o fnu lkf[;dh; :i l egRoi.k FkA vkoY;'ku d 150o fnu] dkQh de Fkkd ?kuRo vFkkr 0-38 Mg m^{-3} dk f'kou dh ifÙk;k d lkFk ukV fd;k x;k Fkk] tk dp, dh b-;ftfu;k çtkfr d lkFk Fk vkj ;g ,bu ifÙk;k ¼0-41Mg m^{-3}½ d lkFk ,d gh çtkfr d dp, d cjkcj FkkA f'kou vkj ,bu ifÙk;k ,d vPNk lkr g ;fn [kkn cuku d nkjku Fkkd ?kuRo dk de dju d fy, dpvk dh bA ;thfu;k çtkfr d lkFk Vhdk yxk;k tkrk gA

vf/kdre ty /kkj.k {kerk e ifjoru% rkfydk 2 e çLrr vkdMk l] ;g vueku yxk;k tkrk g fd [kkn lkexh dh vf/kdre ty /kkj.k {kerk e vrj 1 vkj 150 o fnu d voykdu d fy, lkf[;dh; :i l egRoi.k FkkA D;kfd f'kou d iÙkk dk lEeku e dkcfud inkFkk d ckdh fgLlk dh ryuk e lkf[;dh; :i l cgrj ik;k x;k FkkA nkuk fVlif.k;k ij vf/kdre ty /kkj.k {kerk dk çfr'krA 'k: e f'kou d iÙkk e 178-10% dh vf/kdre ty /kkj.k {kerk vfdr dh xb Fkh] bld ckn ,bu d iÙk ¼160-95%½ vke d iÙk ¼149-85%½ vkj dkt d iÙk ¼134-12%½ FkA [kkn cuku d 150 o fnu dh mPpre ty /kkj.k {kerk Hkh nt dh xb FkhA f'kou d iÙkk e ¼239-70%½ vkj lcl de dkt dh ifÙk;k ¼185-00%½ e nt fd;k x;kA lkekU; rkj ij vf/kdre ty /kkj.k {kerk e of) [kkn d çkjfHkd l vfre fnu rd n[kh tkrh Fkh vkj ;g —fe dkfLVx dh lex ç—fr vkj [kkn e dkcfud inkFkk dk tkMu d dkj.k gk ldrk gA tfn;k ,V vy

rkfydk 1% tfod vo'k"kk dh [kkn d nkjku Fkkd ?kuRo ¼Mg m^{-3}) e ifjoruA

Treatments	*Eisenia foetida*	*Eudrilus eugineae*	Mean
vke d iÙk	0.65	0.71	0.68
Dkt d iÙk	0.72	0.54	0.63
f'kou d iÙk	0.48	0.38	0.43
vkbu d iÙk	0.52	0.41	0.47
ehu	0.59	0.51	
	M effect	**E effect**	**M X E EFFECT**
S.E+	0.01	0.01	0.02
C.D.(P=0.05)	0.03	0.02	0.05

M-Material effect E-Eartworm effect N.S-Non significant

rkfydk 2% tfod vo'k"kk dh [kkn d nkjku vf/kdre ty /kkj.k {kerk ¼%½ e ifjoruA

Treatments	1st Day			150th Day		
	Eisenia foetida	*Eudrilus eugineae*	Mean	*Eisenia foetida*	*Eudrilus eugineae*	Mean
vke d iÙk	143.60	156.10	149.85	201.17	198.20	199.68
Dkt d iÙk	129.60	138.63	134.12	183.50	186.50	185.00
f'kou d iÙk	178.30	177.90	178.10	244.60	234.80	239.70
vkbu d iÙk	160.50	161.40	160.95	246.40	204.17	225.28
ehu	153	158.51		218.92	205.92	
	M effect	E effect	MXEEFFECT	M effect	E effect	MXEEFFECT
Σ.E+	1.08	0.77	1.53	1.15	0.82	1.63
C.D.(P=0.05)	3.28	2.32	4.64	3.50	2.48	4.95

