

MORPHOLOGICAL AND BIOCHEMICAL CHARACTERISATION OF EGGS FROM TRADITIONALLY REARED HENS AND COMMERCIAL EGGS



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INTRODUCTION

Free-range eggs are considered to have a more intense flavour, even though their external morphological appearance is less uniform. On the other hand, consumers prefer brown eggs because they are associated with larger and larger hens, and therefore of better quality than white eggs.

This research will analyse the differences between eggs of different colour and origin; it will check if there is a nutritional difference between criollo and commercial eggs, and, if so, which would be the best option. In addition, the veracity of the belief that brown eggs are considered richer and healthier than white eggs and are therefore the most commonly found in shops will be analysed. The starting hypothesis is that free-range eggs will be nutritionally better than commercial eggs and that the colour of the eggshell will not influence the results.

METHOD

First of all, data is taken on the external appearance of the egg, weight, height. It was separated the yolks and whites into separate tubes. The contents of the tubes are then diluted to 20 % concentration. The egg white and yolk solutions are then subjected to the biuret test with 20 % potassium hydroxide and 10 % cupric sulphate, after which their absorbance were determined.

OBJETIVES

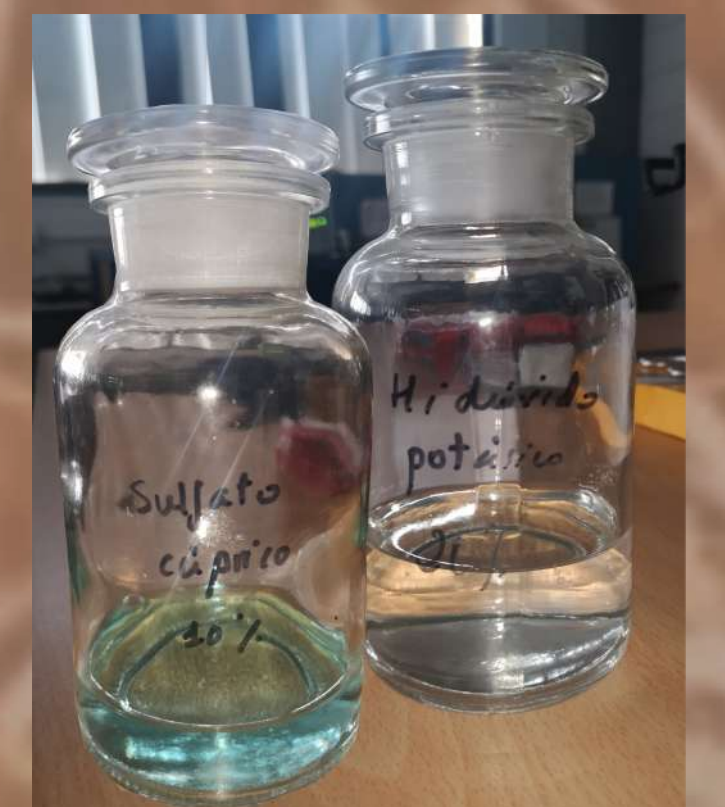
1. Determine morphological differences between commercial and traditional eggs.
2. To analyse quality indices in both types of eggs such as yolk index, albumen index and morphological index.
3. To quantify the protein content of yolks and whites of free-range and commercial class L eggs.
4. To verify or rule out morphological and/or nutritional differences between brown and white eggs.

MATERIALS

- Tube racks and centrifuge tubes
- A pipet
- 20 % potassium hydroxide
- 10 % cupric sulphate
- Petri plate
- Distilled water
- Scale
- Caliber



Picture 1: Racks and centrifuge tubes used.



