



Quality of Eggs Available to Consumers in Herat City Markets

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Introduction

- Afghanistan imports over 350 million eggs annually¹.
- India alone, imports over 23,000 t of egg products to Afghanistan².
- Afghan consumers have many choices of different types of eggs in the market.
- Here we examined the quality of three types of eggs: Iranian industrially produced, Afghan industrially produced, and Afghan locally produced.

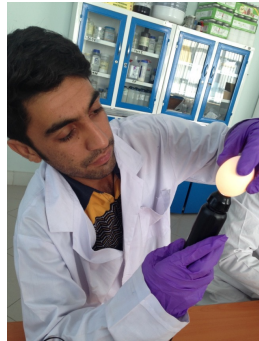


Fig. 1. Candling of egg highlighting the air cell and shell cracks.

Procedures

We collected 222 eggs from local retail markets in Herat City and measured quality based on:

- External Defects
- Weight
- Albumin Height
- Haugh Measurement
- Air Cell
- Internal Defects
- Yolk Characteristics
- Shell Thickness



Fig. 2. Plating egg samples on XLT4 agar to test for presence of Salmonella.

All eggs were also tested for the presence of Salmonella.

Results

Table 1. Weight, Albumin Height, and Haugh score of Iranian Industrial, Afghan Industrial, and Afghan Local Eggs Available in Herat City, Afghanistan.

Source	Weight, g (std. dev.)	Albumin, mm (std. dev.)	Haugh Score (std. dev.)
Iranian Industrial	48.9 ^a (3.3)	3.6 ^a (2.1)	58.2 ^a (9.9)
Afghan Industrial	55.2 ^b (7.3)	4.8 ^b (0.9)	68.7 ^b (8.3)
Afghan Local	47.4 ^a (7.5)	4.9 ^b (1.8)	71.3 ^b (13.1)

Numbers with different superscripts are significantly different at $P < 0.05$

Table 2. Internal Quality Characteristics of Iranian Industrial, Afghan Industrial, and Afghan Local Eggs Available in Herat City, Afghanistan.

Source	Yolk Color		Yolk Score			Meat/Blood Spots %
	Yellow (%)	Orange (%)	1	2	3	
Iranian Industrial	100.0 ^b	0.0 ^a	37.8 ^b	44.6 ^b	17.6 ^a	0.0 ^a
Afghan Industrial	84.4 ^a	15.6 ^b	18.8 ^a	62.4 ^c	18.8 ^a	1.4 ^a
Afghan Local	87.2 ^a	12.8 ^b	11.5 ^b	16.7 ^a	71.8 ^b	5.1 ^a

Yolk score: 1 = soft, flat; 2 = medium; 3 = compact, tall; numbers with different superscripts are significantly different at $P < 0.05$.

Table 3. Air Cell and Shell Characteristics of Iranian Industrial, Afghan Industrial, and Afghan Local Eggs Available in Herat City, Afghanistan.

Source	Air Cell Size	Cracked Shells (%)	Shell Thickness (mm)
Iranian Industrial	1.8 ^a	4.0 ^a	0.38 ^a
Afghan Industrial	1.8 ^a	10.3 ^a	0.37 ^a
Afghan Local	1.9 ^a	12.1 ^a	0.36 ^a

Air Cell Size: 1 = small; 2 = medium; 3 = large; numbers with different superscripts are significantly different at $P < 0.05$.

Results (cont.)

- Haugh scores of Afghan locally and industrially produced eggs were significantly higher than Iranian eggs ($P < 0.05$).
- Yolk characteristics of Afghan locally produced were significantly better than all other eggs tested ($P < 0.05$).
- There was a tendency for Afghan locally eggs to have more cracks compared to other eggs ($P = .10$).
- Cost of eggs per unit (g):
 - Iranian Industrially Produced: 0.11AF/g
 - Afghan Industrially Produced: 0.12AF/g
 - Afghan Locally Produced: 0.20AF/g

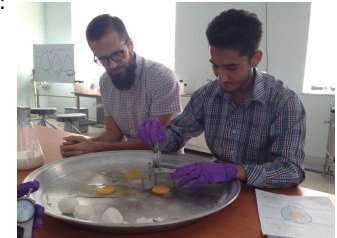


Fig. 3. Measuring albumin height to calculate Haugh Scores.

Conclusions

- All afghan eggs were of higher quality compared to imported eggs.
- Afghan locally produced eggs, however, had the most quality attributes.
- Considering cost, the quality attributes of Afghan locally produced eggs represent 0.1AF/g egg.
- It is up to the Afghan consumer to determine their willingness to pay for these quality attributes.

References

- ¹Ministry of Agriculture, Irrigation, and Livestock of the Islamic Republic of Afghanistan. 2009. HLP 4th Newsletter: Special Issue on the Livestock Production Program.
- ²Windhorst HW, Grabkowsky B, Wilke A. 2013. Atlas of the Global Egg Industry. International Egg Commission.