CrossMark

I   `       `   N-

J   J   .*, K   K   , D   C   , N   L

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ABRAC

D   N   (N)-   . T   N
        (   )   (   )
                                          . T
                                              . D   N   14%
                      ,   12%
                                            NH$_3$. A   ,
                    HS (   )   ,
                  HS   70%   ,   0
30%   27. I   GI
                        80%. T
                        N

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1. Introduction

N   (D   T   -K   , 2005;
N   ., 2017). D   N-   ,
C   . T
(J   ., 2015;   ., 2017).   . T
I   N
                                                  (N   ., 2017). S
2017). N   (N)   ,   ,   N-
            N   (. .   )   I   , NH$_3$
(G   ., 2012). T   N   (J   ., 2015 ; P   ., 2006). M   ,   H
80%   N   (N   ., 2014). T   , N   NH$_3$ NH$_4$-N
    16 74%   N   -   NH$_3$ NH$_3$,   N
   (M   ., 2002; R   , 2010),   (B   ., 2009). T   ,
(., 2016). T   ,   ,
NH$_3$ -   NH$_3$ N
            .   (H   ., 2009; R   ., 2010;   , 2015). T
   I   ,   N-   (. .   H   6.7 9.0 (B   ., 2009).
)   T   , `   H
                                                                   (J   .,
                                 2014). A   ,   ,

$$GI\ (\%) = \frac{S \qquad\qquad (\%) \times R}{S \qquad\qquad (\%) \times R} \times 100\%$$

(1)

NH$_3$ (2%)

H$_2$SO$_4$. CO$_2$

N OH,   HC .

T   CO$_2$ NH$_3$

,   NH$_3$

N OH. T   NH$_3$

.

T   TKN   K

(B ., 2002). NH$_4$-N   -KC   (1:10,

/)   N OH   -H$_2$SO$_4$. NO$_3$-N

-

-F SO$_4$ NH$_4$-N. T

(TOC)   -

. H   (HS)

. (2008). T   N

C   :

N   (%) = (N   × M   − N   × M   )/(N   × M   )   (2)

C   (%) = (C   × M   − C   × M   )/(C   × M   )   (3)

H   N   C   TN   C   ($^{-1}$),

N   C   TN   C   (

  $^{-1}$),   M   M

( ).

2.4. Data analysis

A   STD . D

SPSS 17.0 (IBM SPSS S   I ., C -

, IL, USA)   ANO A

P < .05. A   S   P -

(12.5, S S , I ., S J , CA, USA).

3. Results and discussion

3.1. Temperature

T   -

,   (., 2015).

E   P-100   A-100   ,

.

F . 2

. A

P   (50 °C)   4 9 ,

T   P-100   ,

9. J . (2014)

( )

,

. T

H   EC (6.0   4.8 S $^{-1}$) -

(6.6   3.0 S $^{-1}$),

(B ., 2009). T -

.

D ,

. T

4 (F . 2). R

, ,   (L   K ,

2012). T ,

, -

(C ., 2016).

3.2. CO$_2$ emissions

CO$_2$

(.,

2004). A   F . 3,

          (F . 2). D   -
   CO_2 114.1   P-100   94.6 $^{-1}$ A-100
   9,   . I   ,
          81.5 $^{-3}$ P-30/70   85.4 $^{-3}$ A-30/70,   -
      . D CO_2 -
      P-100, P-70/3, P-30/70, A-100, A-70/30,   A-30/70
             22.5, 20.6, 19.9, 25.5, 23.9   23.6 $^{-3}$,
                .
   T CO_2-C   54
          1216, 1116,   1078   P-100, P-70/30   P-30/70,
             ,   37.9%, 34.8%   33.6%
      C (T   2). M   ,   1254,
1172,   1156 ,   ,   39.1%, 36.5%
36%   C (T   2). T   C
      CO_2 -
                                    (11.4 22.5%)
       -                         (C   ., 2014)
             (29.6 48.9%)   N   . (2017).
A   , CO_2
                                    (P < .01).

NH$_3$ (mg d^{-1})

57%

70%

I ... N ... 35.2
49.8% ... N (T 3), ... (B ... ., 2002; S ... ., 2010).
T ... N ... 100% ...
. S ... N ... 14%
12%

(N ... . (2017). H ...
N ...
(D ... T -
K ... , 2005). T ...
, ... NH$_4$-N ... . P ...
. T NH$_4$-N
>1.0 $^{-1}$, ... NH$_4$-N -
0.4 $^{-1}$ (D ... T -K ... ,
2005). H ... ,
N ... ,
.
F ... , ... H -
100% -
(D ... T -K ... , 2005). B
H ... N- ... NH$_3$,
H > 7.5 (B ... ., 2009),
N
. I ... ,
H ... , NH$_3$
, ... N.
M ...
N ... NH$_3$ (J ... ., 2014;
L -C ... ., 2016). H ... , (
, ... , ... , .)
, EC, C/N, H,
(L ... ., 2013;
J ... ., 2014; L -C ... ., 2016). T
(H ... EC)
. F ... , , -
.

