IMPORTANCE OF CAMPYLOBACTER SPP. IN LAYING HENS

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Summary

Bacteria belonging to Campylobacter genus present microorganisms that, besides Salmonella and some E. coli spp., present one of the most important food contaminants. They are the most frequent reason for food poisoning, when present in food of animal origin. Spreading of Campylobacter in nature is connected to domestic and wild animals, on one side, and the environment on the other. Because of the role that humans have in nature, they constantly follow circulation of this bacteria and influence its presence. Poultry meat and its products are the most common sources of Campylobacter infection and therefore it is necessary to know all the routes of its transmission. The scope of this work was bacteriology examination of the samples from laying hens on presence of Campylobacter spp., with the aim to determine if the are present and to draw attention to their importance. Cloacal swabs, parts of digestive and reproductive tracts of laying hens were used as material for examination. Isolation was determined by the method of microaerophil cultivation on selective liquid and solid media, and identification was carried out by determining physiologic activity using biochemical characteristics. Out of all the material Campylobacter jejuni and Campylobacter coli were isolated. The results show that Campylobacter spp. are present in the flocks of laying hens. This has an important role in spreading of these microorganisms on humans.

Key words: Campylobacter jejuni, Campylobacter coli, laying hens

Bacteria belonging to Campylobacter genus (Campylobacter) are widely spread in nature. They can be found in humans and animals, in their excretes and secretes, in water, soil and mud. Circling of Campylobacter spp. in nature occurs between wild and domestic animals and in their habitat. Possible infection of humans is a consequence of direct contact with animals or through food consumption (4). The most important source of Campylobacter bacteria is poultry meat and its products. Campylobacter spp. in this material has been proved by many authors (1, 6). Presence of this microorganism in food of animal origin is related to presence in animals used for production (8). A important part in poultry industry represent laying hens. Campylobacter spp. in laying hens may be a potential danger for humans. Jacobs-Reitsma, F.W., 1994 (5) pointed out what is the importance of Campylobacter spp. in a flock of laying hens. Presence of Campylobacter spp. shows that there is a way of vertical transmission of these bacteria through eggs.

All this was a reason for bacteriologic examination of the samples of laying hens on presence of Campylobacter spp., with the aim to determine if these bacteria are present in this material and to point out their importance.
Materials and methods

In order to achieve the aim, we analyzed different material originating from laying hens. There was a total of 50 cloacal swabs, 35 caecums and the same number of magnums (reproductive tract). Isolation of *Campylobacter spp.* was done on Preston broth (HiMedia) adding Campylobacter Selective Supplement IV (Preston Modified) (HiMedia) and Preston agar (HiMedia) with the same selective supplement. The swabs and parts of the organs were prepared in Preston broth enriched with 5% of heamolised ram's blood and incubated at 37°C and 43°C (10). After incubation for 48 hours the material was subcultured on a prepared Preston agar and incubated microaerophilic for 48 hours at 37°C and 43°C (4). The suspected colonies were stained according to Gramm. The isolated microorganisms that did not stain according to Gramm, and were in a spiral shape, were identified by certain physiological characteristics (10) using API Campy strips (BioMerieux) and software for reading, whereby presence of *Campylobacter spp.* was confirmed.

Results and discussions

We examined different kinds of material in order to prove presence of *Campylobacter spp.* in laying hens and the role of this production category in spreading of this bacterial. Examining cloacal swabs and caecum we wanted to determine if this kind of microorganisms are present in laying hens, while analyses of reproductive tract was aimed to determine if *Campylobacter spp.* are present in production of eggs, what can influence the transmission of these microorganisms in vertical line from eggs to chicken, but also on humans in consuming eggs. In Table 1 are displayed the data obtained from examination of cloacal swabs, caecums and magnums.

