The Supplementation Effect of Turmeric (*Curcuma domestica* Vahl.) and Brotowali (*Tinosporacrispa* L. Miers) Extract on Broiler Meat Quality

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ABSTRACT

The usage of natural feed additive be expected can increase meat quality and broilers performance. This research was aimed to study interaction effect of turmeric and brotowali extract feed supplementation on broiler meat quality.300 birds of Cobs broiler strain were used and separated on 50 pens with 6 birds each pen and maintained until 42 days old. The research was use factorial complete randomized design with first factor was turmeric extract levels (0; 0.2; 0.4; 0.6; and 0.8%), and the second factor was brotowali extract levels (0; 0.2; 0.4; 0.6; and 0.8%), so there was 25 treatment combinations with two replications. The research parameters were meat pH, cooking loss (CS), dry matter (DM), and organic matter (OM). Result of research showed that turmeric and brotowali extract supplementation have significant interaction effect on broiler meat DM content, but does not have effect on pH, CS, and OM content. Combination of 0.4% turmeric and 0.2% brotowali extract supplementation was provide highest DM content, meanwhile on individual effect, supplementation turmeric at 0.4% level has significant effect on SC parameter.

Key Words: Turmeric, Brotowali, Broiler, Meat Quality

INTRODUCTION

Broiler is familiar meat produce poultry in Indonesia. Customer selection of broiler tends to increase, when they prefer quality, soft, delicious, and low fat/ cholesterol meat (Kim et al. 2009). This issue was stimulating broiler farmers to use high quality, useful, high availability, easy to get and low cost of feed additive to produce safety consumed meat. Indonesia have abundant natural feed additive from medical plants to be used increasing broilers meat quality, two of them were turmeric and brotowali.The intended of feed additive application was to improve feed efficiency, production and poultry quality. Generally, feed additive which used was synthetic antibiotic. The excessive usage this type will be headed on antibiotic resistance, antibiotic meat residue, and hazardous on consumers. Commercial feed additive generally composed by synthetic compounds, that have harmful side effect, such as spoil of hormonal and immunity system (Cao et al. 2004).

Several research were conducted to substitute the usage of synthetic feed additive which can maintain even increase poultry health and production, one of them was utilized plant based natural antibiotic/phytobiotic. Turmeric (Curcuma domestica Vahl.) is type of plant that can use to substitute synthetic antibiotic because it's active and bioactive compound have similarities function with this synthetic one. Based on Rukmana (2001), curcuminoid compound on turmeric contain curcumin and its derivation having large spectrum of biological activity such as, antibacterial, antioxidant and antihepatotocsic. Brotowali was one of medical plant with natural chemical compound useful for human healthy like diabetic, malaria, hepatitis etc. Brotowali contain berberin, antimicrobial and columbine also others chemical compound as medicine such as, alkaloid, soft resin, glycoside, picroretocyd, picroretin biter, tinocrysposid, and coaculin (Lentera and Kresnadi, 2003).Turmeric and brotowali extract adding on feed be expected increase pH value, cooking shrinkage (CS), dry matter (DM), and organic matter (OM) of broiler meat.

MATERIAL AND METHODS

Research was conducted for 42 days with using 300 birds Cobb 500 broiler strain. The research was use factorial complete randomized design with first factor was turmeric extract levels (0; 0.2; 0.4; 0.6; and 0.8%), and the second factor was brotowali extract levels (0; 0.2; 0.4; 0.6; and 0.8%), so there was 25 treatment combinations with two replications. Based feed in this research was BP-11 Bravo(R) of PT. Charoen Pokphand (moisture content: 13% max; crude protein 21-23%; crude fat 5%; crude fiber 5% max; ash 7% max; and phosphorus 0.6% min).

The turmeric and brotowali extract were obtained from fresh turmeric tuber and brotowali stem material. Material was cleaned by water washing, thin slicing and soaking on 30^{o}C water for 20 minutes before juiced with composition 1:1 (g/g material: water). The obtained solution screened and deposited for two days. The sediment was dried on 60^{o}C oven until dry and milling to get turmeric and brotowali dry extract.

The research parameters were meat pH, cooking Loss (CS), dry matter (DM), and organic matter (OM).

RESULT AND DISCUSSION

Meat pH

pH value of 42 days old broiler meat is presented on Table 1.

Table 1. Broilers Meat pH

Turmeric Levels (%)	Brotowali Levels (%)					Average
	0	0.2	0.4	0.6	0.8	
0	5.33	5.37	5.16	5.33	5.32	5.30
0.2	5.27	5.35	5.31	5.34	5.36	5.32
0.4	5.41	5.10	5.49	5.54	5.35	5.38
0.6	5.44	5.24	5.13	5.27	5.27	5.27
0.8	5.48	5.31	5.44	5.37	4.98	5.31
Average	5.39	5.27	5.30	5.37	5.25	

Based on variance analysis showed that there was no interaction of combination and no significant individual effect (p>.05) of adding turmeric and brotowali extract on broiler meat pH. The pH value of broiler meat in this research about 5.25 – 5.56, and its lower while compare with Abdullah et al. (2010) that state 5.48 – 5.69 and Raharjo et al. (2015) with value 5.55. The result of research categorized as normal pH value of broiler meat.

