Annals of *Spiru Haret* University

Veterinary Medicine Series

Year XIX, no. 19, volume 2, 2018

EDITURA FUNDAȚIEI *ROMÂNIA DE MÂINE*
BUCHAREST

A Publishing House classified by the *Ministry of National Education and Scientific Research, by the National Council of Scientific Research, Category C (areas Philology, Philosophy, History and Cultural Studies, Architecture and urbanism, Performing Arts)*

http://www.edituraromaniademaine.ro

ISSN: 2558-8486; ISSN-L: 2558-8486

CONTENTS

Amfim, Adriana, Gheorghe, Dragoş, *Toxicological screening in rodenticide poisoning of wild animals*……..... 5
Grigorescu, Paul, Tudor, Laura, *Incidence, diagnosis and treatment of genito-mammary disorders in a dairy farm from Calarasi County ….…..…..…..…..* 11
Simion, Violeta-Elena, *Whey – from food to supplement with therapeutic indications ….….....* 19
Marinescu, Ioana Andreea, *Sustainable development in conditions of biophysical and biochemical infections in the veterinary sanitation ….…..….....* 25

TOXICOLOGICAL SCREENING IN RODENTICIDE POISONING OF WILD ANIMALS

Adriana AMFIM, Dragoş GHEORGHE
Spiru Haret University, Faculty of Veterinary Medicine
256 Basarabia Ave., 30352, Bucharest, Romania
e-mail: ushmv_padure.adriana@spiruharet.ro

Abstract

The purpose of this study was to evaluate the presence of anticoagulant rodenticides in samples collected from savage animals with a diagnosis of suspected rodenticide poisoning. The survey was carried out from 2014 to 2015, in a county in the west of Romania, on 188 liver samples, 19 deer carcass, 188 samples of stomach content and 3 samples of rodent bait. The qualitative and quantitative analyses were conducted using an analytical method based on Liquid chromatography–mass spectrometry (LC-MS) for the simultaneous determination of 6 anticoagulant rodenticides (bromadiolone, brodifacoum, coumachlor, coumatetralyl, difenacoumand warfarin). In all the cases analyzed, the corpses showed signs of common intoxication with anticoagulants: epistaxis, microbleeds, hemorrhagic infiltration, etc. The presence of anticoagulant rodenticides was detected in liver samples and rodent bait. The most commonly detected compound was bromadiolone and brodifacoum: in 12 samples of deer liver (7.3%) only brodifacum was determined and in 21 samples of deer liver (12.7%) only bromadiolone. This study emphasizes the relevance of the determinations of anticoagulant rodenticides in cases of suspected poisoning in veterinary practice.

Keywords: *anticoagulant, rodenticides, wild animals, analytical*

Introduction

Rodenticides are a heterogeneous group of compounds that exhibit markedly different toxicities to humans and rodents. The varieties of rodenticides used over the years are legion. Before the mid-20th century, heavy metals (arsenic, thallium) were the often-used agents. Since the mid-20th century, anticoagulant substances have been the mainstays of rodenticide products. In 2014, anticoagulant rodenticides constituted 8,833 of the 11,309 case mentions of exposure to rodenticides recorded in the National Poison Data System (NPDS), administered by the American Association of Poison Control Centers (AAPCC) (4).

Anticoagulant rodenticides inhibit the enzyme vitamin K – epoxide reductase, which normally reactivates vitamin K, a crucial component in a number of normal clotting factors, after those factors are consumed in normal maintenance. All anticoagulants have the basic coumarinor indanedione nucleus. The "first-

generation" anticoagulants (warfarin, pindone, coumafuryl, coumachlor, isovalerylindanedione and others less frequently used) require multiple feedings to result in toxicity. The "intermediate" anticoagulants (chlorophacinone and in particular diphacinone) require fewer feedings than "first-generation" chemicals, and thus are more toxic to non-target species. The "second-generation" anticoagulants (brodifacoum, bromadiolone, difethiolone) are highly toxic to non-target species (dogs, cats, livestock, or wildlife) after a single feeding. Secondary poisoning in non-target animal species from anticoagulants has also been documented. The concentration of brodifacoum and bromadiolone in the bait available as pellets or blocks is usually 0.005% and that of difethiolone 0.0025% (5). Second generation anticoagulants such as brodifacoum and bromadiolone have higher toxicity to non-target species than the first generation anticoagulants such as warfarin and coumachlor (2).

Most commonly, domestic and wild animals are intoxicated by intake of baits containing anticoagulant rodenticides (primary opportunity). The lack of odour and its pleasant taste due to the saccharose content appear to be additional reasons for the extensive incidences of intoxication in humans and animals. Another main cause is the ingestion of dead or alive poisoned rodents (secondary opportunity) by dogs, cats, swine, wild mammals, or birds (6). The biological half-life (T1/2) of warfarin, diphacinone and brodifacoum is 14-15 h, 15-20 days, and 120 days, respectively.

