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RESTAURANT CONSUMER ACCEPTABILITY OF GRILLED EMU STEAK

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Background

An upsurge of interest in emu as a meat source has occurred as a result of the transition of the emu industry from a breeder to a commercial market. The meat has been characterized as having the flavor of beef and is a good source of protein and minerals. Emu meat is lower in total fat and cholesterol than an equivalent serving of beef (Frapple and Hagan, 1992). While consumer acceptability studies of innovative meat sources have been published, no data exists in the scientific literature concerning restaurant consumer response to emu meat. Therefore, the objective of this study was to determine restaurant consumer acceptance of grilled emu steaks.

Methods

Meat. Thirty emus were slaughtered at the Meat Science Laboratory, Texas Tech University (Lubbock, TX). After a 24-h chill, carcasses were divided according to Bulletin 4266 of the Australian Quarantine and Inspection Service (1993). Based on data collected by Thompson et al. (1994), the fan fillet, flat fillet, flat rump, full rump, inside drum, mid drum, outside drum, and outside fillet were fabricated into steaks, 2.0 cm-thick and weighing 170 grams. Each steak was vacuum-packaged and labeled to indicate the muscle and bird from which the steak was obtained. The steaks were frozen at -20°C and held for 17 d. Prior to evaluation, steaks were thawed for 24 h at 3°C.

Consumer Panel. Potential panelists were invited, via campus mail, to participate in a meat quality study. After 92 consumers agreed to participate, emu was identified as the meat to be evaluated, and a steak was randomly assigned to each consumer.

Test Meal. The emu steaks were evaluated at Skyviews of Texas Tech (Lubbock, TX), the university's 120-seat upscale restaurant laboratory. Upon arrival, panelists were seated, and steaks were pulled from the refrigerator according to panelist numbers. After the appetizer and salad courses, steaks were grilled on a Star-Max Broiler (Star Manufacturing International Inc., Smithville, TN), to a medium degree of doneness (70°C). Steaks were seasoned with lemon pepper, and a pick labeled with a five-digit number was inserted in each steak. The steak was served with accompaniments.

Consumer panelists rated the emu steak on a 9-point hedonic scale for the quality attributes of appearance, aroma, flavor, juiciness, and tenderness and overall acceptability. Each panelist also ranked the importance of the five attributes for meat quality. The service manager collected the evaluation forms and offered a glass of wine to the panelists. At the completion of the entree course, dessert and coffee were served.

Statistical Analysis. The data were analyzed using SAS (1990). Means and standard deviations were determined for each quality attribute and overall acceptability and for the ranking of the importance of the quality attributes. GLM procedures of SAS (1990) were used to analyze the effect of demographic variables on the quality attribute ratings. Least square means were separated by least significant differences. Four probability levels ($P < .10$, .05, .01, and .001) are provided in the text.

Results and Discussion

Consumer Rankings of Attributes. Based on a maximum ranking of 5, flavor (4.5) and tenderness (3.5) were the two most important quality attributes. Juiciness received a 3.0 importance ranking, followed by appearance (2.1) and aroma (1.9). Consumers typically rate tenderness as the most important meat quality attribute (Dikeman, 1987). Perhaps the higher importance ranking of flavor in the present study is based on concerns that an unfamiliar meat might have off-flavors.

Consumer Acceptability Ratings. Table 1 indicates flavor received the highest mean rating; tenderness received the lowest rating. Variability was highest for juiciness and tenderness. The overall acceptability rating of emu steaks was 6.90; a score of 7 indicated "like moderately".

Acceptability ratings based on consumer gender did not differ for appearance, aroma, juiciness, tenderness, or overall acceptability. The males gave flavor a rating of 7.48, which was higher ($P < .10$) than the acceptability rating of 6.96 by females.

Table 1. Means and standard deviations of consumer acceptability ratings of grilled emu steaks[a]

Attribute (n= 92)	Mean	SD
Appearance	7.02	1.55
Aroma	7.00	1.54
Flavor	7.34	1.48
Juiciness	6.09	2.29
Tenderness	5.23	2.25
Overall Acceptability	6.90	1.75

[a]9-point hedonic scale (1=dislike extremely; 5=neutrality; 9=like extremely).

As Table 2 indicates, consumers, 40 to 49 years old, gave flavor the highest mean rating. This rating differed from the ratings of the youngest ($P < .01$) and oldest consumer groups ($P < .05$). The 40 to 49 year group's juiciness rating was higher ($P < .05$) than the 21 to 29 years, 50 to 59 years, and 60 years or older groups and higher than the 30 to 39 year group ($P < .10$). The 40 to 49 year group's rating for tenderness was higher ($P < .01$) than the 21 to 29 group, higher ($P < .05$) than the 60 years or older group, and higher ($P < .10$) for the 30 to 39 and 50 to 59 year old groups. The overall acceptability score was highest for the 40 to 49 year old group and differed ($P < .001$) from the ratings of the 21 to 29 and 60 years or older groups and ($P < .05$) from the 50 to 59 year old group.

