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**Current situation of industrial
chicken manure use in the red river delta and
initial results of composting treatment**

Bui Huu Doan

Faculty of Animal Science and Aquaculture, Hanoi University of Agriculture

Email: bhdoan@hua.edu.vn

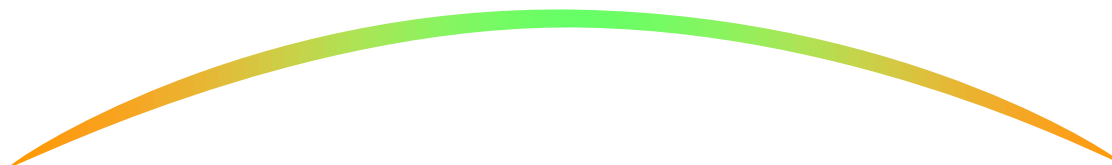
An Giang, 16-18 Nov



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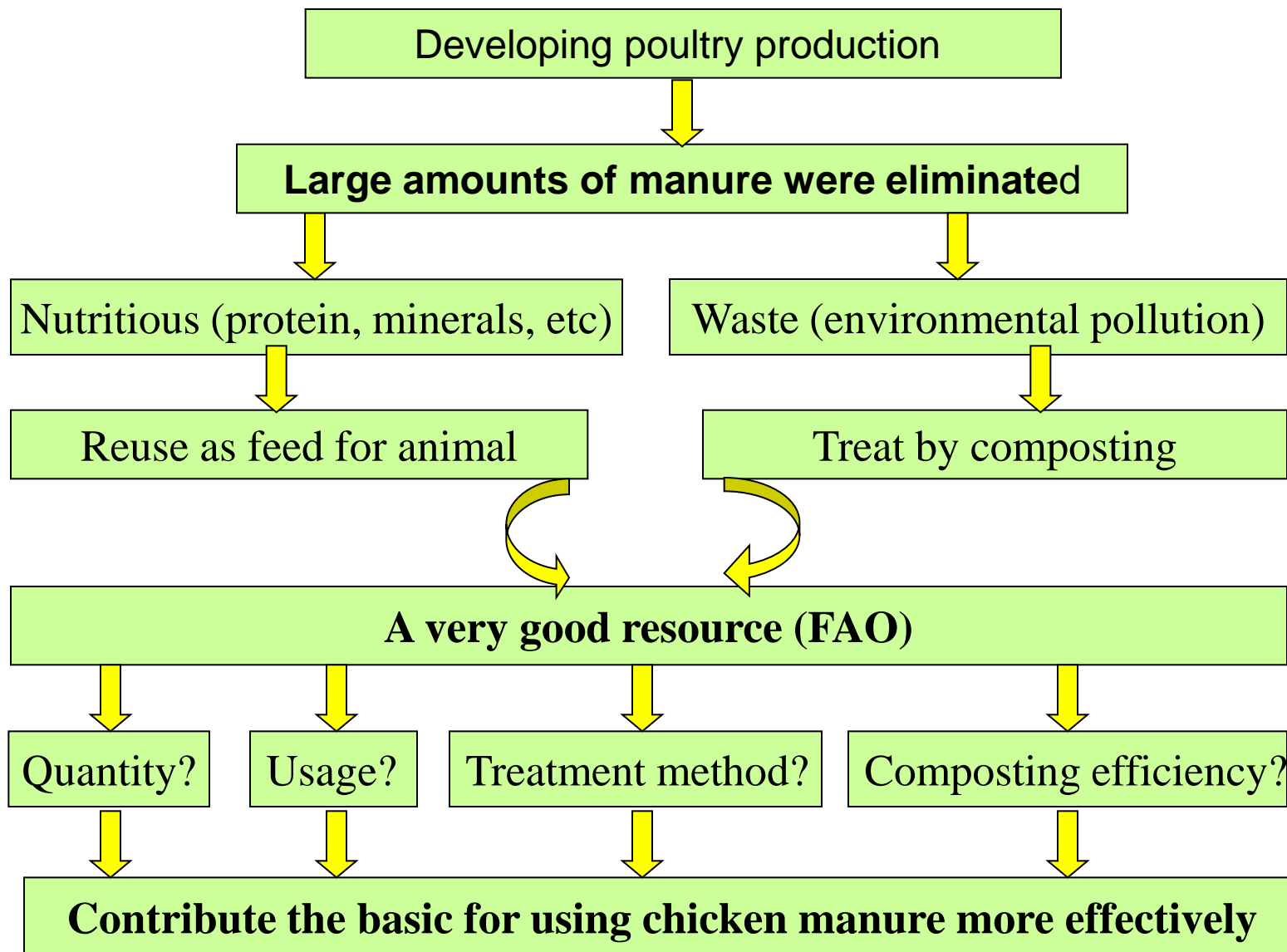
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Introduction