Potentially dangerous to all mammals and birds, anticoagulant rodenticides are a common cause of poisoning in pets and wildlife. Intoxications in domestic animals have resulted from contamination of feed with anticoagulant concentrate, malicious use of these chemicals, and feed mixed in equipment used to prepare rodent bait. Rodenticides are toxic to many species of birds and mammals including pets, farm animals, and wildlife species. The time between exposure and development of clinical signs is dependent upon the specific chemical and amount consumed. Considering therapeutic differences between first and second generation coumarin anticoagulants, which are not accompanied by any difference of detectable clinical signs, our objective was to study how often the different classes of compounds (first and second generation coumarin anticoagulants) were found in the suspected cases of poisoned animals reported in this assay. Finally, the increasing demand of official analyses requires sensitive and validated analytical methods (5).

Material and methods

In the years 2014 and 2015, anticoagulant rodenticides analyses were performed on 188 liver samples, 19 deer carcass, 188 samples of stomach content and 3 samples of rodent bait (from wild animals deer, wild rabbits, pheasants, magpies, hawks).

The geographical area covered in this study corresponds to the west county of Romania. After proper harvesting and packaging, the samples were frozen and sent to the National Reference Laboratory for Veterinary Toxicology at the Institute of Diagnosis and Animal Health.

Anatomopathological examinations were performed on 19 male and female deer carcass, aged between two and five years. Conformation and quantitative

analysis are carrying on using Liquid chromatography–mass spectrometry (LC-MS) for the simultaneous determination of 6 anticoagulant rodenticides (bromadiolone, brodifacoum, coumachlor, coumatetralyl, difenacoum and warfarin). Anticoagulants were extracted from liver with mixtures of acetone/diethylether and acetone/ chloroform. The LC-MS method provided good linearity, sensitivity, intra- and inter-day precision, and good identification capabilities for these compounds in samples, based on single ion monitoring, to ensure a high sensitivity in positive polarization with an ESI source.

Results and discussions

Among the various substances used to prepare baits, anticoagulant rodenticides are quite common in European countries, such as Italy, Portugal, Spain, and France (7).

Following the anatomopathological examination of 19 deer carcasses, the results showed a morphopathological picture dominated by haemorrhages in all tissues and organs, uncoagulated blood haematomas or uncoagulated blood in the cavities. All these changes along with the toxicological survey data and the baits found at the site of the toxic accident can confirm the suspected coagulopathy induced by anticoagulants.

Over the total of 188 liver samples, 188 samples of stomach content and 3 samples of rodent baits were examined. Presence of anticoagulant rodenticides was detected only in liver samples and rodent baits.

Of the six anticoagulant substances analyzed simultaneously – warfarin, cumaclor, cumatetralil, difenacum, brodifacoum, bromadiolone –, only brodifacoum and bromadiolone were detected.

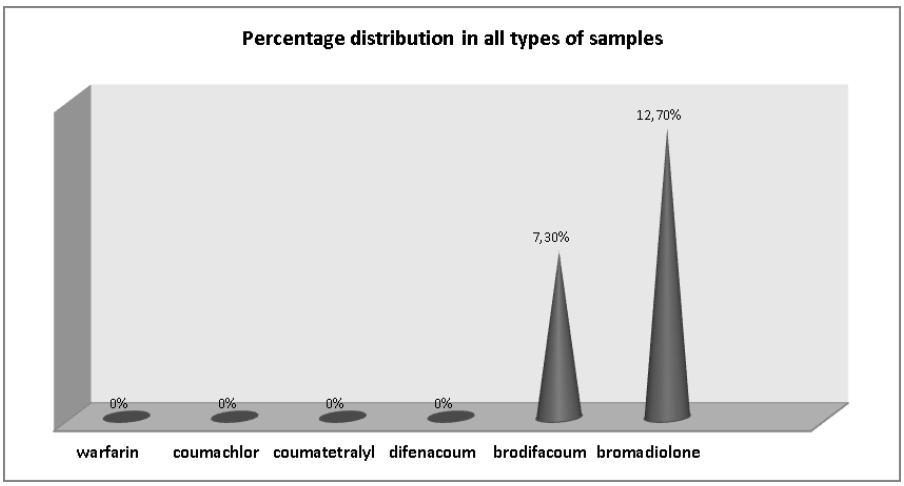

Fig. 1. *Percentage distribution of the cumarinic anticoagulant rodenticides detected in the positive samples of animal organs (liver) and baits collected during one year*

In none of the 188 samples of stomach contents were detected the anticoagulant rodenticides (Fig. 1, Fig. 2). The lack of substances analyzed in the gastric contents samples, correlated with the anatomopathological and clinical examination, and the presence of compounds in the liver samples suggest contamination long before the intoxication was reported.