Cooking Loss (CL)

Cooking Loss of 42 days old broiler meat is presented on Table 2.

Table 2. Broilers Meat Cooking Loss (%)

Turmeric Levels (%)	Brotowali Levels (%)					Average
	0	0.2	0.4	0.6	0.8	
0	15,00	10,00	15,00	15,00	15,00	14,00^{a}
0.2	10,00	20,00	10,00	20,00	15,00	15,00^{ab}
0.4	25,00	30,00	25,00	30,00	30,00	28,00^{b}
0.6	20,00	20,00	15,00	20,00	15,00	18,00^{ab}
0.8	20,00	20,00	30,00	15,00	25,00	22,00^{ab}
Average	18,00	20,00	19,00	20,00	20,00	

Different superscript on same column of table above show significant different (p<0.05)

Based on variance analysis showed that there was no interaction of combination ($p>.05$) turmeric and brotowali extract on broiler meat CL, however there is significant individual effect ($p<.05$) adding turmeric extract on broiler meat CL. The result showed adding 0.40% turmeric extract affected higestCL value (28.00%), it was higher when compare on Prayitno et al. (2010) with value 26.79%. This was suspected due to active compound in turmeric, curcumin and essential oil, which can increase CL value by bonding myofibril protein. The adding of plant extract contain curcumin and essential oil will be capable to increase CL value of broiler meat (Dono, 2010).

Meat Dry Matter (DM)

Meat dry matter percentage of 42 days old broiler meat is presented on Table 3.

Table 3. Broilers Meat Dry Matter (%)

Turmeric Levels (%)	Brotowali Levels (%)					Average
	0	0.2	0.4	0.6	0.8	
0	25.91^{hij}	23.15^{ab}	25.04^{efg}	25.35^{ghi}	25.85^{hij}	25.06
0.2	23.82^{abc}	25.38^{ghi}	24.87^{efg}	25.14^{gh}	25.14^{fgh}	24.87
0.4	25.60^{ghi}	26.78^{ij}	24.1^{cdef}	2.02^{a}	24.85^{efg}	24.87
0.6	24.17^{cdef}	23.88^{abcd}	25.48^{ghi}	26.28^{ij}	24.71^{cdefg}	24.90
0.8	24.77^{defg}	24.80^{defg}	24.02^{bcde}	24.12^{cdef}	25.65^{ghi}	24.67
Average	24.85	24.80	24.70	24.78	25.24	

Different superscript on table above show significant different ($p<.05$)

Based on variance analysis showed that there was interaction significant effect ($p<.05$) of turmeric and brotowali extract adding on broiler meat DM percentage. The best DM percentage was obtained on combination of 0.4% turmeric and 0.2% brotowali extract combination (26.78%). It seems due to turmeric and brotowali extract content, the active compound curcumin, essential oil, flavonoid, tannin and saponin, capable to increase meat DM. In contrast with Estancia et al. (2012), adding turmeric extract as single additive cannot increase DM meat with value 24.69%.

Meat Organic Matter (OM)

Meat organic matter percentage of 42 days old broiler meat is presented on Table 4.

Table 4. Broilers Meat Organic Matter (%)

Turmeric Levels (%)	Brotowali Levels (%)					Average
	0	0.2	0.4	0.6	0.8	
0	95.47	95.34	77.24	9.77	95.10	91.78
0.2	95.00	95.71	52.07	95.63	95.65	86.81
0.4	95.46	95.03	95.46	95.40	94.91	95.25
0.6	94.25	94.59	94.74	95.64	95.68	94.98
0.8	95.13	95.44	94.95	95.33	95.11	95.19
Average	95.06	95.22	82.89	95.55	95.29	

Based on variance analysis showed that there was no interaction of combination and no significant individual effect ($p>.05$) of adding turmeric and brotowali extract on broiler meat OM. Turmeric and brotowali extract adding which contain active compound such as curcumin, essential oil, flavonoid, tannin and saponin, on broiler feed, expected increase feed intake/ consumption and poultry antioxidant. The combination of two extracts didn't affect meat OM. Another research on garlic and temulawak extract combination supplementation, with active compound like as curcumin,

essential oil, flavonoid, tannin and saponin, didn't give any significant effect on broiler meat OM percentage (Dono, 2012).

CONCLUSION

Supplementation of turmeric and brotowali extract have significant interaction on broiler meat DM percentage, but didnt have effect on pH, CL, and broiler meat OM. The best DM percentage was obtained on combination of 0.4% turmeric and 0.2% brotowali extract combination. On individually, turmeric extract have significant effect on CL, which is adding 0.4% was the best level.

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