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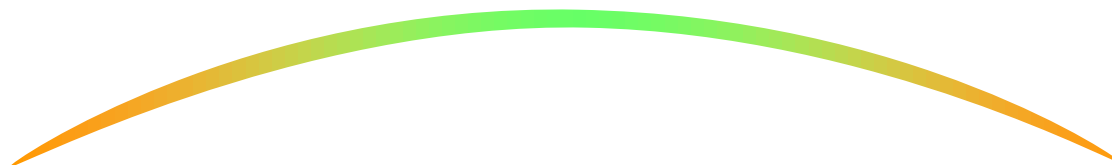




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Methodology



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- **Productivity** of industrial chicken’s manure of the Red River Delta was calculated by secondary data from Department of Livestock Husbandry, Ministry of Agriculture and Rural Development in 2007
- **Situation** of chicken manure usage of households were investigated by semi-structure questionnaire at 105 households



Treatment of manure by wet and dry method, including 4 formulas (200kg of manure per each formula) with EM product as showed in table:

Formula	Chicken manure (%)	Molasses (%)	Rice bran (%)
F1 (with 1% EM enzyme)	90	5	5
F2 (with 1% EM enzyme)	90	0	10
F3 (with 1% EM enzyme)	90	0	10% tapioca
F4 (non EM enzyme)	90	0	10% tapioca

(1) EM enzyme in dry powder



- **Identify diminishing level** by weighing quantity of manure before and after (3, 4 and 5 composting weeks)
- **Identify pH value** with litmus paper at the time before and after (1, 2, 3, 4 and 5 composting weeks)
- **Check the temperature** at centre of the composting pile with a thermometer before and after composting (1, 7, 14, 21, 28 and 35 days)



- Chemical analysis of manure: based on (AOAC, 1975)
 - ✓ **DM**: by drying the samples
 - ✓ **Crude protein**: by Micro Kjeldahl method
 - ✓ **Crude fiber**: by Henneberg and Toman methods
 - ✓ **Total ash**: by dry burning at 550 °C
 - ✓ **Ca**: by standard method
 - ✓ **P**: by methods of volume and weight



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**RESULTS
AND DISCUSSIONS**



Table 1. Situation of chicken manure use at some investigated households (HHs)

Using purpose	No. of HHs	Rate (%)	Used amount (ton)	Rate (%)	Non processed	Rate (%)
Crops planting	90	85.71	35.06	25.26	15	16.67
Feed for fishes	30	28.57	77.52	55.86	28	93.33
Rice planting	20	19.05	23.39	16.86	15	75.00
Fruit tree planting	5	4.76	2.80	2.02	3	60.00
Biogas	4	3.81	-	-	0	0
Livestock production	0	0	0	0	0	0
Total	125	-	138.77	100	-	-



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Table 2. Methods used for processing chicken’s manure of households

Processing methods	No. of applying HHs	Rate (%)
Composting fresh manure only	36	40.91
Composting with additives	45	51.13
Earthworm and fly larva nourishing	3	3.41
Using for biogas	4	4.55
Total	88	100



Table 3. Change of manure's weight during composting process

Formula	Diminishing rate (%)					
	Dry composting			Wet composting		
	<i>Week 3</i>	<i>Week 4</i>	<i>Week 5</i>	<i>Week 3</i>	<i>Week 4</i>	<i>Week 5</i>
F1	14.75	16.21	17.85	29.75	33.15	34.05
F2	15.25	17.25	19.32	30.25	34.65	35.65
F3	14.92	16.45	18.25	28.95	33.25	34.15
F4	15.98	17.98	19.85	30.67	34.95	35.25
Average	15.04	17.09	18.75	29.91	34.00	34.78



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Table 4. Change of PH level in manure during the dry composting time

Composting duration (week)	F1	F2	F3	F4
0	7.26	7.26	7.26	7.26
1	5.82 ± 0.04	6.01 ± 0.02	5.95 ± 0.06	6.15 ± 0.04
2	5.31 ± 0.07	5.52 ± 0.06	5.29 ± 0.07	5.57 ± 0.08
3	5.19 ± 0.03	5.37 ± 0.04	5.17 ± 0.09	5.42 ± 0.05
4	5.07 ± 0.09	5.35 ± 0.02	5.14 ± 0.02	5.40 ± 0.06
5	5.09 ± 0.02	5.37 ± 0.08	5.18 ± 0.05	5.45 ± 0.03



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Change of PH level in manure during the dry composting time

