Potential of Local Microalgae as A Natural Antioxidant to Produce 
Asuh Broiler Meat

Salvia 1, Mirzah2, Yetti Marlida2, Endang Purwati2

1 Program Study of Animal Science, Polytechnic of Agricultural, Andalas University, Payakumbuh
E-mail: xxx@yyy.zzz

2 Faculty of Animal Science, Andalas University Padang, West Sumatera, Indonesia
E-mail: salviasani@gmail.com

Abstract— Feed quality for food safety. To produce ASUH (safe, healthy, whole and halal) food from broiler, it should be fed with quality ration that free from chemical residues derived from synthetic antioxidants such as BHT, BHA and antibiotic for the meat contained residue that will cause negative effect. Microalgae has the potential to be used as natural supplement because it contains nutrients, antioxidant, cholesterolemic effect and plant growth regulator. Objectives of this study is to exploit natural antioxidant substance in local microalgae extract as natural supplement for broiler. This research used local microalgae collected from water of the pond located around chicken farm in Nagari Mungka, 50 Kota District. DPPH free radical absorbance method used to test antioxidant activity, while ascorbic acid (Vitamin C) used as comparison, and was tested to broiler to oversee its performance. Best concentration tested to broilers and its performances was observed. The result of study; Local microalgae extract has ability to inhibit DPPH free radical by concentration at 80 µg/ml which is equal to 6 µg/ml of Vitamin C. The performance after giving microalgae as antioxidant is better than Vitamin C because it contains nutrition and others secondary metabolic such as antimicrobial, cholesterolemic effect and plant growth regulator. Local microalgae is potential as source of natural antioxidants for producing ASUH broiler meat.

Keywords— Microalgae, Antioxidant Activity, ASUH Chicken Meat.

I. INTRODUCTION

This Feed quality for food safety. To produce ASUH (safe, healthy, whole and halal) food from broiler, it should be fed with quality ration that free from chemical residues derived from synthetic antioxidants such as BHT, BHA and antibiotic for the meat contained residue that will cause negative effect. Broiler meat is one food that is declared less safe for consumers because it is assumed to contain high cholesterol and chemical residues derived from feed additive which added to commercial rations in order to trigger the growth of chickens and as a preservative. The residue of feed additive left inside the chicken and this will trigger the development of a disease such as hypertension, coronary heart disease and cancer for those who consume it.

Considering the dangers of chemical residues, there should be an exploration of the natural ingredients that are safer to feed suplement. Many reports say that microalgae contains active compound such as antibiotic, antiviral, cytotoxic and antimitotic activities. Microalgae is known to contain antioxidant molecules, such as ascorbate and glutathion (GSH), including carotenoid (Yuan at al, 2005). Microalgae has the potential to be used as natural antioxidant. It is also contains nutrients, cholesterolemic effect and plant growth regulator (Kamase, 2007). Thus, the objectives of this study is to exploit natural antioxidant substance in local microalgae extract as natural supplement for broiler.

II. MATERIAL AND METHOD

This research used local microalgae collected from water pond located around chicken farm in Nagari Mungka, 50 Kota District. DPPH free radical absorbance method used to test antioxidant activity by Vachos et al (1996), while ascorbic acid (Vitamin C) used as comparison, and was tested to broiler to oversee its performance. The examination of antioxidant activity on local microalgae with concentration; 10 µg/ml, 20 µg/ml, 40 µg/ml, 60µg/ml, 80µg/ml dan 100 µg/ml. Concentration of ascorbic acid are: 1 µg/ml, 2µg/ml, 3µg/ml, 4 µg/ml, 5µg/ml dan 6 µg/ml. A 10 mg extract dissolved with 10 ml methanol in a 10 ml
erlemeyerad to produce 1 µg/ml concentration. Methanol was added to dilute it in order to get sample with varying concentrations (10, 20, 40, 60, 80 and 100 µg/ml). The determination of antioxidant activity of each concentration done in micro pipette and poured into the vial. Then, a 3.8 ml DPPH 50 µM solution added. The mixture was homogenized and stored in dark room for 30 minutes. The absorbance measured by means spectrophotometer UV-VIS at 515 nm wave length. Ascorbic acid (concentration 1,2,3,4,5,6 µg/ml) used as comparison.