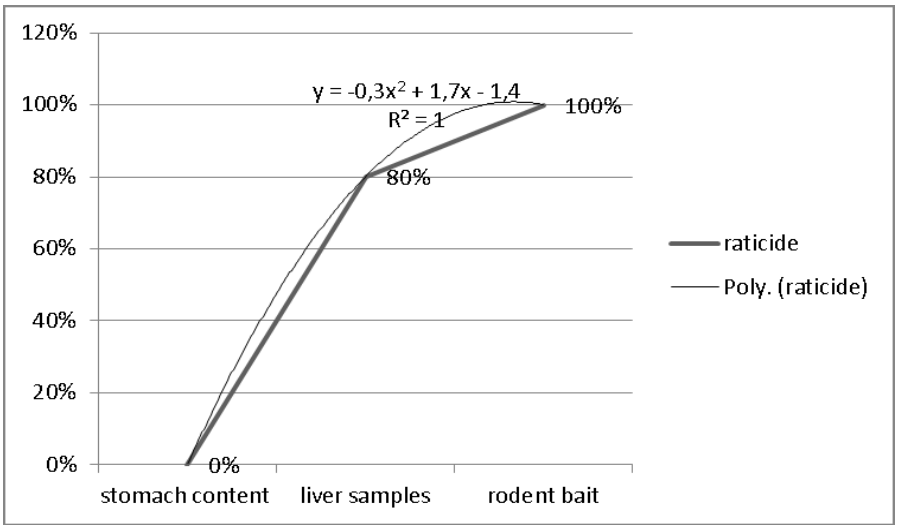

Fig. 2. *Frequency of rodenticides depending on sample type analyzed*

In most liver samples, both brodifacoum and bromadiolone were highlighted. Thus, bromadiolone and brodifacoum were determined in most of the liver samples harvested from the roe deer – 132 (80%), as well as in the samples of the hawk liver. In all liver samples from the other wild animal species under study (wild rabbits, pheasants, magpies) only **brodifacoum** was detected.

In some liver samples was determined either brodifacoum or bromadiolone. Thus, in 12 samples of deer liver (7.3%) was determined only **brodifacoum**; only bromadiolone was detected in 21 samples of deer liver (12.7%).

It has been found that there is a very good linearity for the two compounds (correlation coefficient > 0.99) in the working range of 0.2-1 μg / ml, which is true of the other compounds, so the method used is also suitable for quantitative determinations (Table 1).

The level of concentration of the two rodenticides in bait samples are with insignificant variations in manufacturers' recommendations, suggesting that they were placed shortly, and the compounds did not have time to denature/inactivate (Table 2).

Table 1

The concentration of brodifacoum and bromadiolone in bait samples and liver samples

Type of samples	No. animals	Brodifacoum (mg/kg)	Bromadiolone (mg/kg)
deer	12	0.074-0.311	-
deer	21	-	0.042-0.437
deer	132	0.052-0.227	0.033-0.331
pheasants	4	0.105-0.182	-
magpies	4	0.182-0.256	-
wild rabbits	6	0.082-0.163	-
hawks	9	0.153-0.374	0.092-0.391

Table 2

The concentration of brodifacoum and bromadiolone in bait samples and liver samples

Type of samples	Brodifacoum (%)	Bromadiolone (%)
Bite 1	0.0031	0.0051
Bite 2	0.0061	0.0047
Bite 3	0.0048	0.0046

The present study has permitted us to investigate the animal poisoning cases of anticoagulant rodenticides in a west county from Romania. From our assay, according to other study, dogs and cats represent the most common species victims of anticoagulant rodenticide poisoning. Although the second generation rodenticides were most prominent (bromadiolone and brodifacoum) in samples from the wild animals. In some European countries, anticoagulant secondary poisoning is reported in birds, especially predators and scavengers (mainly birds of prey). It is reported less frequently in pigeons, partridges, and waterbirds (1) and even in granivorous birds (3). In our study anticoagulant rodenticides were mostly detected in deer livers, then in other wild animal such as birds.

Conclusions

✓ The purpose of this paper was to simultaneously detect anticoagulant rodenticides (warfarin, coumachlor, coumatetralyl, difenacoum, brodifacoum, bromadiolone) from different samples corresponding to different biological matrices (liver and stomach contents) or baits using liquid chromatography-mass spectrometry (LC-MS) (qualitative method).

✓ Liver samples are recommended for the determination of anticoagulant raticides as they circulate in the vascular system, are eliminated in the urine in a relatively low amount, but most of them accumulate in the liver.

✓ Since this technique determines the raticides in a relatively short time (3-4 hours), the method can be extended to identify these toxins from the serum samples and in this way the clinician veterinarian based on a certainty diagnosis and through appropriate treatment, can intervene promptly in the management of a poisoning that has an increased incidence among pets and beyond.