3.5. HS contents
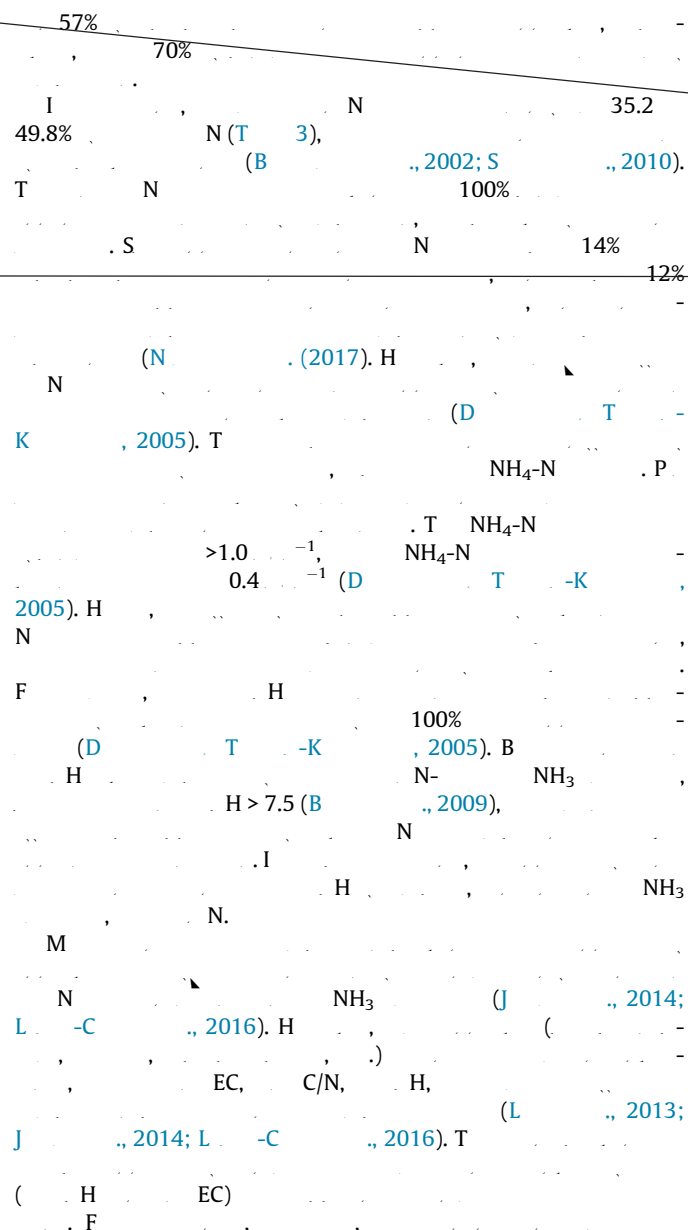
H (HS)
(B ... ., 2009). T ... HS
(P < .01)
(F . 6). T ... HS
30%, 20%

2013), ... NH$_3$, 10% ... 100, 70/30, 30/70, . E
(P < .001), HS
(J ... ., 2014). . C ... HS -

3.4. Nitrogen change and N loss
. A

A ... , TN, NO$_3$-N ... NH$_4$-N - HS (P < .01)
HS ... P-70/30 A-70/30
(P < .05) (T . 3). 30% (F . 6). S
, TN 9%
, NH$_4$-N (A ... ., 2006;
26% 175%. H ... , NO$_3$-N 100% ... ., 2000). J ... . (2014)

HS TOC

. I , HS TOC
P-100, P-70/30, A-100, A-70/30
, P-30/70 A-
30/70. T -
P-30/70 A-30/70 -
(B
., 2009).

3.6. GI

GI
(., 1981). B
NH$_3$ (S ., 2004), GI
9 (F . 7),
(L ., 2012). T , GI

. I , GI -
80%.
T GI P-30/70 80%,
EC (5.2 S $^{-1}$) (T . 3) -
.

4. Conclusion

I ,
,
NH$_3$.

. T

References

A , S., H , M., L , L., M , G., G , M., P , E., R , J.C., B , J.
R., A , A., 2006. S
. P B . 41, 410 422.
B , S., C , D., T , M., K , ., 2002. E
. B . T . 83, 189 194.
B , M.P., A , J.A., M , R., 2009. C
. A R . B . T .
100, 5444 5453.
C , M.T., S , A., , J. ., 2016. R
. B . T . 200,
838 844.
C , M.A., N , A., J , L.S., 2014. P
. C 97, 16 25.
D , D.B., T -K , K., 2005. D
. B . T . 96,
1093 1101.
G , J., , S.P., B , R., B , P., A , D., , A.N., , S.
R., 2012. A :
. B .
T . 114, 382 388.
H , M.S., H , J., A , O.I., H , B., 2009. B
T
P . B . T . 100, 4773 4782.
H , G.F., , J. ., Q.T., N , B.B., 2004. E C/N
. M . 24, 805 813.
J , J., D , M.H., H , M., ., 2015. I