M-Material effect E-Eartworm effect N.S-Non significant

¼2008½ u ;g Hkh ik;k fd [kkn vkj oehdEikfLVx dh vof/k d nkjku ty /kkj.k {kerk c< tkrh gA mUgku n[kk fd lCth dpj d oehdEikfLVx e 1 llrkg l 10 o llrkg rd ikuh dh /kkj.k {kerk ¼%½ 49-57% l 72-00% rd gkrh gA

f'kou d iÙkk dh [kkn cuku d 1 fnu e dpvk dh b&QfVMk çtkfr d lkFk budkfVQkbM ik;k x;k] tcfd ckdh d bykrk e f'kou d iÙkk d vykok dp, dh b ;thfu, çtkfr dk NkMdj vU; nokvk dh ryuk e dkQh cgrj ik;k x;kA ; nkuk mipkj vU; lHkh mipkjk ij lkf[;dh; :i l egRoi.k FkA tcfd [kkn cuku d 150 o fnu ,bu ifÙk;k dk dpvk dh bA QkbVVk çtkfr d lkFk Vhdk yxk;k tkrk g vkj f'kou dh dpvk dh b QkbVhMk çtkfr d lkFk Vhdk yxk;k tkrk g] tk ckdh mipkj l;ktuk e lkf[;dh; :i l cgrj ik;k tkrk g vkj ; nkuk mipkj ,d nlj d lkFk lkf[;dh; :i l leku ik, x, A

ih,p e ifjoru% rkfydk 3 e çLrr vkdMk l] ;g n[kk x;k g fd dkcfud vo'k"kk d [kkn d nkjku ih,p e ifjoru 1 fnu d lkFk&lkFk 150 o fnu Hkh egRoi.k ugh ik, x,A ,vkb dh ifÙk;k d lkFk igy fnu 6-76 dh lcl de ih,p nt dh xb Fkh] tcfd vke d iÙkk d lkFk vf/kdre ih,p ¼7-12½ ukV fd;k x;k FkkA [kkn d 'k: gku l igy ih,p d vojkgh Øe e dkcfud vo'k"k

rkfydk 3% dkcfud vo'k"kk dh [kkn d nkjku ih,p vkj fo|r pkydrk ¼Mh,l ,e &1½ e ifjoruA

lkexh	ih,p						fo|r pkydrk (dS m^{-1})					
	1st Day			150th Day			1st Day			150th Day		
	EF	EE	Mean	EF	EE	Mean	EF	EE	Mean	EF	EE	Mean
ML	7.19	7.05	7.12	6.30	7.23	6.76	1.37	1.23	1.30	0.94	0.71	0.83
CL	6.27	7.29	6.78	6.35	7.10	6.73	1.19	1.28	1.23	0.78	0.72	0.75
SL	6.64	7.16	6.90	6.83	7.20	7.01	1.45	1.25	1.35	0.65	0.39	0.52
AL	6.22	7.30	6.76	7.11	7.04	7.08	1.29	1.21	1.25	0.77	0.37	0.57
Mean	6.58	7.20		6.65	7.14		1.33	1.24		0.79	0.55	
	M effect	E effect	MxE effect	M effect	E effect	MxE effect	M effect	E effect	MxE effect	M effect	E effect	MxE effect
S.E.+	0.16	0.11	0.23	0.17	0.12	0.25	0.03	0.02	0.04	0.16	0.12	0.23
CD.P=0.05	NS	0.35	NS	NS	0.37	NS	0.08	0.05	0.11	NS	NS	NS

EF-*Eisenia foetida* EE-*Eudrilus eugineae* M effect-Material effect E effect -Earthworm effect
ML-vke d iÙk MxE effect-Interaction effect NS-Non significant
SL-f'kou d iÙk
CL-Dkt d iÙk
AL-vkbu d iÙk

bl çdkj Fk] vke d iÙk] f'kou d iÙk> dkt d iÙk> ,u d iÙk tcfd vfre mRiknk d fuEu Øe e Fkh ,u d iÙk> f'kou d iÙk> vke d iÙk> dkt d iÙkA bl çdkj [kkn d lcl de ih,p ¼6-73½ d vr e dkt d iÙkk e ukV fd;k x;k tcfd ,b d iÙkk e vf/kdre ih,p ¼7-08½ ukV fd;k x;kA HkkuxFk ¼1997½ e dkt dh ifÙk;k d lkFk 6-57 dk lcl de ih,p eku Hkh ik;k x;kA johæu ,V vyA ¼2008½ u ,fifMd dpvk ,lfu;k QfVMk dk mi;kx djd peM d m|kxk l mRiUu Bkl dpj d oehdEikfLVx ij dke fd;k vkj mUgku n[kk fd oehdEikfLVx e ih,p 6-74 dh deh gb ft ld ifj.kkeLo:i bVjDV çHkko 1 fnu ij lkf[;dh; :i l xj egRoi.k Fkk vkj lkFk gh lkFk 150 o fnu Hkh voykdu b- QkIfVMk d lkFk vke d iÙkk d ih,p e deh FkhA dkt vkj ,bu ifÙk;k d lc/k e ih,p eku e deh dh blh rjg dh çofÙk dpvk dh bA ;thu; çtkfr d lkFk n[kh xb Fkh] tk rVLFkrk dh vkj [kkn inkFk d ih,p eku dh f'kf¶Vx dk ldr nrk gA ;g ckn e nk lkrk e ,flM io }kjk CO_2 vkj vf/kd dkcfud vEy d mRiknu d dkj.k gk ldrk gA