References

1. Berny, P., Caloni, F., Croubels, S., Sachana, M., Vandenbroucke, V., Davanzo, F., & Guitart, R., "Animal poisoning in Europe. Part 2: companion animals." *Vet J*, 183, pp. 255-259, 2010.
2. Langford, K. H., Reid, M., & Thomas, K. V., "The occurrence of second generation anticoagulant rodenticides in non-target raptor species in Norway." *Science of Total Environment*, 15, pp. 450-451, 2013.
3. Sánchez, Barbudo, I. S., Camarero, P. R., & Mateo R., "Primary and secondary poisoning by anticoagulant rodenticides of non target animals in Spain." *Science Total Environm*, 420, pp. 280-288, 2012.
4. https://emedicine.medscape.com/article/818130-overview
5. https://www.msdvetmanual.com/toxicology/rodenticide-poisoning/anticoagulant-rodenticides-warfarin-and-congeners
6. https://pdfs.semanticscholar.org/5a8e/853d932de543394c0ea77d578111706e474c.pdf
7. http://www.izs.it/vet_italiana/2016/52_2/VetIt_118_333_3.pdf

INCIDENCE, DIAGNOSIS AND TREATMENT OF GENITO-MAMMARY DISORDERS IN A DIARY FARM FROM CALARASI COUNTY

Paul GRIGORESCU, Laura TUDOR
Spiru Haret University, Faculty of Veterinary Medicine
256 Basarabia Ave., 30352, Bucharest, Romania
e-mail: paul_g63@yahoo.com

Abstract

The study was conducted in the I.I. CHIRIȚĂ C.G.G. MARIA located in Dorobantu, Calarasi County. It is a medium-sized Holstein dairy cow farm. The milk obtained is partly sold to the population of Bucharest through known milk dispensers. In parallel, milk is also used in the cheese production in the own farm plant.

The study under review was conducted between January 2017 and January 2018 on a flock of 228 lactating cows and other categories, ages between 2 and 10.

The milking was performed with a De Laval milking plant, on parallel stands, 4 cows simultaneously.

The cows are exploited in a semi-intensive system, in free but also extensively stable farming, benefiting from a nearby pasture. In the summer, the cows are grazed in the morning and in the evening, with the feast filled with concentrated fodder. During the cold season, cows are taken out on the paddock, on sunny or slightly cold days, fed with dried, silo and concentrated wheat fodder.

Data on the conditions encountered were processed from the unit's registries, but also diagnosed "in situ".

Keywords: *dairy cow, diagnosis, treatment genito-mammary disorders*

Introduction

I.I. CHIRIȚĂ C.G.G. MARIA (Fig. 1), located in Dorobantu, Calarasi County, in which the study was conducted, in order to elaborate the present scientific paper, is a holding of average Holstein milk cows. The milk obtained is partly sold to the population of Bucharest through known milk dispensers. In parallel, milk is also used for the cheese production in the farm's micro-plant.

Material and methods

The study covered by this paper was conducted between January 2016 and August 2017 on a herd of 218 and 228 lactating cows and other categories.

The cows are exploited in a semi-intensive system, in free but also extensively stable farming, benefiting from a nearby pasture. In the summer, the

cows are grazed in the morning and in the evening, with the feast filled with concentrated fodder.

Fig. 1. *I.I. CHIRIȚĂ C.G.G. MARIA dairy farm, general view in paddock (orig.)*

During the cold season, cows are picked up in the paddock on sunny or cold days, fed with dried, insulated and concentrated wheat fodder.

Data on the conditions encountered were processed from the unit's registries, but also diagnosed "in situ".

Results and discussions

Of the total number of 97 dairy cows in 2016, a number of 17 cows with different diseases of the reproductive system and the mammary gland were treated. In 2017 of the total number of 89 lactating cows, 12 cows with the same types of diseases were treated (Fig. 2).

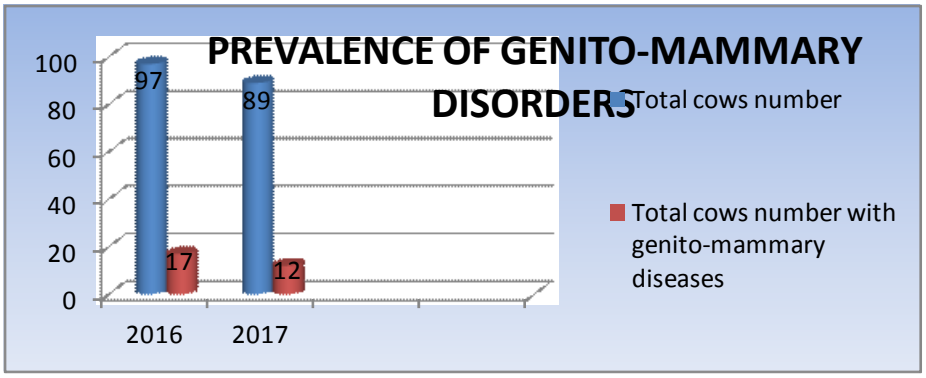

Fig. 2. *The incidence of genital diseases at I.I. CHIRITA C.G.G. Maria, Calarasi County*

The incidence of genito-mammary disorders during the year 2016 was the following (Fig. 2):

- uterine subinvolvement – 2 cases;
- placental retention – 5 cases;
- distocia – 2 cases;
- endometritis – 6 cases;
- mastitis – 2 cases.