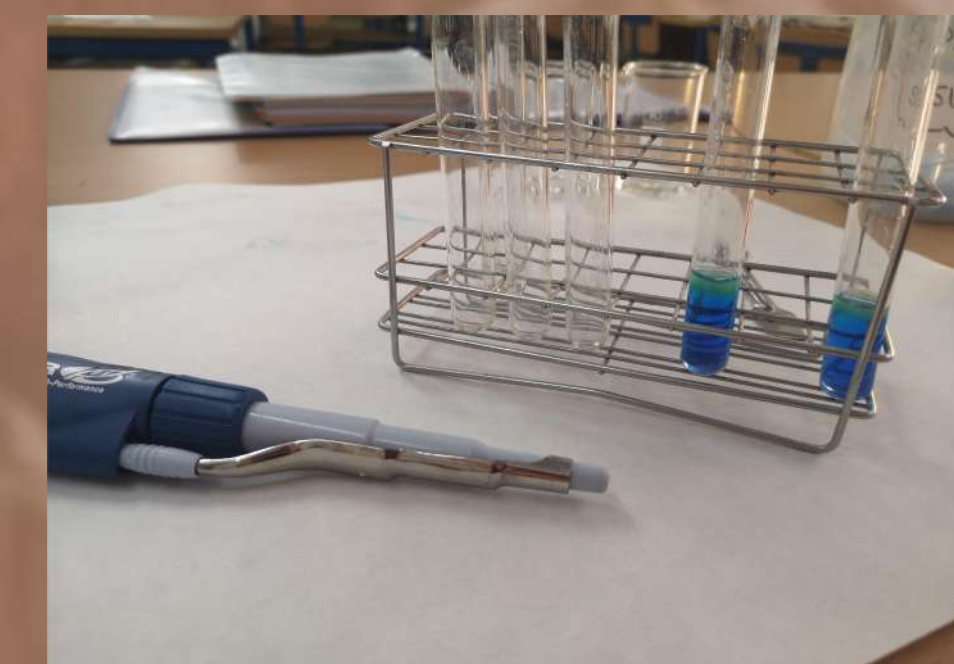
Picture 2: Reagents used to determine concentrations.



Picture 3: Egg external data collection.



Picture 4: Taking a picture of the egg under graph paper and then separating the yolk and white.



Picture 5: Biuret test on the samples of yolks and whites.

RESULTS

	Traditional eggs	Commercial eggs
Egg weight	65,47	63,75
Egg height	5,712	5,69
Average egg width	4,489	4,448
Dense albumin fraction	8,26	4,09
Albumin fluid fraction (cm)	10	10
Dense egg white height (mm)	6,87	5,87
White appearance	2,5	2,1
White weight (g)	34,94	33,76
Clear pH	6	5,5
Yolk height	1,38	1,31
Yolk diameter (cm)	4,46	4,26
Yolk weight	17,4	16,59
Yolk pH	5,5	5,5
Yolk colour	8,90	11,35
Colour of shell	5,05	7
Weight of husk	7,56	7,377
Peel thickness	0,4525	0,324

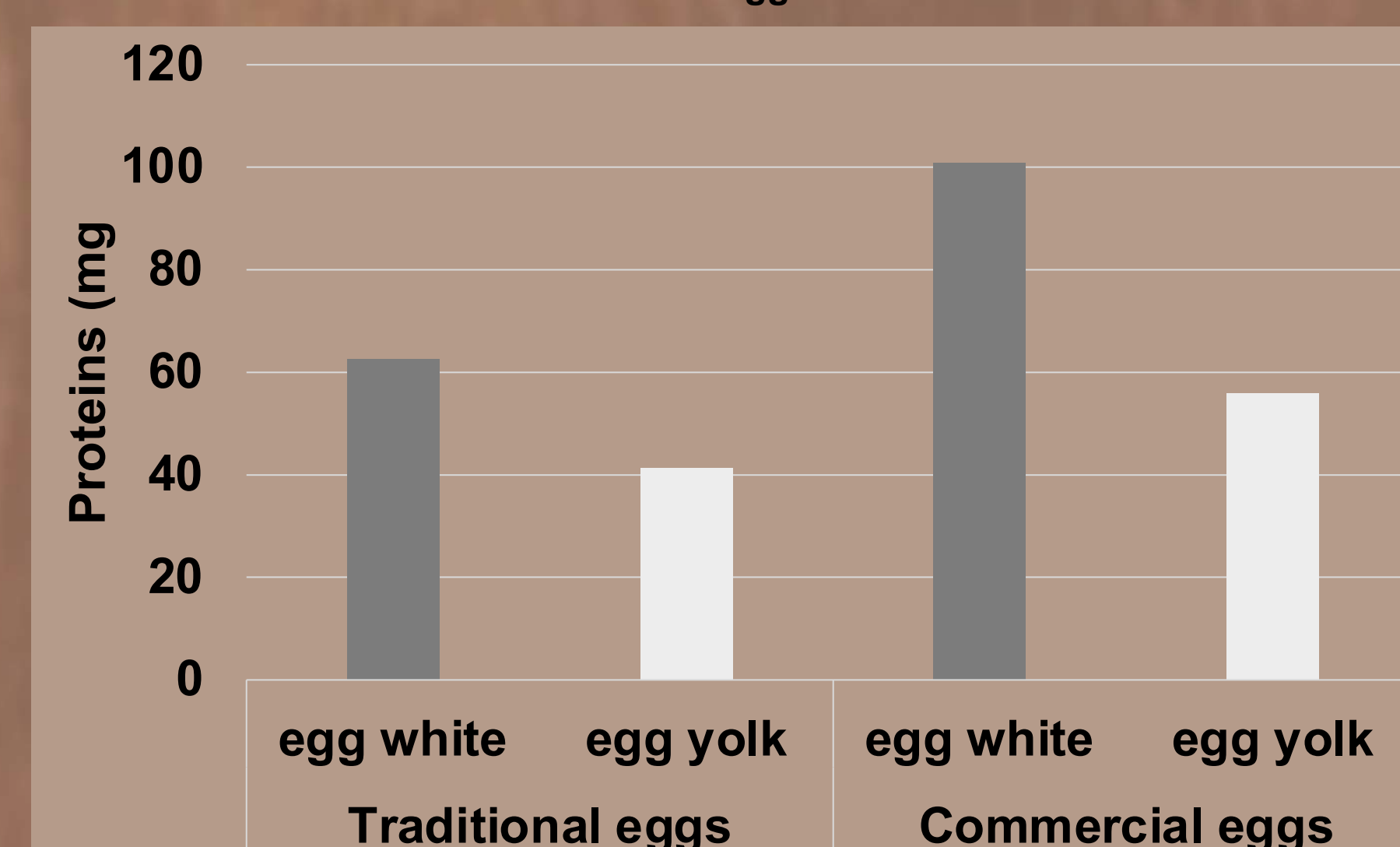
Table 1: Collection of physical data on the exterior and interior of the eggs of the farm and commercial eggs