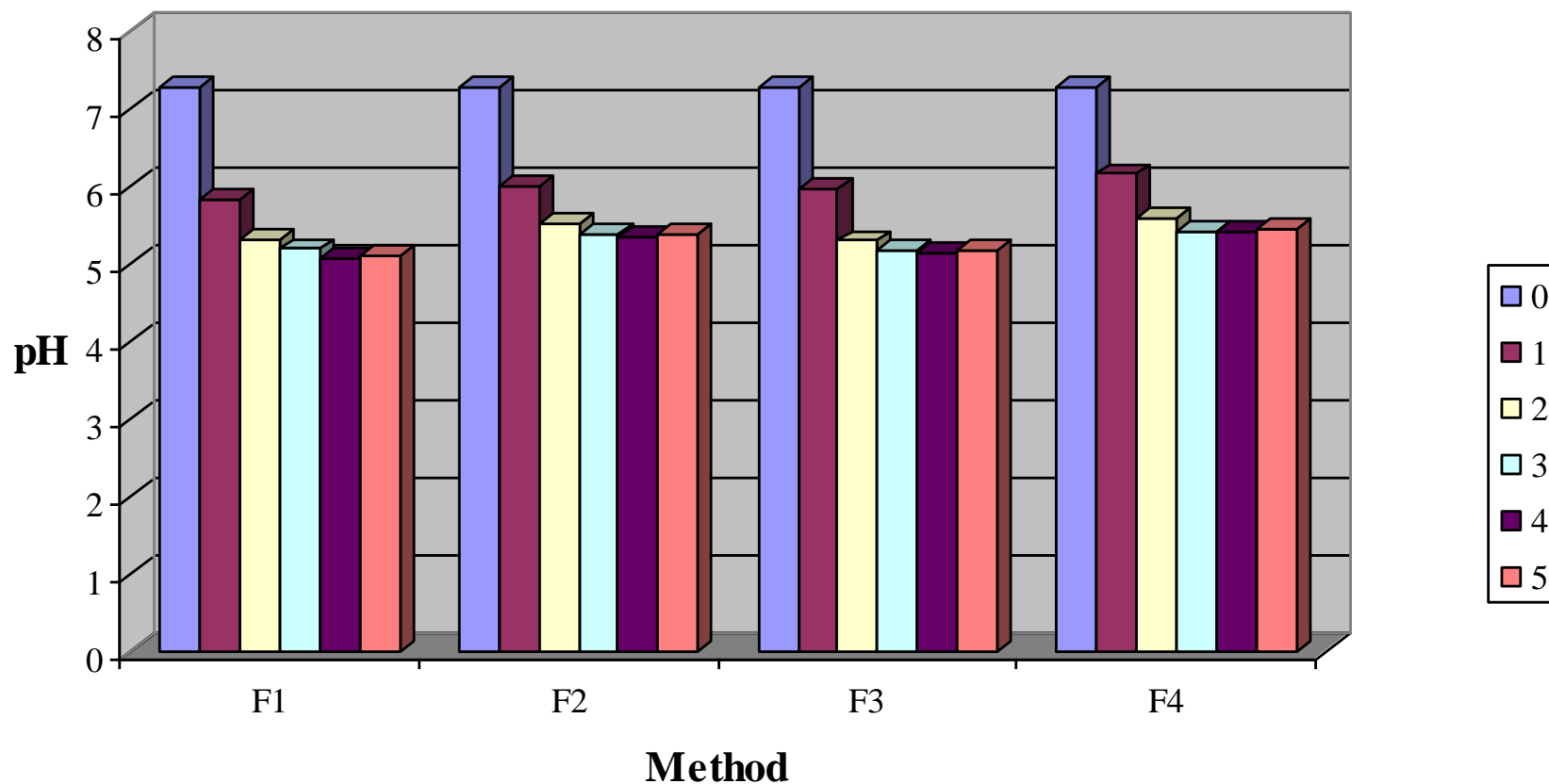




Table 4. Change of PH level in manure during the wet composting time

Composting duration (week)	F1	F2	F3	F4
0	7.83	7.83	7.83	7.83
1	6.87 ± 0.05	6.93 ± 0.08	6.68 ± 0.06	6.72 ± 0.06
2	6.27 ± 0.05	6.45 ± 0.05	6.39 ± 0.07	6.45 ± 0.04
3	6.21 ± 0.06	6.39 ± 0.05	6.22 ± 0.05	6.25 ± 0.05
4	6.20 ± 0.09	6.37 ± 0.06	6.21 ± 0.09	6.23 ± 0.08
5	6.28 ± 0.06	6.40 ± 0.07	6.27 ± 0.07	6.31 ± 0.06