<table>
<thead>
<tr>
<th></th>
<th>Number of the samples</th>
<th>Positive findings</th>
<th>Campylobacter jejuni</th>
<th>Campylobacter coli</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloacal swabs</td>
<td>50</td>
<td>19 (38%)</td>
<td>13 (68.42%)</td>
<td>6 (31.58%)</td>
</tr>
<tr>
<td>Caecum</td>
<td>35</td>
<td>25 (71%)</td>
<td>19 (76.0%)</td>
<td>6 (24.0%)</td>
</tr>
<tr>
<td>Magnum</td>
<td>35</td>
<td>3 (8.57%)</td>
<td>2 (66.66%)</td>
<td>1 (33.33%)</td>
</tr>
</tbody>
</table>

Presence of *Campylobacter* in the samples of laying hens was proved through findings in cloacal swabs. The analyses detected that 38% of the sampled swabs were positive on some of these microorganisms. Also it was observed that two kinds of Campylobacter are present: *Campylobacter jejuni* and *Campylobacter*...
coli. According to the data from the literature (7) presence of Campylobacters in flock may be even 100%. Our examination of caecum in laying hens showed that 71% of animals in the flock were positive on some Campylobacter spp. and the results were in accordance with the results of some other authors (1).

It is importance to know that Campylobacter spp. may be found in reproductive tract. In magnum, which presents an important part of reproductive tract where the egg white is formed, both Campylobacter spp. were found. The same was in digestive tract. According to the data in the literature (2) presence of Campylobacter jejuni was detected in all the parts of reproductive tract (magnum, uterus and vagina). There were 8.57% of positive findings, what is considerably lower comparing to 50% of the findings detected by other authors.

The findings of Campylobacter spp. in laying hens, especially in reproductive tract is important because they may also be found in eggs or on eggs.

An interesting research is reported by (9) who examined possibility of penetration of C. jejuni in eggs and their contamination. After the trial it was concluded that after penetration C. jejuni may survive in eggs for over 6 hours. Shanker, S. et al., 1986 (8) examined the role that eggs have in poultry production (broiler fattening) as a possibility of vertical transmission of C. jejuni. By examining the flocks of laying hens on presence of C. jejuni and later their eggs, it was observed that, although Campylobacter spp. was isolated in the laying hens, it was not found in their eggs. They concluded that vertical transmission of C. jejuni is not possible through eggs. The similar problem was analyzed by (3). He examined relationship between C. jejuni in laying hens and their reproductive abilities. He discovered that the largest number of C. jejuni was excreted through feces of laying hens in April and October, but the presence of this bacteria did not influence egg production. Possibility of penetrating of C. jejuni inside an egg happened only in two, out of 266 examined eggs. C. jejuni was isolated from the surface of egg shell, but not in egg content. It was concluded that C. jejuni cannot penetrate egg content, but may be isolated on the inner side of a shell and membrane of cooled eggs. In the works of (5) the importance of Campylobacter spp. in the flocks of laying hens was examined. The presence of Campylobacter spp. shows a possibility of vertical transmission of these bacteria through eggs on their offspring. Since further investigations have not supported the opinion of possible vertical transmission of Campylobacter spp. through eggs, it was concluded that the flocks colonized by Campylobacter spp. may be a reservoir of horizontal transmission of these bacteria.

Contrary to this opinion, that vertical transmission of Campylobacter spp. cannot be proven with certainty, the author (12) reported on isolation of vibrio forms in egg follicle, oviduct and egg yolk in already formed egg of diseased or dead laying hens. This finding supports the opinion that transmission of these bacteria to their offspring through eggs is possible.
Conclusions

Examining the material on presence of bacteria from \textit{Campylobacter spp.} in the laying hens presence of two kinds were determined: \textit{Campylobacter jejuni} and \textit{Campylobacter coli}. Out of total, 71\% were positive on one or two isolated bacteria.

Both isolated bacteria were found in the reproductive tract. The examination showed that 8.57\% samples of magnum were positive on some of \textit{Campylobacter spp.} \textit{Campylobacter spp.} are widely spread in the environment. Their circulation in nature threatens humans, therefore understanding of every segment that provides a possibility for contact and infection presents a professional challenge. The findings of \textit{Campylobacter spp.} in reproductive tract and a possibility of their presence in eggs or on eggs gives a considerable contribution to understanding of this problem, although some facts are still not enough clear.

References