	Traditional eggs	Commercial eggs
Albumen index	83,09	73,97
Morphological index	78,75	78,21
Yolk index	0,31	0,31

Table 2: Morphological, albumen and albumen index of the farm and commercial eggs

	Traditional eggs		Commercial eggs	
	egg white	egg yolk	egg white	egg yolk
Proteins mg/g	3,66	1,17	4,99	1,66
Weight (g)	17,40	34,94	19,90	33,76
Total proteins mg totales	62,64	41,38	100,86	55,97

Table 3: Protein concentration mg/g and total mg of yolk and white and their weights of each egg



Graph 1: Protein concentration mg/g and total mg of yolk and white and their weights of each egg

It is observed (Graph 1) that in commercial eggs the protein content in mg/g is higher than in traditional eggs, both in yolk and white. However, the weight of the eggs is very similar. Therefore, the total protein content is higher in commercial eggs than in traditional eggs, both in the yolk and in the white. These differences may be due to the fact that hens in commercial farms are fed a higher protein content.

Comparing the results in tables 1 and 2, it is deduced that there are no major differences between the traditional farm eggs and the eggs purchased from a farm origin, as both had an almost identical morphological index and are healthy eggs; however, the albumen dense fraction albumen index and shell thickness were higher in the traditional farm eggs, while the commercial farm eggs have a more reddish yolk colour and more symmetrical shapes. On the other hand, egg colour did not influence the results, so it is assumed that these characteristics depend on the age, breed and feed of the hen.

CONCLUSIONS

1. The morphological characteristics of commercial and traditional eggs are very similar. However, the dense fraction of albumen in traditional eggs was higher, while the colour of the yolk and shell was more intense in commercial eggs.
2. There is no difference in the quality indexes (albumen index, yolk index and morphological index) between the two types of eggs. From this it can be deduced that there are no major differences between the Creole eggs and the purchased eggs as these belong to free-range hens (brand: EL MERCADO DE ALDI) and it is proven that these have a good diet and health to lay eggs very similar to those of Creole hens, making both eggs a good option to choose.
3. Commercial eggs have a higher protein content in mg/yolk and white than traditional eggs, but as the weights of both are very similar, this results in a higher total protein content in commercial eggs.
4. The shell colour of the eggs did not influence the results, so it is assumed that these characteristics depend on the age, breed and feed of the hen.

ACKNOWLEDGEMENTS

- To Elena León for helping and guiding the investigation.
- To Ito Castro and Carmen V. Garcia, my parents for collaborating.
- To Innovation and Curriculum Development Project Fidiencia 2.0
- To IES Fidiana.
- To Consejería de Educación de la Junta de Andalucía.

