PHENOLIC CONTENT AND ANTIOXIDANT CAPACITY OF MINCED PORK TREATED WITH MESQUITE HONEY

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I. INTRODUCTION

Mexico is the fifth largest honey exporter worldwide and the beekeeping industry has significant social and economic implications with approximately 43,000 beekeepers that produce around 61,000 tons of honey annually [1]. Honey has been valued for centuries not only for its sensory attributes like flavor, but also for its nutraceutical properties [2]. Honey exhibits a remarkable ability to neutralize free-radicals responsible for oxidative stress in the human body. This antioxidant potential of honey makes it an attractive option to treat diseases related to oxidative stress, such as cancer and heart disease [2,3]. In addition, honey contains antimicrobial and antioxidant compounds that can offer effective protection against oxidative deterioration of foods, prolonging their shelf-life without compromising food quality and safety [3]. However, it has been reported that the floral origin plays a very important role in the chemical composition and biological properties of honey [4]. The aim of this study was to investigate the potential use of mesquite honey as an antioxidant and antimicrobial additive for minced pork meat.

II. MATERIALS AND METHODS

Honey samples (2.5 L each) derived from blossoms of the Velvet mesquite (from *Prosopis velutina*) were collected from two apiaries located at two municipalities (Pueblo de Álamos and Carbó) of the Sonoran Desert, Northwestern México. Upon arrival to the laboratory, honey samples were diluted with water (1:10) at 10,000 rpm/25 °C/1 min. The resultant solutions (MH1 and MH2) were analyzed for total polyphenols contents (phenolics, TPHC; flavonoids, TFC; tannins, TTC), Free-Radical Scavenging (FRSA) and reducing power activities (RPA and FRAP). Minced pork samples (*M. semimembranosus*, 24 h *postmortem*; 1.5% salt; 10% fat) were allocated to four treatments (Control with no antioxidant; MH1 and MH2, mesquite honey from apiaries #1 and #2, at 500 ppm; and Butylhydroxytoluene at 500 ppm as a positive control (BHT-Std), cooked in a water bath (65 °C for 60 min), and assessed for pH and thiobarbituric acid reactive substances (TBARS) [5,6]. Data (n=6) were subjected to ANOVA and Tukey-Kramer's multiple comparison tests at $P<0.05$ (NCSS v11).

III. RESULTS AND DISCUSSION

As shown in Table 1, MH2 showed higher TPHC, TFC, and TTC values than MH1 ($P<0.05$). Regarding antioxidant activity, the BHT-Std showed the highest FRSA values ($P<0.05$) and no differences were detected between honey-added samples ($P>0.05$). Concerning reducing power activities, the BHT-Std showed the highest FRAP and RPA values ($P<0.05$), and the comparison between honey-added treatments indicated higher values ($P<0.05$) for MH2. As depicted in Figure 1, meat samples treated with antioxidants did not vary in pH (MH1 = MH2 = BHT-Std; $P>0.05$) whose values were slightly higher than their control counterparts ($P<0.05$). Also, MH2 showed the lowest TBARS values as compared

to other treatments (P<0.05). In agreement with the current results, it has been evidenced that honey exerts antioxidant properties associated to the presence of phenolic, flavonoid,s and tannins [4,5]. In addition, it has been reported that the inclusion of Japanese honey species in fresh beef, pork, and chicken reduced the development of oxidative compounds [7].

Table 1 – Polyphenol's content and measurements of antioxidant activity of Mesquite honey.

Item	TPHC	TFC	TTC	FRSA	FRAP	RPA
MH1	102.50±2.88[a]	46.67±1.37[a]	8.67±0.52[a]	24.17±0.75[a]	0.05±0.01[a]	0.11±0.01[a]
MH2	119.67±1.37[b]	99.08±0.92[b]	12.10±0.91[a]	24.33±1.21[a]	0.10±0.01[b]	0.15±0.01[b]
BHT-Std.	ND	ND	ND	87.33±0.52[b]	1.04±0.05[c]	0.82±0.02[c]

ND: No determined.

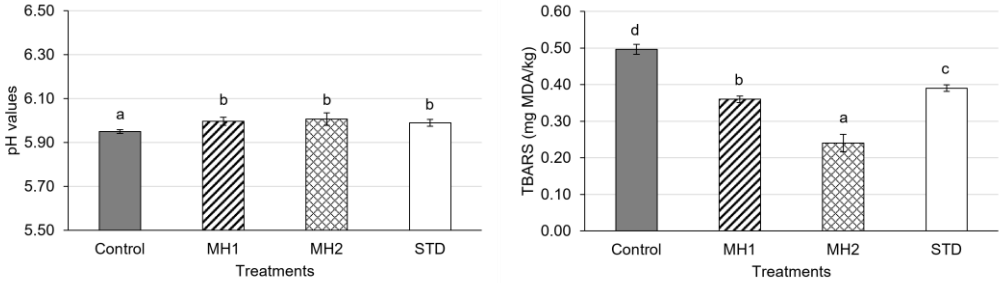

Figure 1. Effect of treatment on pH and TBARS values of cooked minced pork.

IV. CONCLUSIONS

The polyphenol content of the mesquite honey collected in Northwestern Mexico is influenced by its provenance. Mesquite honey is a source of antioxidant compounds that deserves to be proposed as a potential, natural additive for pork products but it should be noted that in this experiment its resultant antioxidant activity is far from being comparable to that of the BHT.

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