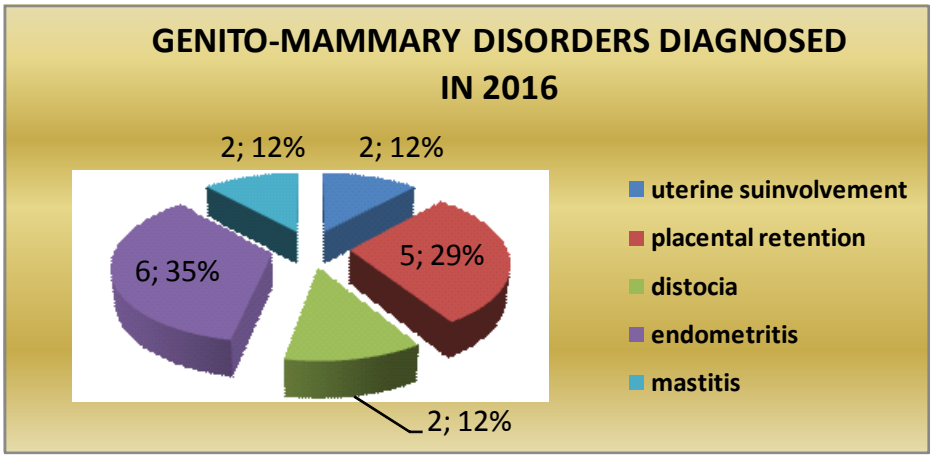

Fig. 3. *Genito-mammary disorders diagnosed in 2016*

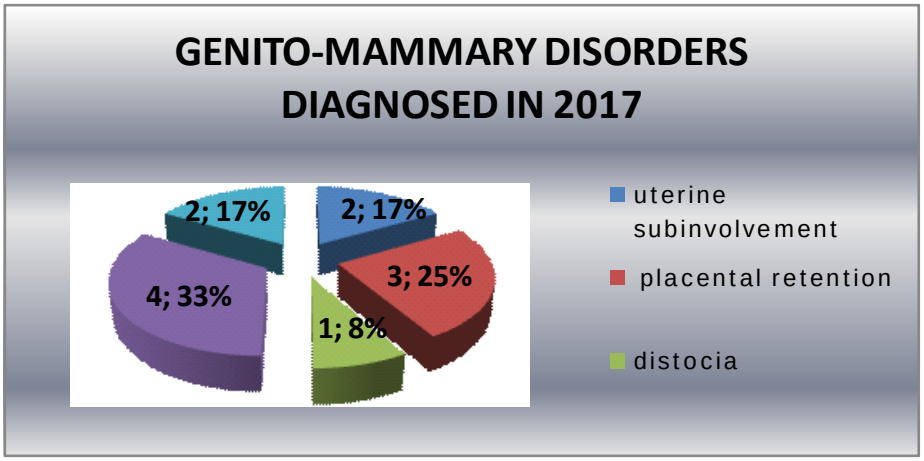

Fig. 4. *Genito-mammary disorders diagnosed in 2017*

The incidence of genito-mammary disorders during the year 2017 was the following (Fig. 4):

- uterine subinvolvement – 2 cases;
- placental retention – 3 cases;

– distocia – 1 case;
– endometritis – 4 cases;
– mastitis – 2 cases.

Most diagnosed genito-mammary disorders were endometritis (10 cases) as a result of inappropriate or non-timed treatments in cases of uterine subinvolution or placental retention. Their evolution, clinical type and outcome of treatments are shown in the following graph (Fig. 5)

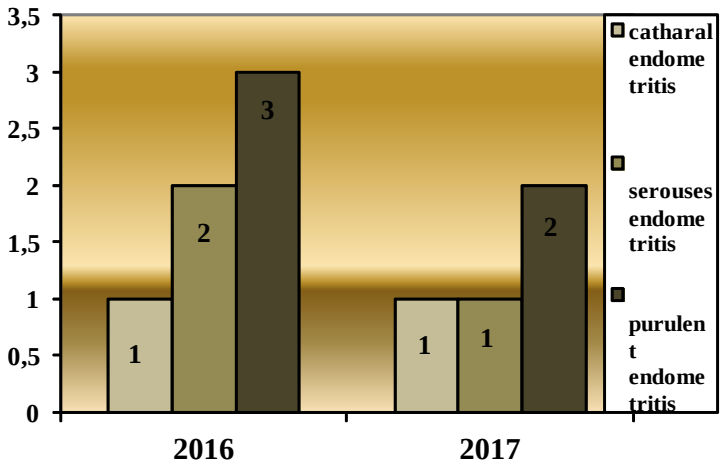

Fig. 5. *The incidence of endometrial types in the period 2016-2017*

Caws with endometritis have been detected by the caregivers and the veterinary staff of the farm. Treatments were made with antibiotic and chemo-therapeutic suspensions or other intrauterine drugs. Cows with endometritis were cured at 83.34% (2016) and 75.00% (2017) (Fig. 6).