fo|r pkydrk e ifjoru% rkfydk 3 e çLrr vkdMk l] ;g n[kk x;k fd [kkn d igy fnu fofHkUu dkcfud vo'k"kk d fo|r pkydrk eY;k e egRoi.k vrj FkkA fofHkUu vo'k"kk d fo|r pkydrk eY;k dk fuEufyf[kr Øe e ukV fd;k x;k Fkk% f'kou d iÙk> vke d iÙk> ,u d iÙk> dkt d iÙkA 1 fnu e lcl de fo|r pkydrk okyh [kkn ¼1-23 Mh,l ,e &1½ dkt d iÙkk e ,bu ifÙk;k ¼1- Mh,l ,e &1½ vkj vke d iÙkk ¼1-35 Mh,l ,e &1½ d :i e ukV fd;k x;k FkkA fo|r pkydrk dk de dju e f'kou dh ifÙk;k ij ; rhu mipkj dkQh cgrj FkA dp, dh b-;ftfu;k çtkfr d lkFk mipkfjr fofHkUu vo'k"kk d fo|r pkydrk eY;k dk dEikfLVx dju d igy fnu b Q,bfVMk d lkFk bykt dju okyk dh ryuk e dkQh de Fk] yfdu [kkn d vr e b ;thfu;k vkj b Q,fLlMk çtkfr d dpvk dh l[;k lkf[;dh; :i l xj egRoi.k ikb xbA lkexh vkj dpvk dk ijLij çHkko 1 fnu e egRoi.k ik;k x;k vkj ;g [kkn d 150o fnu e egRoi.k ugh FkkA

rkfydk 3 e çLrr vkdMk l] ;g Li"V g fd mud i.k fo?kVu d ckn lHkh vo'k"kk dh fo|r pkydrk e dkQh deh FkhA bld fy, ftEenkj dkj.k l{e thok vkj dpvk }kjk ?kyu'khy dkcfud vo'k"kk l ?kyu'khy yo.kk dk mi;kx gA

C:N vuikr e ifjoru% ;g rkfydk 4 e çLrr vkdMk l n[kk x;k Fkk fd lhh ,u vuikr 'k: e] ;g lHkh vo'k"kk dk n[kr g, 31-56 l 46-21 dh lhek e FkkA C:N f'kou d iÙkk dk ,u vuikr mPpre ¼46-21½ n[kk x;k vkj ;g ckdh vo'k"kk dh ryuk e dkQh cgrj FkkA [kkn cuku d 150 o fnu] fofHkUu dkcfud vo'k"kk d C:N vuikr e vrj lkf[;dh; :i l egRoi.k ekuk x;kA C:N e Øfed vkj dkQh deh FkhA 150 fnuk rd dh vof/k e mUufr d lkFk [kkn d fy, lHkh dkcfud vo'k"kk dk ,u vuikrA dkcu vkj lh dh deh e deh oehdEikfLVx e ,u vuikr dpvk vkj l{ethok dh 'olu xfrfof/k l ;k ukbVktu e of) }kjk çkIr fd;k tk ldrk g] dhM d vykok tfod ukbVktu d l{e [kfut }kjk mud mRltu d ek/;e l ukbVktu ;ä vif'k"Vk d l;ktu eA bl c<h gb ekbØkfc;y xfrfof/k d fy, ftEenkj Bgjk;k tk ldrk g] D;kfd dkcu viuh Åtk vko';drk d fy, l{ethok }kjk mi;kx fd;k tkrk g vkj ?kyu'khy ukbVktu d l{etho çkVhu e ifjoru dk dkj.k curk g ft ll ukbVktu gkfu dk jkdk tk ldrk gA 'kek ,V vy-] ¼2004½ u fn[kk;k fd oehdEikfLVx d ek/;e l bLreky fd, x, ik/kk vkj dkxl ?kkl d d'ky iupØ.k u C:N vuikr dk 14-5% 1 vkj yVkuk e 17-4% 1 dk de dj fn;kA flg ,-Vh- ¼2006½ vkj lhrkjkey{eh ,V-] vy ¼2013½ e Hkh fofHkUu dkcfud vo'k"kk d C:N vuikr e deh n[kh xbA

