QUALITY AND STORAGE CHARACTERISTICS OF CHICKEN PATTIES WITH *ROBINIA PSEUDOACACIA* HONEY

Sehyuk Oh[1], Sanghun Park[1], Yunhwan Park[1], Gyutae Park[1], Nayoung Choi[1], Youngho Lim[1], Taeyeon Moon[2], and Jungseok Choi[1*]

[1]Department of Animal Science, Chungbuk National University, Republic of Korea

[2]Orge, Agricultural corporation, Republic of Korea

*Corresponding author email: jchoi@chungbuk.ac.kr

I. INTRODUCTION

Adding sugar to meat products not only reduces spoilage organisms but also retains moisture in the product, stabilizes emulsion, and prolongs the keeping time by improving storage characteristics [1]. Antioxidants and antimicrobials of natural sources are attracting attention in the food industry [2]. Honey is a natural substance produced when the nectar and sweet deposits from plants are gathered, modified and stored in the honeycombs by honeybees [3]. Meda et al. [4] reported that honey is accepted as a reputable and effective treatment by practitioners of conventional medicine and by the general public. Honey, sweet and fragrant natural product, is highly consumed because of its high nutritional value and beneficial effects on human health with antioxidant, bacteriostatic, anti-inflammatory and antibacterial properties [5, 6]. So, honey was selected as a natural product to be added to meat products in this experiment. The purpose of this study is to develop honey-added chicken patties with improved quality and storage characteristics by finding the appropriate level of acacia honey added.

II. MATERIALS AND METHODS

Table 1 shows formulations of chicken patties with *Robinia pseudoacacia* honey (Nonghyup, Seoul, Korea). As quality characteristics, cooking loss (CL), water holding capacity (WHC), and texture profile of chicken patties were measured. As storage characteristics, pH, 2-thiobarbituric acid reactive substance (TBARS) and total microbial count (TMC) were measured on chicken patties were stored at 4°C for 0, 4, 7, and 14 days. All statistical analyses including Duncan's multiple range test were carried out using SAS Statistical Package 9.4 (SAS, 2003). *p*-values <0.05 indicated significant differences.

Table 1 The formulations of chicken patties with *Robinia pseudoacacia* honey

Item	C (Honey 0%)	T1 (Honey 0.1%)	T2 (Honey 0.5%)	T3 (Honey 1%)
Chicken patty[1] (g)	1250	1250	1250	1250
Robinia pseudoacacia honey (g)	0	1.25	6.25	12.5

[1]: Chicken breast (24%), Chicken leg (56%), Skin (4.29%), Defatted soy protein (2.14%), Water (8.57%), Salt (1.2%), Raw rice bran powder (3.8%)

III. RESULTS AND DISCUSSION

Table 2 is results of texture profile analysis of chicken patties with *Robinia pseudoacacia* honey. According to study of Mir et al. [7], hardness and chewiness are affected by various factors, such as fat content, moisture content and pH reducation. Figure 1 is comparison of pH, TBARS, TMC values of chicken patties with *Robinia pseudoacacia* honey after storage at 4°C for 0, 3, 7, and 14 days. T3 showed significantly ($p < 0.05$) lower pH value than others at 14 day. Honey may have affected the product's pH, as it contains various organic acids, which give an average pH of 3.9 [8]. T3 showed significantly ($p < 0.05$) lower TBARS values than others at 7, 14 days. The maillard reaction is facilitated by reducing sugars from the honey, and the Maillard reaction product inhibits lipid oxidation [9]. McKibben et al. [10] showed similar results that adding 1% honey to turkey meat was effective in reducing lipid oxidation from day 3 onwards. There are no significant differences in TMC between C and T3 at all days.