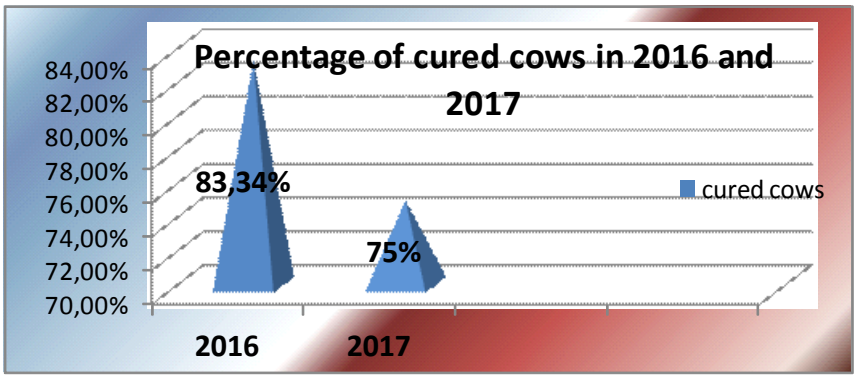

Fig. 6. *The percentage of cured cows in 2016 and 2017*

Complications came from purulent endometritis and represented 16.66% in 2016 and 25.0% in 20 17 (Fig. 7).

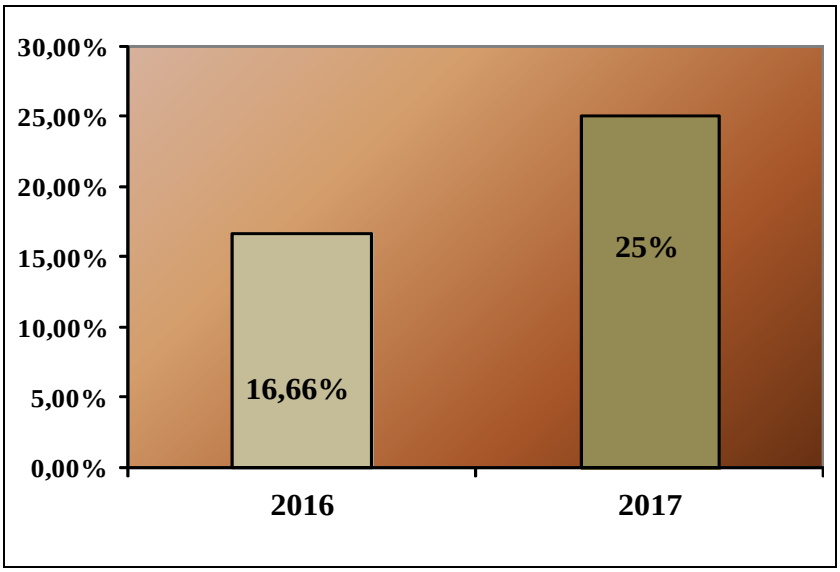

Fig. 7. *The percentage of complicated endometritis*

Endometritis treatment

In the nearly 2 years of the study, 10 cows were treated for endometritis at I.I. CHIRIȚĂ C.G.G. MARIA, Dorobantu locality, Calarasi County.

A wide range of treatments have been used in endometrial therapy. These were administered only intrauterine once, to serum endometrites and 2-3 times to the other forms, as the case may have been. The effectiveness of these treatments is shown in the graph. Most cases were treated with Metricure and Metrijet. On the third place was Metrosept as an intrauterine method (Fig. 8).

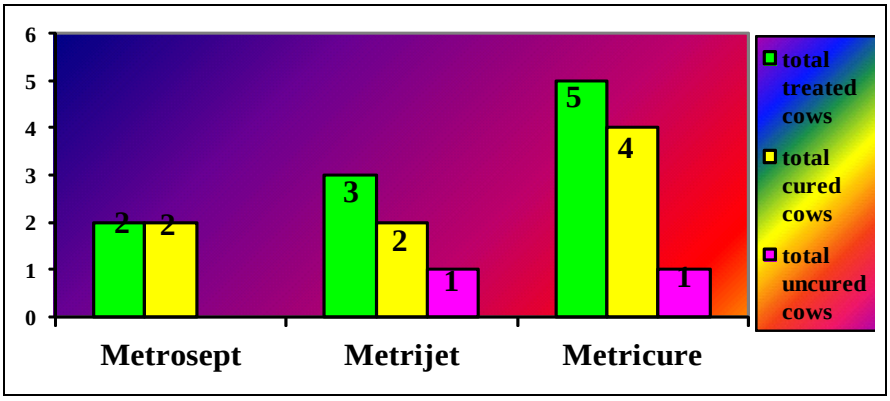

Fig. 8. *The efficiency of endometritis treatments*

The incidence of uterine dynamic cases described above is shown in the following chart (Fig. 9):

