

# Changes of Physico-chemical Properties and Assessment of Maturity on Composting of Species of Turfgrass Clippings from the Golf Courses

Seung Myung Ha<sup>\*</sup>, Suon Kyu Ham<sup>1</sup>, Ki Woon Chang,

Ki Pil Han<sup>2</sup>, Joo Hwah Hong<sup>2</sup>, Jong Jin Lee<sup>2</sup>

Dept. of Bio Environmental Chemistry, Chungnam National University

<sup>1</sup>Korea Turfgrass Research Institute, <sup>2</sup>PANKOREA Co, Ltd

## Objectives

Turfgrass clippings from the golf courses are useful organic resource and worthy of notice as desirable material of organic farming. But Korean Law treats turfgrass clippings as waste and study of turfgrass clipping is understaffed. This study was conducted on scientific lines for the purpose of application of turfgrass clippings from the golf courses into agricultural organic resource.

## Materials and Methods

### • Materials

- Turfgrass clipping(Creeping Bentgrass, Kentucky Bluegrass, Korean Lawngrass), Rice Bran, Composted Chicken Drop

### • Methods

- Aerated Static Pile(ASP) system
- Sampling : 1, 3, 5, 7, 8, 10, 20, 21, 30 days
- Analysis : Physico-chemical properties of samples during the composting
- Assessment of maturity : Round paper chromatogram, G.I. value

## Results

- The temperature during the composting of all treatments increased rapidly and reached at the highest temperature(57.9°C, 67.8°C, 74.3°C) within 20th day, and then stabilized to the range of 35.2 ~ 41.6°C at the 30th day.
- The pH value of all treatments decreased at the first time. However, the pH was increased rapidly after third day and decreased 10~20th days. pH value of 30th day was stabilized on low alkali level.
- The content of total carbon during the period of composting tends to decrease and total nitrogen was increased for factor of reduction of volume. The rate of initial C/N ratio to final C/N ratio in maturity standard is 0.75. KL treatment balanced better than others at 0.62. CEC value during the period of composting tends to increase.
- The round paper chromatogram of extracted solution of KL sample was the sharpest and clearest among treatments. The G.I. value of CB, KB, and KL in 30th day of composting were about 95.1, 77.7, and 98.7 in germination test using chinese cabbage, respectively.

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Correspondence : Seung Myung Ha E-Mail : smha99@hotmail.com Tel. : 042-821-7887

Table 1. Characteristics of total carbon, nitrogen and moisture contents of turfgrass species dried and sub-materials  
(Unit : g kg<sup>-1</sup>)

Materials	Creeping bentgrass	Kentucky bluegrass	Korean lawngrass	Rice bran	Composted chicken drop
Total carbon	191	519	531	456	178
Moisture(%)	53.3	76.4	62.3	11.2	31.9
Total Nitrogen	23	47	20	27	11
C/N ratio	8.3	11.0	26.6	17.1	16.2

Table 2. A quality evaluation of turfgrass compost compared with KSC

Items	KSC	Creeping bentgrass	Kentucky bluegrass	Korean lawngrass
O.M(g kg <sup>-1</sup> )	> 250	407	469	448
T-N(g kg <sup>-1</sup> )		19.7	23.3	20.1
O.M/T-N	< 50	20.6	20.1	22.2
Moisture(%)	< 50	38	43	43
As(mg kg <sup>-1</sup> )	< 50	ND*	ND	ND
Cd(mg kg <sup>-1</sup> )	< 5	ND	ND	ND
Cr(mg kg <sup>-1</sup> )	< 300	38	68	38
Hg(mg kg <sup>-1</sup> )	< 2	ND	ND	ND
Cu(mg kg <sup>-1</sup> )	< 300	38	68	72
Ni(mg kg <sup>-1</sup> )	< 50	34	32	34
Pb(mg kg <sup>-1</sup> )	< 150	ND	ND	ND
Zn(mg kg <sup>-1</sup> )	< 900	127	295	363
NaCl(g kg <sup>-1</sup> )	< 10	3	6	6

\*ND : not detected

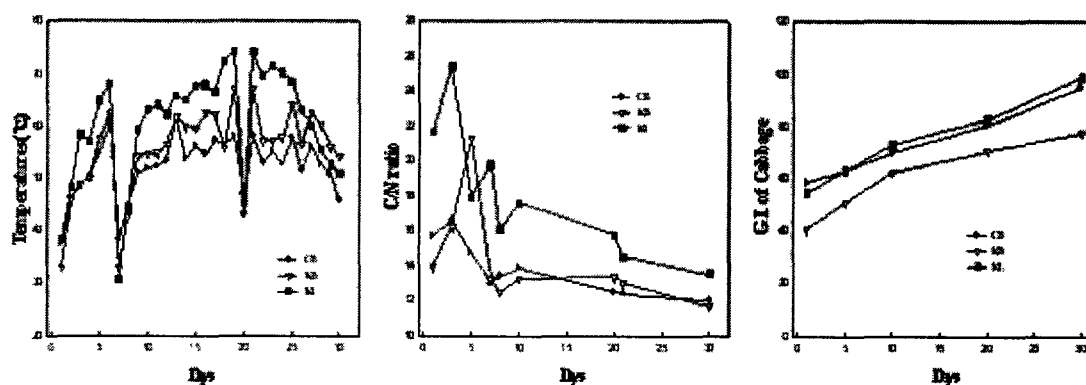


Fig. 1. Changes of temperature, C/N ratio and G.I. of Cabbage during the period of composting