Table 2 Results of texture profile analysis of chicken patties with *Robinia pseudoacacia* honey

Item	C	T1	T2	T3	SEM	*p*-value
Hardness (kg)	1.47^{b}	1.75^{a}	1.75^{a}	1.69^{ab}	0.05	0.090
Springiness (%)	53.9	52.8	62.7	61.9	1.85	0.093
Cohesiveness (%)	33.9^{ab}	30.0^{b}	37.8^{a}	34.6^{ab}	0.94	0.001
Chewiness (kg)	0.50^{c}	0.52^{ab}	0.66^{a}	0.58^{ab}	0.03	0.027

$^{a-c}$: Means ± SD with different superscripts in the same row differ significantly ($p < 0.05$, n = 3)

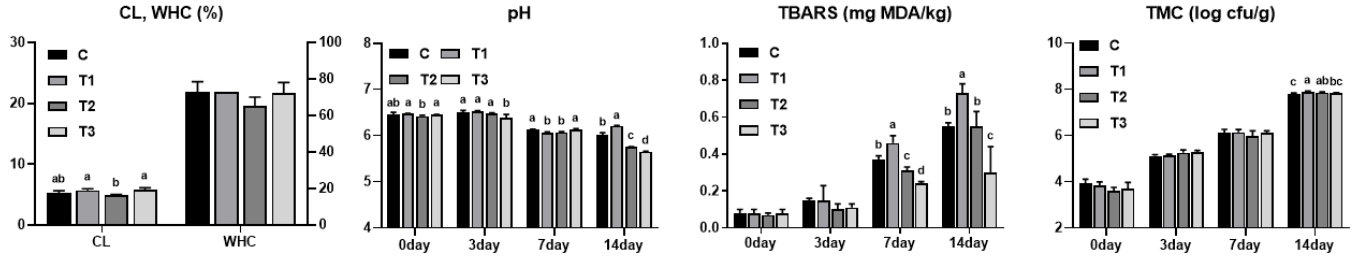

Figure 1. Comparision of CL, WHC, pH, TBARS, TMC values of chicken patties with Robinia pseudoacacia honey. $^{a-d}$: Least square means with different letters within the same treatments are significantly different ($p < 0.05$)

IV. CONCLUSION

Adding 1% of *Robinia pseudoacacia* honey has a positive effect on chicken patty storage characteristics. The development of chicken patties with 1% honey added will meet consumer needs and create high value-added meat products.

ACKNOWLEDGEMENTS

This research was supported by “Regional Innovation Strategy (RIS)” through the National Research Foundation of Korea (NRF) funded by the Ministry of Education (MOE)(2021RIS-001).

REFERENCES

1. Kraybill, H. R. (1955). Sugar and other carbohydrates in meat processing. In Eisenberge, S., Use of sugars and other carbohydrates in the food industry (pp 83-88). Washington: Advances in chemistry.
2. Karre, L., Lopez, K. & Getty, K. J. (2013). Natural antioxidants in meat and poultry products. Meat science 94: 220-227.
3. Al-Jabri, A. A. (2005). Honey, milk and antibiotics. African Journal of Biotechnology 4: 1580-1587.
4. Meda, A., Lamien, C. E., Millogo, J., Romito, M. & Nacoulma, O. G. (2004). Therapeutic uses of honey and honeybee larvae in central Burkina Faso. Journal of ethnopharmacology 95: 103-107.
5. Manyi-Loh, C. E., Clarke, A. M. & Ndip, R. N. (2011). An overview of honey: Therapeutic properties and contribution in nutrition and human health. African Journal of Microbiology Research 5: 844-852.
6. M Alvarez-Suarez, J., Giampieri, F. & Battino, M. (2013). Honey as a source of dietary antioxidants: structures, bioavailability and evidence of protective effects against human chronic diseases. Current medicinal chemistry 20: 621-638.
7. Mir, N. A., Rafiq, A., Kumar, F., Singh, V., & Shukla, V. (2017). Determinants of broiler chicken meat quality and factors affecting them: a review. Journal of food science and technology 54: 2997-3009.
8. Chick, H., Shin, H. S. & Ustunol, Z. (2001). Growth and acid production by lactic acid bacteria and bifidobacteria grown in skim milk containing honey. Journal of Food Science 66:, 478-481.
9. Bailey, M. E. & Um, K. W. (1992). Maillard reaction products and lipid oxidation. In Allen J. St. Angelo., Lipid oxidation in food (pp 122-139). Washington: American chemical society.
10. McKibben, J. & Engeseth, N. J. (2002). Honey as a protective agent against lipid oxidation in ground turkey. Journal of Agricultural and Food Chemistry 50: 592-595.