

# EFFECT OF POLYPHENOLS ON FORMATION OF BENZO(A)PYRENE IN CHARCOAL-GRILLED MEAT

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## I. INTRODUCTION

In recent years, Barbecue has been more and more popular in China. Because it has a clear beneficial impact, the improvement of flavor. However, carcinogens such as polycyclic aromatic hydrocarbons (PAHs) are produced. PHAs are a class of aromatic compounds formed by incomplete combustion or pyrolysis of organic materials, that is why higher PAH contents in grilled and smoked meat products. People exposure to these substances can lead to skin cancer, lung cancer and stomach cancer. Due to their toxicity in human health, the EU has chosen eight priority PAHs as an indicator of carcinogenic, moreover Benzo(a)pyrene has been pointed as a group I carcinogen.

In the past few years, more and more attention was given to the inhibition of PAHs' formation and meat marinating has become a popular method. Beer, wine, tea and lemon, naturally rich in phenolic compounds can reduce PAHs in processed meat has been conformed. Nevertheless, information about what kind of polyphenol has effect is still a challenge for researchers. Thus the aim of this research was to evaluate the influence of polyphenols on formation of B(a)p in charcoal-grilled chicken wings.

## II. MATERIALS AND METHODS

Marinades were polyphenols solutions (mg/L), 3 kinds of polyphenol (Gallic acid, Ferulic acid and (+)Catechin) were selected. Marinating conditions described by Viegas et al (2014) [1] and Chong et al (2017) [2] were selected. Grilled sample codes as the followed: ctrl (marinated in distilled water), R-ctrl (unmarinated), CG, CF, CC (chicken wings marinated in solution of Gallic acid, Ferulic acid and (+)Catechin, respectively).

The DPPH radical scavenging assay was performed according to the method of Chong et al. (2017) Extraction were performed according to Viega et al. (2014).

## III. RESULTS AND DISCUSSION

The DPPH radical-scavenging activities (before and after marinating) showed in figure 1. Error bars represent deviation obtained from triplicated experiments.

As can be seen, before marinating, the strongest scavenging activity was found in CC (21%), followed by CF (13%) and CG (7%). After marinating, the strongest scavenging activity was found in CC (15%), followed by CF (12.5%) and CG (7.5%). The decrease was found for CC and CF and CG was increased.

CF and CG had no significant change after marinating, however a significant change was found in CC,

and CC exhibited a significantly higher value than others, this result was correspond with the decrease of B(a)P content after marinating. Maybe interactions between Catechin and oxidative species of meat Surface occur.

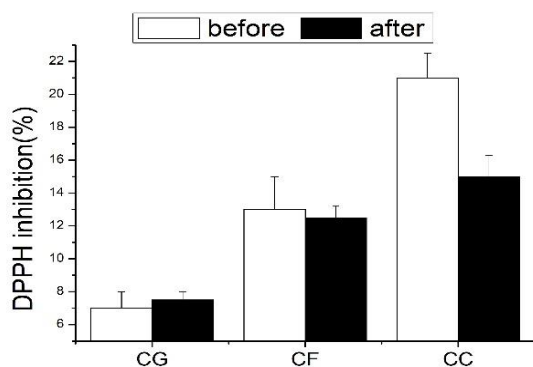


Figure 1. The DPPH radical-scavenging activities

Table 1: B(a)P formation on charcoal-grilled chicken wings

Treat	B(a)P (ng/g wet weight grilled meat)
CF	2.29 ± 0.19b
CG	4.18 ± 0.38a
CC	1.43 ± 0.52c
Ctrl	1.24 ± 0.47c
R-ctrl	1.49 ± 0.47c

Result are presented as the mean ± standard deviation, n=3. Means with different letters in the same row are significantly different ( $p < 0.05$ )

The content of B(a)P in chicken wings were show in table 1. The content of R-ctrl was around 1.9 ng/g. B(a)P was still formed in marinated samples, however the sum was changed in these samples. Compared with R-Ctrl, the decrease was found for CC and ctrl. As for CC, the result is in agreement with Saerom et al. (2018). [3] According to the author the amount of PAHs decreased as the concentration of EGCG increased. Water also has the effect of inhibition on formation of B(a)P, the result correspond with previous papers, the reason maybe water provide an oxygen source while heating. The content of B(a)P in CF(2.29ng/g) and CG(4.18 ng/g) was increased compared with R-ctrl, it is due to the pyrolysis of polyphenols may contribute to the formation of PAHs, according to McGrath et al. (2001)

#### IV. CONCLUSION

In this study, the DPPH scavenging activity and formation of B(a)P (affected by polyphenol solution) were evaluated, the correlation between them suggests that the radicals from polyphenols affect the formation of B(a)P. further study are required to research which kind of radical is the contributor to B(a)P formation.

#### ACKNOWLEDGEMENTS

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