Table 2. Least square means and standard error of means for consumer ratings of emu quality attributes based on consumer age[a]

Age in years	n	Appearance LSM	Appearance SEM	Aroma LSM	Aroma SEM	Flavor LSM	Flavor SEM	Juiciness LSM	Juiciness SEM	Tenderness LSM	Tenderness SEM	Overall Acceptability LSM	Overall Acceptability SEM
21-29	24	6.81	(.44)	6.90	(.44)	6.41^{c}	(.40)	6.21^{c}	(.64)	4.62^{c}	(.64)	6.17^{c}	(.46)
30-39	16	7.04	(.43)	7.29	(.44)	7.53^{b,d}	(.40)	6.21^{c}	(.62)	5.16^{c}	(.64)	7.22^{b,d}	(.46)
40-49	18	7.70	(.45)	7.85	(.45)	7.90^{b}	(.42)	7.69^{b}	(.65)	6.45^{b}	(.66)	8.01^{b}	(.47)
50-59	26	7.18	(.34)	7.19	(.34)	7.65^{b,d}	(.31)	6.13^{c}	(.49)	5.33^{c}	(.50)	7.02^{c,d}	(.36)
60+	8	6.12	(.57)	6.28	(.57)	6.61^{d}	(.53)	4.90^{c}	(.82)	4.36^{c}	(.84)	5.37^{c}	(.60)

[a]9-point hedonic scale (1=dislike extremely; 5=neutrality; 9=like extremely.
[b,c,d]Means in the same column with unlike superscripts are different ($P<.10$).

The four lowest income groups gave the highest acceptability ratings for flavor (Table 3). The ratings of the less than $10,000 and $15,000 to 24,000 groups differed from the $50,000 to 74,999 group ($P < .10$), the $75,000 or more group ($P < .05$), and the $35,000 to 49,999 group ($P < .01$). The $10,000 to 14,999 and $25,000 to 34,999 rated flavor higher ($P < .05$) than the $35,000 to 49,999 group. Findings were similar for overall acceptability with three of the four lowest income categories rating overall acceptability of the emus steaks higher ($P < .05$) than two of the three highest income groups.

Table 3. Least square means and standard error of means for consumer ratings of emu quality attributes based on annual household income of consumer[a]

Annual income	n	Appearance LSM	Appearance SEM	Aroma LSM	Aroma SEM	Flavor LSM	Flavor SEM	Juiciness LSM	Juiciness SEM	Tenderness LSM	Tenderness SEM	Overall Acceptability LSM	Overall Acceptability SEM
<$10,000	7	7.68	(.62)	6.88	(.61)	8.60^{b}	(.56)	6.29	(.89)	5.21	(.89)	8.15^{b}	(.65)
$10,000-14,999	11	6.81	(.51)	6.42	(.50)	7.68^{b,c}	(.46)	6.51	(.73)	4.82	(.73)	6.89^{b,c,d}	(.53)
$15,000-24,999	8	7.59	(.59)	7.91	(.58)	8.30^{b}	(.53)	7.37	(.85)	6.51	(.85)	7.88^{b}	(.62)
$25,000-34,999	13	7.46	(.45)	6.88	(.44)	7.81^{b,c}	(.40)	5.40	(.64)	5.15	(.64)	7.25^{b,c}	(.47)
$35,000-49,999	22	6.45	(.36)	6.88	(.35)	6.45^{d}	(.32)	5.42	(.51)	4.95	(.51)	5.99^{d}	(.37)
$50,000-74,999	14	6.84	(.45)	6.96	(.44)	7.16^{c,d}	(.41)	7.14	(.64)	5.52	(.65)	6.87^{b,c,d}	(.47)
$75,000+	17	6.87	(.39)	7.04	(.39)	7.00^{c,d}	(.35)	5.36	(.56)	5.04	(.56)	6.43^{c,d}	(.41)

[a]9-point hedonic scale (1=dislike extremely; 5=neutrality; 9=like extremely.
[b,c,d]Means in the same column with unlike superscripts are different ($P<.10$).

Conclusions

The emu industry can begin identifying consumer segments to whom to market their products; promotion should focus on flavor. The low ratings and variability of tenderness must be addressed as it is the second most important quality attribute but received the lowest rating. The industry needs to improve the ratings of consumers in higher income groups.

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