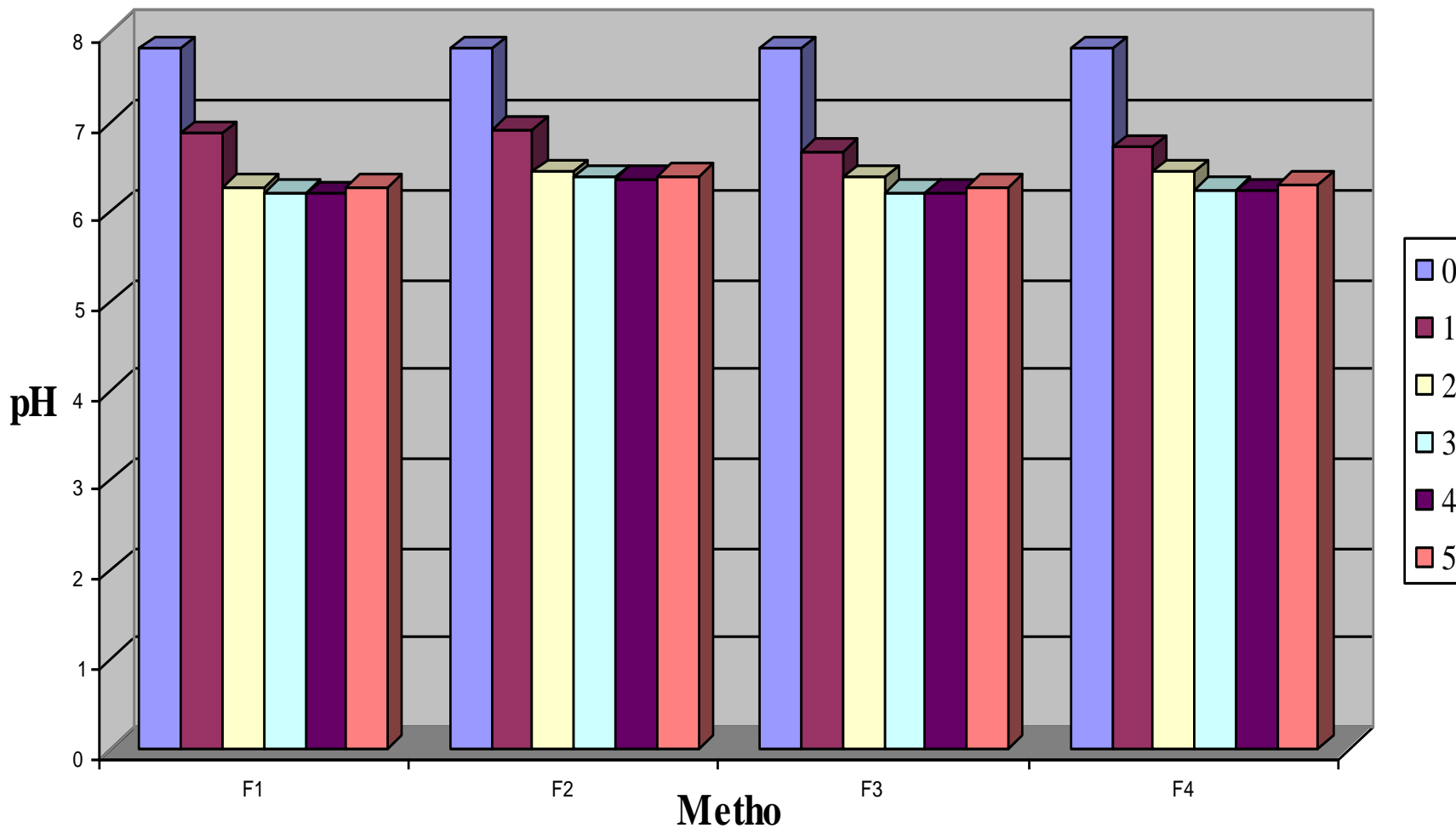


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Change of PH level in manure during the wet composting time





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Table 5. Change of temperature of manure during the dry composting process

Days of compost	F1	F2	F3	F4
0	32.41	32.41	32.41	32.41
1	44.52± .56	44.61±2.02	44.39±2.63	41.77±1.89
7	52.54±2.35	52.65±2.45	52.33±2.79	49.75±2.22
14	51.35±2.46	50.57±1.89	52.44±2.15	52.13±1.85
21	61.66±1.78	61.22±2.31	61.55±1.68	54.18±1.76
28	57.52 ± 1.89	56.53 ± 2.42	56.36 ± 2.49	50.15 ± 2.18
35	47.57±2.04	47.56±1.97	48.3 ± 1.56	45.52±2.04



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Change of temperature of manure during the dry composting process

