STUDIU PRIVIND CONȚINUTUL DE CALCIU AL COCHILIEI LA UNELE SPECII DE HELICIDE

STUDY REGARDING THE SHELL CALCIUM CONTENT ON SOME SPECIES OF HELICIDAE

M. BURA*, D.NICA*, SILVIA PATRUICA*
* USAMVB, Faculty of Animal Sciences and Biotechnologies, Aradului nr. 119, street, Timisoara, 300645, Romania.
nicadragos@k.ro

SUMMARY

The present study aims to establish the content of bind calcium from some *Helicidae* shells, depending on specie and origin area. The biological material was represented of 30 shells belonging to different snail species, distributed in three samples (10 shells for each sample): sample I – *Cepaea vindobonensis*; sample II – *Helix pomatia* (origin area: Oravița); sample III - *Helix pomatia* (origin area: Pădurea Verde, Timişoara). The bind calcium content was determined by complexometric method. The study reveals the presence of higher calcium content in the first sample shells, and of minor differences between shell calcium percentage belonging to the second and the third sample.

Cuvinte cheie: continut de calciu, Helicidae, melc, cochilie
Key words: calcium content, Helicidae, snail, shell

INTRODUCTION

In the shell chemical composition calcium carbonate is the major element; the rest is made from other organic and anorganic substances. Calcium deficiency lead to a thin and translucid shell, sometimes inadequately to lodge the visceral mass. The content of bind calcium from the shell can represent a useful tool in marking the evolutionary relations between two breeds of snail, but to confirm this hypothesis further studies are necesary. However the simple determination of shell calcium content suggests some interesting links between the snail habitat, breed and diet and the concentartion of bind calcium from the shell.

MATERIALS AND METHODS

In order to acomplish the analyses for determining the shell calcium content we used shells from snails belonging to Helicidae family, snails which had a well known origin area. Their systematization was based on the book of Alexandru V. Grossu, *Fauna R.P.R., Mollusca, vol.III, facsicula 1, Gastropoda Pulmonata.*

In our research we used shells from freshly killed snails (***Helix pomatia*** var. *Banatica* and ***Cepaea vindobonensis).*** Shell samples were numbered 1, 2, 3, as you can see in table 1, and each sample contained ten shells.

Table 1.**Snail`s origin area**

Nr.crt.	Species	Origin area
1.	***Cepaea vindobonensis***	Pădurea Verde
2.	***Helix pomatia*** var. *Banatica*	Oravița
3.	***Helix pomatia*** var. *Banatica*	Pădurea Verde

Snails were killed by introducing them into a bowl containing ¼ ethanol and ¾ distilled water, 1h. Then we pull out the snail from the shell by tearing it into pieces, starting from the mouth to the body whorl. Shell pieces were minced by trituration. For each sample we took an amount of about 1 gram from the resulted dust (the amount was established by weighing it at analytic balance) and put it in three test tubes numbered from one to three, so that the order mentioned in table one would be respected. Then we put sol. 6N HCl, in order to avoid spuming in excess.

The samples were then let to rest for one or two days.

In order to finish the dissolution we brought to the boil the tubes, for 2h, filtered the tube content using a filter paper with large pores and then we put the filtrate in a calibrated flask of 100 ml, full with deionized water.

Next we determined the calcium content by using the complexometric method. From the sample so prepared we took 1ml of solution, over which we put 50 ml of distilled water, 5-7 ml sol. 8% NaOH in order to reach a pH>12 (the pH was measured by indicator paper) and murexid chemical tracer; then we titrated with sol. 0.01M EDTA, till the solution change its color from pink to violet.

The formula for determining the calcium content was:

$$g\% = \frac{VxFx4}{M}$$

where V = the volum of 0.01M EDTA
F = the normality of sol 0.01M EDTA
M = the mass of analyzed sample

RESULTS AND DISCUSSIONS

The results are presented in table 2.

Table 2. **The content of bind calcium from the shell of some snail, depending on species and origin area**

Sample	Species	Origin area	ml 0.01M EDTA	Mass (g)	Ca% (g)
1.	***Cepaea vindobonensis***	Pădurea Verde	9.60	1.0010	38.30%
2.	***Helix pomatia*** var. *Banatica*	Oravița	9.30	1.0001	37.19%
3.	***Helix pomatia*** var. *Banatica*	Pădurea Verde	9.35	1.0009	37.36%

A graphic illustration of data is shown in figure 1.