Best concentration tested to broilers and its performances was observed. There were 75 DOC broilers used as sample of the research. Best concentration of microalage gained from DPPH free radical inhibition test, which is biologically tested and its performance was observed. As comparison Vitamin C with equivalent concentration with above test result used. The Complete Random Design with 3 treatments and 5 replication used in this research.

Sample antioxidant activity was determined by the rate of DPPH free radical absorbance inhibition by calculating the percentage of DPPH absorbance inhibition using the following formula:

\[
\% \text{ Inhibition} = \frac{\text{Abs control} - \text{Abs Sample}}{\text{Abs Control}} \times 100\% \tag{1}
\]

Explanation:

Abs control : 50 µM DPPH free radical absorbance at 515 nm wave length.
Abs sample : sample absorbance to 50 µM DPPH free radical at 515 nm wave length.

Result data of biological test processed with mini Tab software.

### III. RESULTS AND DISCUSSION

#### A. Antioxidant activity

Table 1 shows antioxidant activity of micro algae extract and Vitamin C using DPPH method while Table 2 exhibits performance of broiler given microalgae supplement for 4 weeks.

| Comparison | Concentration µg/ml | Absorbance | % Inhibition |
|------------|---------------------|------------|--------------|
| Microalgae |                     |            |              |
| 10         | 0.238               | 57.64      |
| 20         | 0.191               | 65.83      |
| 40         | 0.143               | 74.55      |
| 60         | 0.118               | 78.94      |
| 80         | 0.045               | 89.56      |
| 100        | 0.041               | 92.88      |
| Vitamin C  |                     |            |              |
| 1          | 0.322               | 23.34      |
| 2          | 0.314               | 33.88      |
| 3          | 0.297               | 49.55      |
| 4          | 0.189               | 54.01      |
| 5          | 0.109               | 79.86      |
| 6          | 0.062               | 88.25      |

Local microalgaee extract has ability to inhibit DPPH free radical by concentration at 80 µg/ml, which is equal to 6 µg/ml of Vitamin C. The performance after giving microalgae as antioxidant is better than Vitamin C because it contains nutrition and others secondary metabolic such as antimicrobial, cholesterolimic effect and plant growth regulator.
TABLE I
PRODUCTION OF ASUH BROILER NEAT RAISED FOR 4 WEEKS

| Component          | Feed Consumption | Body Weight | Feed Conversion |
|--------------------|------------------|-------------|-----------------|
| Non supplement     | 1578.00 a        | 1075.00 a   | 1467.00 a       |
| Local microalgae   | 1587.00 a        | 1313.00 b   | 1212.00 b       |
| Vitamin C          | 1654.00 a        | 1275.00 ab  | 1297.00 c       |

Mean values with different superscripts in the same column are significantly different (p≤0.05)

IV. CONCLUSIONS

Local microalgae is potential as source of natural antioxidants for producing ASUH broiler meat.

REFERENCES

[1] Angka, T. Soeharto. 2000, Pengaruh konsentrasi nutrien terhadap pertumbuhan dan produktivitas Chlorella sp pada kultur semikontinyu. LIMNOTEK 2(1) (1994) 33–43.

[2] Anonim. 2004, Porphyridium cruentum composition. www.necton.pt/Algae, 11 mei 2004
[3] Basri, J., 1994. Blooming Fitoplankton, Fakultas Perikanan, Institut Pertanian Bogor, Bogor.
[4] Becker FW. 1994. Microalgae biotechnology and microbiology. New York: Cambridge University Press.
[5] Borowitzka MA, Borowitzka LJ. 1988. Mikroalgal biotechnology. Cambridge: Cambridge University Press.
[6] Bornwitzka. al. 1998. An antibacterial and antiviral produced by Enterococcus mundtii ST4V isolated from soya beans. Int. J. of Antimicrobial Agents 25: 508-513
[7] British Pharmacopeia commision. 1993. British pharmacopeia. Vol. II. London: Her Majesty’s stationery office, hal. 167–8.