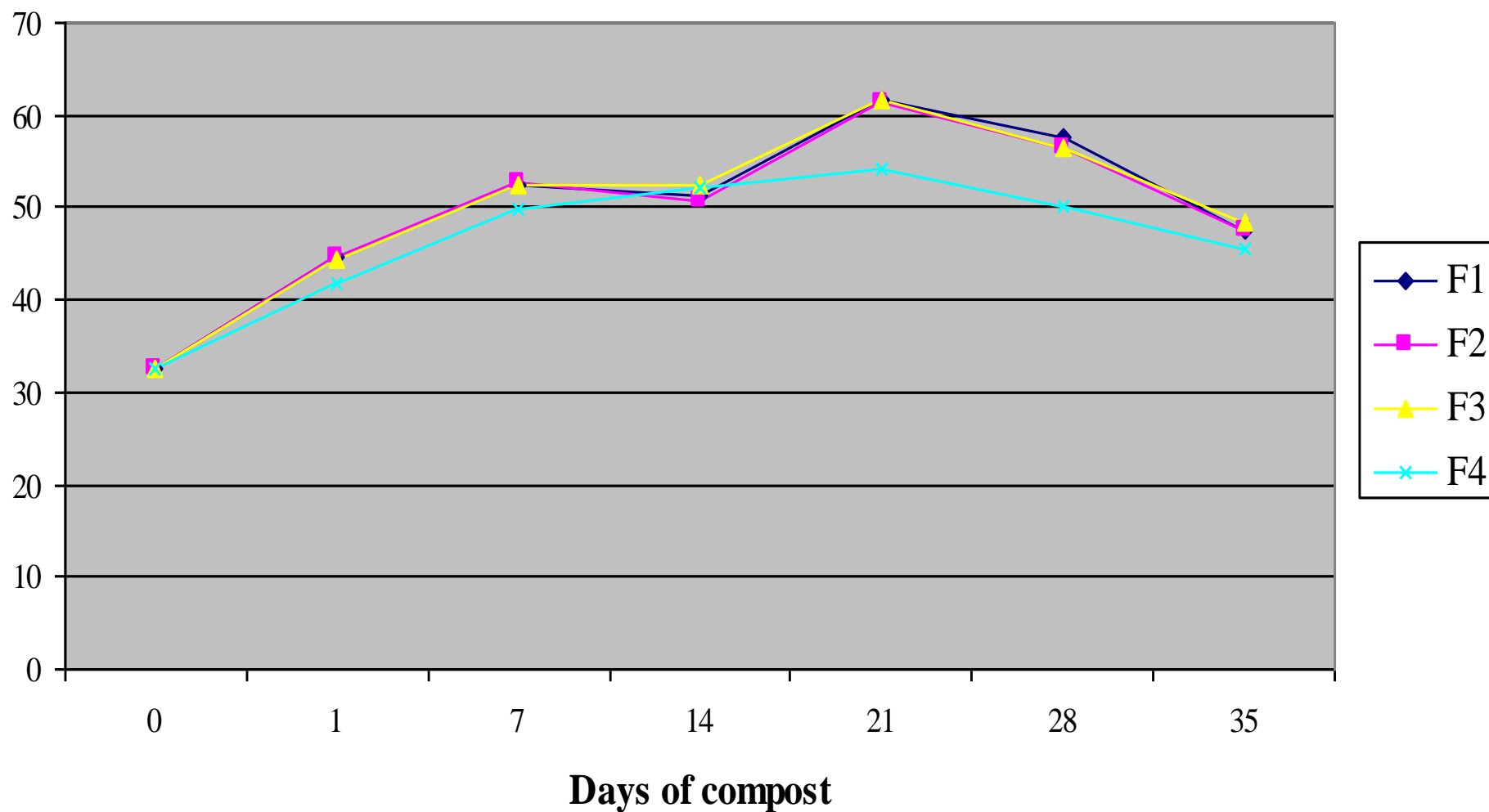




Table 5. Change of temperature of manure during the wet composting process

Days of compost	F1	F2	F3	F4
0	32.41	32.41	32.41	32.41
1	40.72±1.85	40.34±1.81	41.64±2.66	38.15±2.11
7	50.75±2.67	51.38±2.11	50.65±1.98	46.78±2.07
14	55.76±2.46	55.53±2.53	54.97±1.64	56.36±1.68
21	62.348±1.77	63.57± 1.67	62.92 ± 2.46	58.17 ± 2.32
28	58.43 ± 1.52	60.68 ± 2.05	59.46 ± 2.23	55.39 ± 2.09
35	46.79±2.34	46.34±2.43	47.39±1.71	42.17±1.85