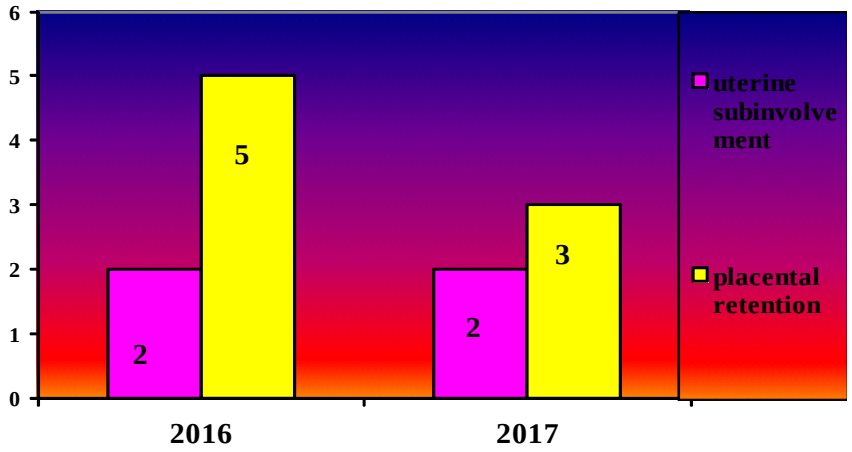

Fig. 9. *The percentage of dynamic uterine cases*

As a consequence of the treatments applied, healing was achieved in all cases with uterine dynamics.

In the two years of the study, there were also three cases of dystocia, two in 2016 and only one case in 2017. One case in 2016 could not be remedied by bloody obstetric surgery, in which case C-section (hysterectomy) was used. The post-operative evolution was very good; the cow was re-entered in the productive-reproductive circuit (Fig. 10).

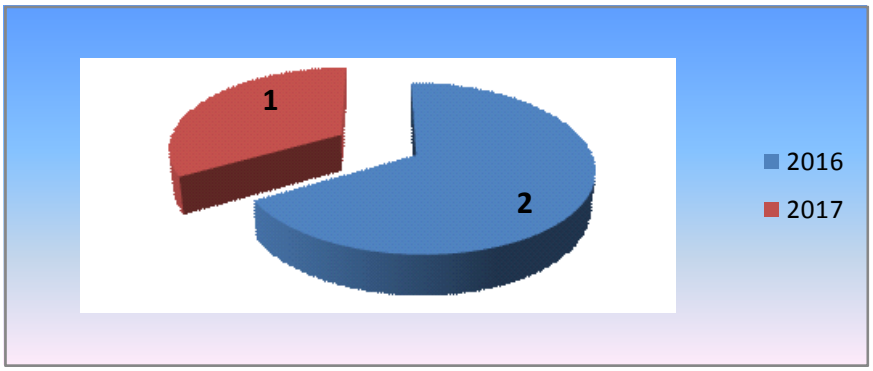

Fig. 10. *The percentage of dystocia in 2016 and 2017*

The incidence of mammoths in the I.I. CHIRIȚĂ C.G.G. MARIA from Dorobantu, Calarasi County was insignificant by the number of cases, only four cases in two years. It is worth pointing out that of the four types of mastitis, two have evolved with definitive agalactia on two mammary sections. This led to the reformation of the two cows and their replacement in the lactating flock (Fig. 11).

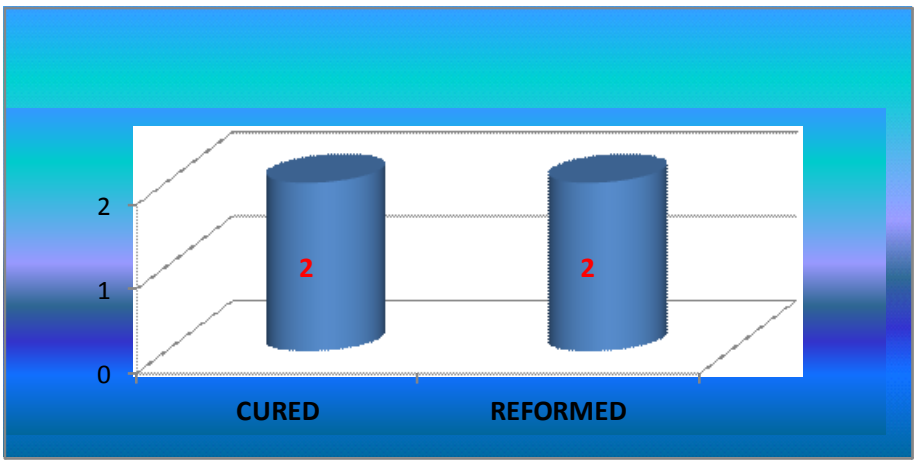

Fig. 11. *The mastitis evolution in 2016 and 2017*

Conclusions

1. I.I. CHIRIȚĂ C.G.G. MARIA dairy farm is a development unit of the future and will become an important source of milk, near Bucharest.