tlk fd C:N vuikr ij dpvk d çHkko dk lc/k g] ;g n[kk x;k fd] C:N vuikr [kkn d 150 o fnu dpvk dh nk çtkfr;k d dkj.k egRoi.k :i l çHkkfor ugh gvk FkkA çkjfHkd dh ryuk e 150 o fnu C:N vuikr e Hkkjh deh FkhA ;g gk ldrk g D;kfd] dp, tfod inkFk dk Hkktu d :i e mi;kx djr g vkj 'olu dh çfØ;k e dkcu d Hkkx dk C:N d :i e NkMr gA 'y"e vkj ukbVktu d mRltu dk mRiknu ukbVktu d Lrj dk c<krk g vkj bld dkj.k C:N vuikr de gkrk gA ; ifj.kke eUuk ,V- vy- ¼1999½] xtfHk, vkj lrir ¼2014½ }kjk çkIr ykxk d vu:i gA

C:N vuikr e cnyko ij fofHkUu Qly vo'k"kk vkj dp, dh lgHkkfxrk [kkn d 150 o fnu egRoi.k ikb xbA b- ;fxub d lkFk dkt d iÙkk dk Vhdk vf/kd ik;k tkrk Fkk vkj ;g , d iÙkk d lkFk ,bu ifÙk;k d cjkcj Fkk] f'kou u b ;ftuuh d lkFk NkM fn;k] f'kou u b QfVMk d lkFk vkj , ;fxuh d lkFk ,bu d iÙkk l C:N ,u vuikr e vf/kdre deh f'kou vkj ,bu ifÙk;k d ekey e ukV dh xb FkhA

rkfydk 4% C:N e ifjoru% dkcfud vo'k"kk dh [kkn d nkjku ,u vuikr vkj jk'ku fofue; {kerkA

lkexh	ih,p						fo|r pkydrk (dS m^{-1})					
	1st Day			150th Day			1st Day			150th Day		
	EF	EE	Mean	EF	EE	Mean	EF	EE	Mean	EF	EE	Mean
ML	33.70	33.06	33.38	13.62	13.53	1357	34.33	34.33	34.33	80.90	89.83	85.37
CL	31.30	31.43	31.56	13.00	14.55	13.77	29.33	29.33	29.33	64.83	74.17	69.50
SL	45.97	46.45	46.21	14.29	14.45	14.37	36.83	36.83	36.83	83.00	90.67	86.83
AL	42.76	72.57	42.66	14.53	13.97	14.25	35.00	35.00	35.00	77.67	84.83	81.25
Mean	38.42	38.37		13.86	14.12		33.88	33.88		76.60	84.88	
	M effect	E effect	MxE effect	M effect	E effect	MxE effect	M effect	E effect	MxE effect	M effect	E effect	MxE effect
S.E.+	0.56	0.40	0.79	0.19	0.14	0.27	0.36	0.25	0.51	1.34	0.95	1.90
CD.P=0.05	1.69	0.35	NS	0.58	0.37	0.83	1.09	0.05	0.11	4.08	2.88	NS

EF-*Eisenia foetida* EE-*Eudrilus eugineae* M effect-Material effect E effect -Earthworm effect
ML-vke d iÙk MxE effect-Interaction effect NS-Non significant
SL-f'kou d iÙk
CL-Dkt d iÙk
AL-vkbu d iÙk