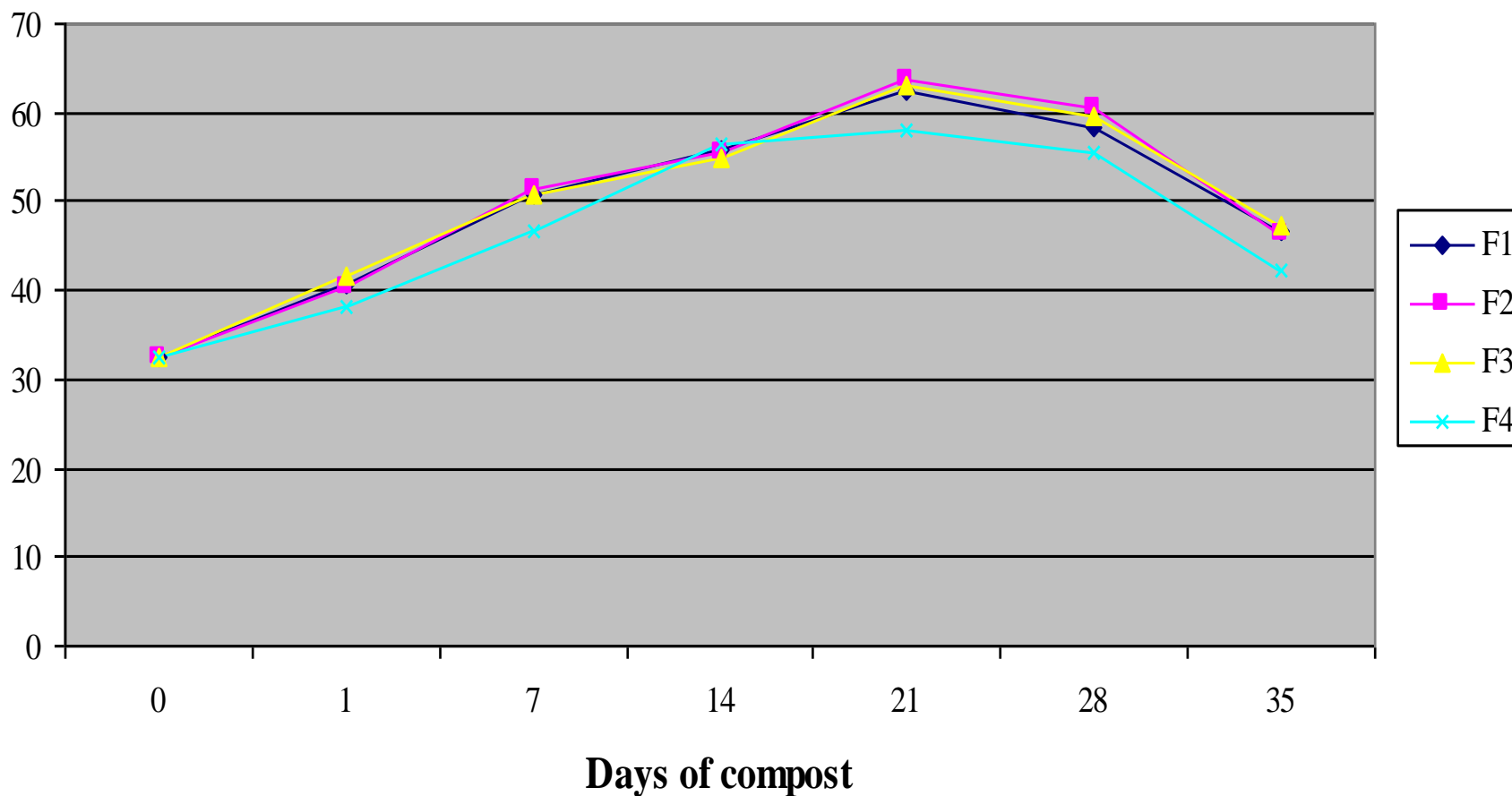


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Change of temperature of manure during the wet composting process





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Table 6. Nutritional compositions of chicken’s manure after 4 composting weeks

Nutritional composition (% DM)	F1	F2	F3	F4
DM	37.04 ± 0.35	70.45 ± 0.04	35.48 ± 0.04	71.28 ± 0.05
Protein	15.15 ± 0.02	16.00 ± 0.25	14.85 ± 0.24	14.03 ± 0.34
Total ash	16.56 ± 0.05	14.25 ± 0.45	17.53 ± 0.26	15.05 ± 0.26
Ca	6.05 ± 0.03	5.02 ± 0.04	7.35 ± 0.06	5.15 ± 0.42
P	0.85 ± 0.26	1.12 ± 0.04	1.35 ± 0.04	1.26 ± 0.02



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Nutritional compositions of chicken's manure after 4 composting weeks

