I 、 *·* 、**N-**



^{,*}, K K , D C , N . . L J J

School of Environment, Henan Normal University, Key Laboratory for Yellow River and Huai River Water Environmental and Pollution Control, Ministry of Education, Henan Key Laboratory for Environmental Pollution Control, Xinxiang, Henan 453007, China College of Mechanical and Electronic Engineering, Northwest A&F University, Yangling, Shaanxi 712100, China

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A	HS ()
A .	HS 70% 0
N .	30% 27. I , GI
C .	80%. T , N

1. Introduction

C I .	(J ., 2015; ., 2017).
2017). N (G	(N), (, (,)), (,),
80% (N (M	N ., 2014). T , N NH ₃ ., 2002; R ., 2010),
(NH ₃	., 2016). T , , -
I	, , , , , , , , , , , , , , , , , , ,

^{*} C .

Ν			. (D		Τ.	-K	, 2005;
N	•,	2017). D				N-	,
•				· • •			.Т [`] -
	````						N .
				<b>(N</b> )		., 20	17). S
	,	N-			Ν		-
I		•	, N	H ₃			÷

. <b>(J</b>	<b>., 2015 ;</b> ]	P ., 2006)	).М.,	H H
NH ₃ (B	- ., 2009). T	NH3 ,	· · ·	N ,
, (H	., 2009; R	, NH₃ ., 2010;	, <u>2015)</u> . 1	N \- [ -
т. Т.,	, H	6.7 9.0	(B	., 2009). ,
2014). A		, ,  ,	. (J	, - , - , -

$GI(\%) = \frac{S}{S} + \frac{1}{S} + \frac{1}{S$	$\begin{array}{c} (\%) \times \mathbf{R} \\ (\%) \times \mathbf{R} \end{array}$
NH ₃ H ₂ SO ₄ . CO ₂ N OH, T CO ₂	(1) (2%) HC . NH ₃
N OH. T NH ₃	NH ₃
T TKN (B ., 2002). NH ₄ -N / ) N OH	K -KC (1:10, -H ₂ SO ₄ . NO ₃ -N
-F SO ₄ (TOC) . H	NH ₄ -N. T (HS) L . (2008). T N :
$\mathbf{N} \qquad (\%) = (\mathbf{N} \times \mathbf{M} - \mathbf{N} \times \mathbf{N})$	$M )/(N_{\rm N} \times M_{\rm N}) $ (2)
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 1 & )/(C & \times M & ) & (3) \\ C & & & (& -^{-1}), \\ TN & C & & (& \\ & & & & \\ & & & & & \\ & & & & $

# 2.4. Data analysis

Α.	-				STD .	. D		
		SPSS	517.0 (IBM	SPSS	S	Ι	., C -	•
, IL, <b>U</b> S	SA)	-	ANO A					
. P <	.05. A	<b>X</b> ·			<b>S</b>	Р	`	•
(	12.5, S	►S 、	, I ., S	J	, CA, I	USA).		

# 3. Results and discussion

# 3.1. Temperature

Τ			<b>.</b> .	`	
с. Е.,	P-100	A-100	,	(	., 2015).
		- ,		`	
F.2					
-		·	÷		A

		( ,	P 50 °C)	4	9.	,
T P-100	9. J	. (2014)	, ) (	, , , , , , , , , , , , , , , , , , ,	-	)
· · ·		. , Т	, , , ,		•	
H (6.6	3.0 S	EC (6.0 ⁻¹ ),	4.8 S ⁻¹	) ., 2009). 1		-,
, , , , , , , , , , , , , , , , , , ,	,	· · · ·	,		•	-
	<i>· ·</i>		.T 4 (F.2	). R		
2012). T	, , <u>,</u> ,	<b>,</b>		(L .	. K	,
× 4		 	, (C	., 2016).		-

# 3.2. $CO_2$ emissions

CO ₂			,	-	
4			. (		••

2004). A F. 3, (F. 2). D  $CO_2$  114.1 P-100 94.6  $^{-1}$  A-100 9, . .1 81.5  $^{-3}$  P-30/70 85.4  $^{-3}$  A-30/70, -D CO₂ -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 CO₂-C 54 1216, 1116, 1078 P-100, P-70/30 P-30/70, 37.9%, 34.8% 33.6% C (T 2). M 1 1254, 1172, 1156 , 39.1%, 36.5% 36% C (T 2). T C (11.4 22.5%) - (C , 2014) (29.6 48.9%) N (2017). A (29.6 48.9%) N (2017).

, 57%	70%		· · · · · · · · · · · · · · · · · · ·
I 49.8%	N (T 3).		35.2
T	(B N	., 2002; S 100%	., 2010).
	. S	, N	. 14%
	· · · ·	<b>,</b>	,
N	(N . (2017). 1	Η,	
К	, 2005). T	(D NH	. T
2005). H N	>1.0 ⁻¹ , 0.4 ⁻¹ (D	. T NH ₄ - NH ₄ -N T	-K ,
F (D H	, H T -K H > 7.5 (B .I N	100% , 2005). B N- ., 2009), N	- NH ₃ , NH ₃
, М	` <b>х</b> мш	, ,	2014:
L -C	., 2016). H ,	U .	(
, , J	EC, C/N,	H, (L 2016). T	., 2013;
( H .F	EC)	· · · · · · · · ·	· · · ·

## 3.5. HS contents

Н	(HS)	. –
( <b>B</b>	., 2009). T HS	$(\mathbf{P} < 0^{\dagger})$
	(F . 6). T	HS
10%	100, 70/30, 30/70,	E
,	.C HS	HS -
<b>,</b> .	· · · · · · · · · · · · · · · · · · ·	, -

2013),		
		 (P < .001),
	(J	., 2014).

3.4. Nitrogen change and N loss

Α	4 ×		, TN, NO ₃ -N	NH ₄ -N	-
	(P < .05) (T	. 3).	30%		х 
•	··· ,	TN		. 9%	
26%	175%. H		NO ₃ -N	100%	

HS TOC HS TOC P-100, P-70/30, A-100, A-70/30 P-30/70 A- T GI P-30/70 P-30/70 A- T GI P-30/70 P-30/70 A-30/70 -(B (B (Cond 1) (

# 3.6. GI

GI ( ,, 1981). B NH₃ (S ,, 2004), GI 9 (F . 7), (L ,, 2012). T , GI



, NH₃ . 

#### Acknowledgements

F N N S F C (N . 51508167), K R P C U E D H P (N . 17A610006 17B610006), S F H N U (N . 2016QK20 2016QK18).

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- .P
   B
   .41, 410
   422.

   B
   , S., C
   , D., T
   , M., K
   , 2002. E.

   B
   , M.P., A
   , J.A., M
   , R., 2009. C
   .

   100, 5444
   5453.
   .
   A R
   .
- 100, 5444 5453. C , M.T., S , A., J. , 2016. R , B , T , 200, C
- , M.A., N , A., J , L.S., 2014. P
- . T
- 96 , S.