dfV;u fofue; {kerk e ifjoru [c mol (p^+) kg^{-1}: rkfydk 4 d vkdMk d voykdu l irk pyk g fd dkcfud vo'k"kk dk fMdEikt dju d lhblh e vrj lkf[;dh; :i l egRoi.k ik, x,A 'k: e f'kou d iÙkk e vf/kdre 36-83 [c mol (p^+) kg^{-1}] nt fd;k x;k] bld ckn in 35-00 [c mol (p^+) kg^{-1}] vke dh ifÙk;k 34-33 [c mol (p^+) kg^{-1}] vkj dkt fudyrk gA ifÙk;k 29-33 [c mol (p^+) kg^{-1}A dikfLVx d 1 fnu e f'kou d iÙkk dk ckdh vo'k"kk dh ryuk e dkQh cgrj ik;k x;k vkj ,u ifÙk;k vkj vke d iÙkk dk ,d&nlj d cjkcj ik;k x;kA 150o fnu f'kou vkj vke d iÙkk dk ,d&nlj d cjkcj ik;k x;kA dkt d lkFk lcl de lhblh] [kkn dh vof/k d nkjku fudyrk gA lhblh e of) iÙkh d dM d ek/;e l tkM tku oky ue dkcfud inkFkk d dkykbMy ç—fr d dkj.k gk ldrh gA

dpvk fofue; {kerk e of) ij dpvk Vhdk dk çHkko [kkn d ueu d 150o fnu lkf[;dh; :i l egRoi.k ik;k x;kA bA ,uhX;,b d Vhdkdj.k d ifj.kkeLo:i b- QkbfVMk ij lhblh e mYy[kuh; of) gbA vYckuy ,V vy ¼1988½ u dikl vk|kfxd dpj d lkFk fefJr HkM dh [kkn d oehdEikfLVx d nkjku g, ifjoruk dk v/;;u fd;k vkj crk;k fd lhblh e 35-5 l 79-6 [c mol (p^+) kg^{-1} FkkA eUuk ,V vy- ¼1994½ u fofHkUu tfod vo'k"kk d lhblh e ifjoru dk v/;;u fd;k] ft le 180 fnuk rd [kkn Mkyu d ckn oehdYpj d lkFk Vhdk yxk;k x;kA ifj.kkek l ldr feyrk g fd dpvk d lkFk lkexh d bukD;y'ku u lHkh vif'k"V inkFkk d lhblh dk dkQh c<k fn;k Fkk yfdu fu;=.k d edkcy Vhdk lkexh dh lhblh e of) vi{kk—r de FkhA

lhblh ij dpvk d lkFk lkexh dh ikjLifjd fØ;k dk xj egRoi.k ik;k x;kA çkjfHkd :i l vf/kdre lhblh 36-83 [c mol (p^+) kg^{-1}] b ;xhu d lkFk bykt fd, x, f'kou d iÙkk e nt fd;k x;k vkj lcl de 29-33[c mol (p^+) kg^{-1}] b d lkFk Vhdk fd, x, dkt d iÙkk e n[kk x;kA [kkn cuku d vr e flfeyjyh] vf/kdre CEC 90-67 [c mol (p^+) kg^{-1}] dk E&eugineae vkj CEC d lcl de 64-83 [c mol (p^+) kg^{-1}] d lkFk bykt fd, x, f'kou d iÙkk e nt fd;k x;k FkkA b- Qkfrnk bu voykduk u dkcfud dkcu d [kfuthdj.k e dpvk dh Hkfedk d egRo dk bfxr fd;k vkj blfy,] vPNh rjg l fo?kfVr dkcfud vo'k"kk d lhblh dk c<k;kA [kkn d 1 l 150 o fnu rd lHkh mipkjk d lhblh e yxkrkj of) gb FkhA /kou vkj dhM ¼1994½ u ik;k fd 'k: e xUu d dpj vkj xkcj d ?kky l r;kj dEikLV mRikn dk lhblh 37-1 [c mol (p^+) kg^{-1}] Fkk [kkn vof/k d fnu tk 120 d ckn c<dj 122-8 [c mol (p^+) kg^{-1}] gk x;kA

fu"d"k

oreku tkp d fu"d"kk d vk/kkj ij] ;g oreku tkp l fu"d"k fudkyk tk ldrk g fd fofHkUu dkcfud vo'k"kk dk eY;kdu fd;k x;k Fkk] f'kou d iÙkk dk rth l [kkn cuku d fy, lcl vPNk lkr ik;k x;k Fkk] ftld ckn ,u ifÙk;k FkhA dp, dh nk çtkfr;k e l] dp, dh b-;ftfu;k çtkfr vf/kdk'k v/;;uk e l vf/kdk'k ekinMk d lc/k e dpvk dh b-v,QfVMk çtkfr l cgrj ikb xbA dpvk bukD;y'ku ;fXer b,e lek/kku d lkFk [kkn çfØ;k dk c<k;kA

lnHk

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