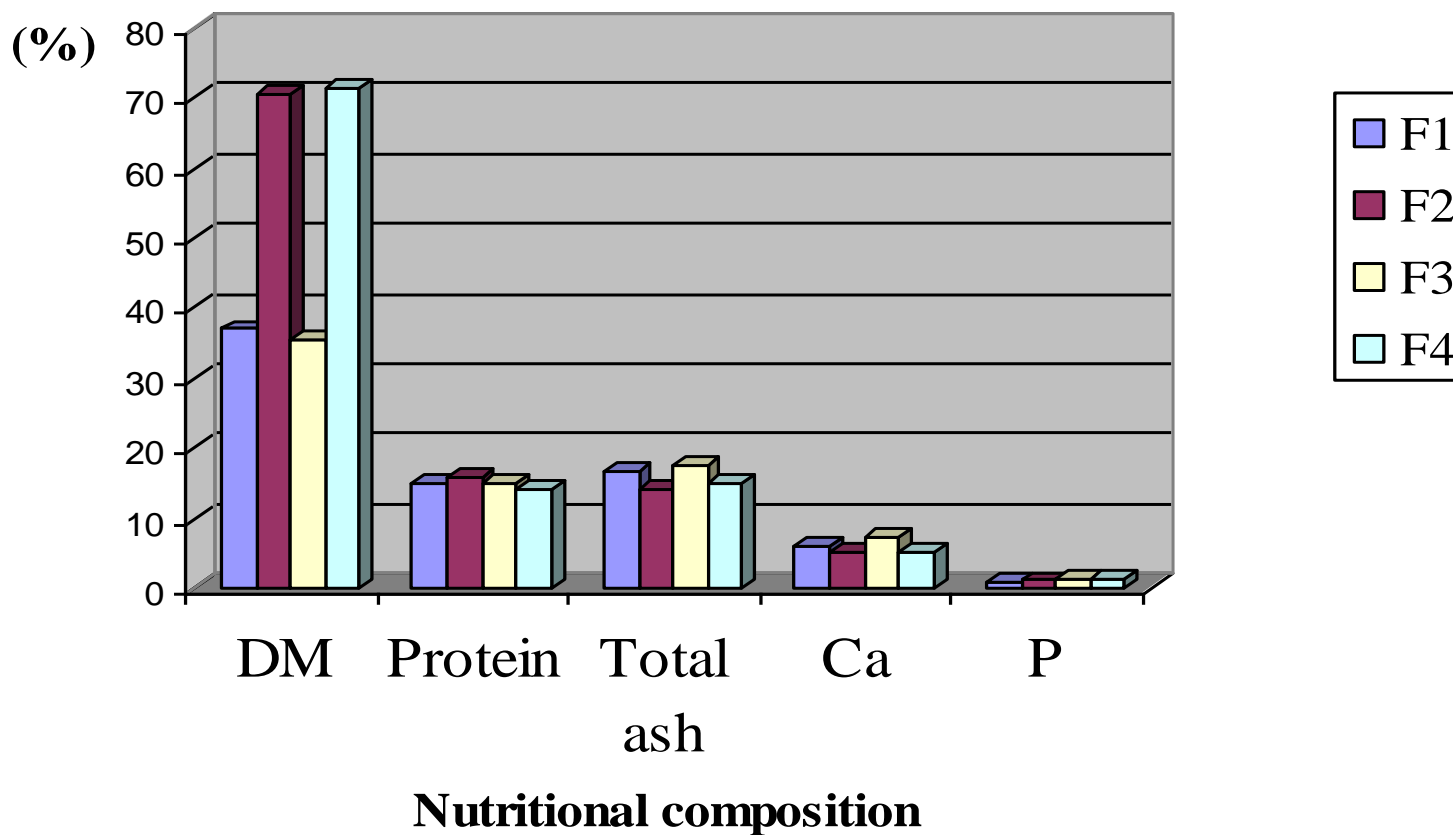




Table 6. Nutritional compositions of chicken’s manure after 5 composting weeks

Nutritional composition (% DM)	F1	F2	F3	F4
DM	36.55 ± 0.04	70.05 ± 0.03	35.15 ± 0.24	70.95 ± 0.5
Protein	14,95 ± 0,05	16,60 ± 0,02	14,25 ± 0,06	13,95 ± 0,04
Total ash	16,85 ± 0,02	14,64 ± 0,05	18,05 ± 0,27	15,45 ± 0,35
Ca	7.30 ± 0.03	5.46 ± 0.03	7.95 ± 0.27	6.01 ± 0.26
P	1.95 ± 0.05	1.52 ± 0.27	2.53 ± 0.24	1.85 ± 0.02