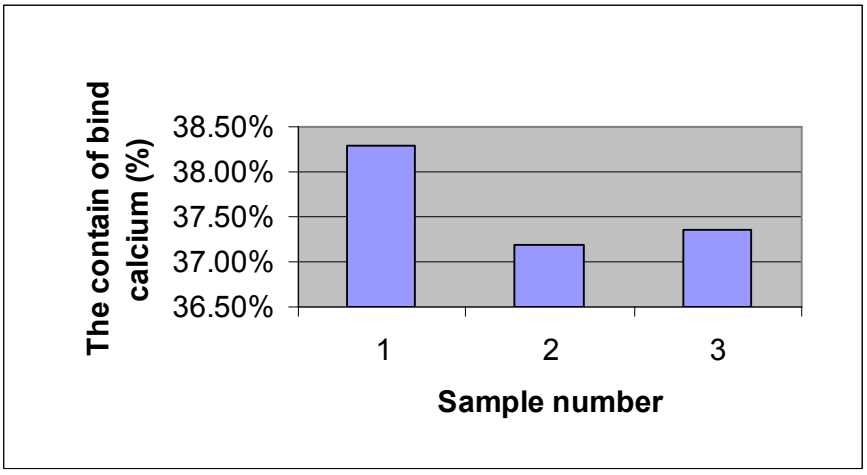

Fig. 1. The content of bind calcium from the snail shell

Speciality literature is poor in data concerning the content of bind calcium from the snail shells, so that for a significant interpretation of the data are necessary a few considerations.

In the chemical composition of snail shells the major element is calcium carbonate (97.5%); the rest is represented by calcium phosphate and silicate, magnesium carbonate and oxide, iron and manganese oxide and other organic substances.

If we consider 100 g of shell dust, in it we will find 97.5 g calcium carbonate. Also we know that the molecular mass of calcium carbonate is 100, so we can consider that:

If in 100g $CaC0_3$ ……we find 40 g of bind calcium

In 100 g shell…..are 97.5 g $CaC0_3$ from which X g of bind calcium

X = 39g (this value will be considered like the medium content of bind calcium from a snail shell)

As calcium is one of the major elements of the shell we make an assumption that the percentage of bind calcium which can be found in a shell varies a little, so that for

interpreting the data we will consider an interval of bind calcium variation from 35 to 40%.

We found that in the case of closely related snail species (both species belong to *Helicidae* family), the population of *Cepaea vindobonensis* from Pădurea Verde (sample 1) had a higher content of bind calcium than the population of *Helix pomatia* var. *banatica* from Oravița (sample 2) and from Pădurea Verde (sample 3) by 18.8%, respectively 22.2%.

We think that there are two possibilities to explain the great differences of bind calcium content which exists between the snails from sample 1 on one hand, and the snails from samples 2, and respectively 3 on the other hand. The first is linked to the snail habitat - *Cepaea vindobonensis* is one of the few snail species well adapted to live in arid areas, whereas *Helix pomatia* var. *banatica* is a breed of snail which prefers more humid places. The second one considers that the different calcium content of ingested food is responsible for those differences – whereas *Cepaea vindobonensis* has an alimentation based on straw plants, in the diet of *Helix pomatia* var. *banatica* nettle and other herbal plants are predominant.

In the case of snails belonging to the same species, but from different area (sample 2 and 3) we observed that the difference of bind calcium content between the snails originary from Pădurea Verde and those from Oravița is insignificant (3.4 %).

CONCLUSIONS

1. The snails from the same species, but belonging to different populations presented closed values of bind calcium content, indifferently of origin area

2. In the case of the snails which belong to different species we observed that although they inhabit the same area, they have different contents of bind calcium in their shells.

REFERENCES

1. *Giaccone V., Ceccato D., Balzan S., Buoso M.C., Moschini G., NovelliI E.*, –Investigation on micronutrient elements composition belonging to Genus Helix

2. *McLaughlin M.J., Parker D.R., Clarke J.M.*, - 1999 – Metals and micronutrients – Food safety issues. Food crops research, 60, 14

3. *Bura M.* – 2004 - Creşterea melcilor o activitate profitabilă, Ed. Eurobit