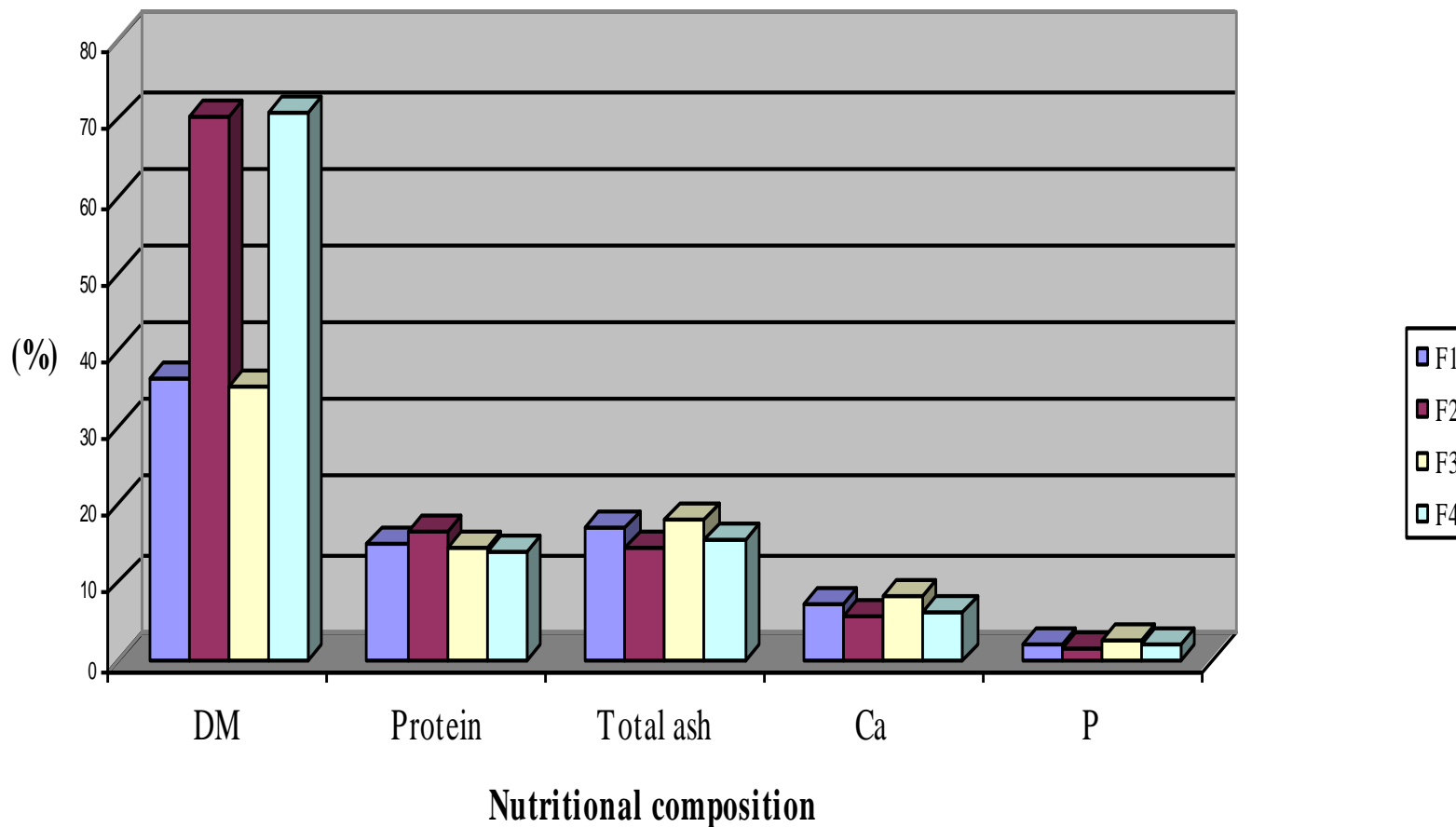


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Nutritional compositions of chicken's manure after 5 composting weeks





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Conclusions



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- Each year, 253,299 tons of manure were eliminated in the Red river delta
- Most of farming households used fresh manure for fish raising (55.86%), follow by crop planting (25.26%) and for rice cultivation(16.86 %).
- Weight of chicken manure reduced from 20 to 35 % while dry or wet composting
- The highest temperature of the composting pile after composting week reaches to 57-58 0C
- pH level of the composting pile decreased continuously (5,0-6,4%) after 5 weeks of dry or wet composting methods



- After 4 weeks of composting, color and smell of chicken manure are improved obviously
- Protein content in chicken manure was rather high (13.9- 16.6 %).
Content of DM, total ash, Ca, fibrous substances in were very considerable
- After composted, nutritional and biological value of chicken manure were enhanced obviously (best value after 4 weeks)
- Adding molasses, rice bran or cassava powder with EM enzyme can enhance nutritional value as well as sense perception of manure
- Chicken manure can completely be reused for animal feed, especially ruminating animals



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• Thank you for your attention!