2. The studied, diagnosed and treated diseases are frequently encountered in such farms.

3. Of the 97/89 flock of cows, between January 2016 and August 2017, 29 cows were diagnosed and treated.

4. The most common conditions were endometrites encountered in 34.48% of cases.

5. Placental retention (27.57%), cases of uterine subinvolvement in equal parts (13.79%) had high frequency.

6. The cases of dystocia were the more rare (10.34%).

7. The evolution of these diseases was positive, in 2016 there were 17 cases (58.62%) of genital diseases, and in 2017 only 12 cases (41.38%).

8. It should be noted that positive developments have been observed in all diagnosed and studied conditions since 2016 in 2017.

9. The present study will continue, especially as the prospect of using European funds for infrastructure development and modern technology of unity is almost certain.

References

1. Andrei, Sanda, Groza, Ioan Ştefan, *Fiziologia şi patologia glandei mamare la vacă*, Editura AcademicPres, Cluj-Napoca, 2010.
2. Bîrțoiu, A., Seiciu, F., *Tratat de patologia reproducției la animale*, ediția a II-a, Editura Bic All, București, 2006.

3. Bîrțoiu, A., "Monitorizarea puerperiumului la vacă," *Veterinarul*, nr. 8, August 2011, 11.
4. Bogdan, Liviu Marian, Groza, Ioan Ştefan, *Obstetrică veterinară*, Editura Academic Pres, Cluj-Napoca, 2009.
5. Constantin, N., *Tratat de medicină veterinară*, Vol. V, Editura Tehnică, București, 2009.
6. Constantin, N. (coord.), Bîrțoiu, A., Codreanu, M., Cornilă, N., Cotor, G., Diaconescu, A., Seiciu, F., Șonea, A., *Tratat de medicină veterinară*, Vol. III, Editura Tehnică, București, 2003.
7. Damian, V., Runceanu, L., *Cercetări asupra patologiei puerperale la vacă*, Lucrări ştiințifice, vol. 49 (8), Editura Ion Ionescu de la Brad, Iași, 2006.
8. Erceanu, E., *Managementul puerperiumului la vacă și importanța lui în reproducție*, Cluj, 2010.
9. Groza, I. Ș., *Compendiu – ginecologie, reproducție şi andrologie veterinară*, Editura Academiei Române, București, 2006.
10. Ruginosu, E., Drugociu, D., Roșca, P., Malancaş Tofan, Cristina, Nechifor, F., "Observații privind dinamica involuției uterine post partum la vacile pentru lapte," *Revista română de medicină veterinară*, Vol. 21, nr. 3, 2011, pp. 12-13.

WHEY – FROM FOOD TO SUPPLEMENT WITH THERAPEUTIC INDICATIONS

Violeta-Elena SIMION
Spiru Haret University, Faculty of Veterinary Medicine
256 Basarabia Ave., 30352, Bucharest, Romania
e-mail: ushmv_simion.violeta@spiruharet.ro

Abstract

Whey, the product resulting from milk processing, being considered not just a residue with a negative impact on the environment, but also poorly used or insufficient in animal feed as well as functional food. The protein composition with a high biological value, significant amounts of immunoglobulin such as IgG, antioxidant, antibacterial and an important source of vitamins and mineral, recommend this by-product as a food but also as a diet in diseases such obesity, diabetes, cardiovascular disease, etc. This review points out the main compounds of functional value of whey and its therapeutic indications.

Keywords: *whey, composition, therapeutic indication*

Introduction

It is time not to consider whey just a residue obtained in the processing of milk, but to introduce it into the category of foods with high nutritional value. The components of whey include beta-lactoglobulin (50-55%), alpha-lactalbumin (20-25%), bovine serum albumin (5-10%) as protein sources; significant amounts of immune substances – immunoglobulins, IgG in particular; we must also note an important content in antioxidant, antibacterial substances such as lactoferrin, lyzozyme, glycomacropeptides; it is an important source of vitamins and minerals [1, 2].

Detoxifying and antioxidant compounds from whey

Studies conducted by Troost et al. (2001) showed that lactoferin found in 1-2% in milk regulates iron absorption and plays an antioxidant, antiviral, antibacterial role, surviving intragastric destruction which gives it intestinal bioavailability [3].

Glutathione peroxidise ($GSHP_X$) is an endogenous enzyme, selenium-dependent, present in all tissues but enzyme-induced with an important role of protection against organic peroxides. The antioxidant effect of whey is due not only to the content of lactoferin but also to the sulphur amino acids in the protein – cysteine and methionine composition that contribute to the synthesis of glutathione (GSH), a powerful intracellular antioxidant [4].

Compounds with an immune function in whey

Milk immunoglobulins (IgA, IgD, IgE, IgG, IgM) represent 10-15% of whey, the most important of which is bovine milk IgG whose amount varies between 0.6-0.9 mg mL-1 and has been shown to suppresses human lymphocyte proliferative response to T cells [5].

It can be concluded that two cups of cow milk consumed bring about 250 mg of bovine IgG, mostly IgG1. The author observed that milk-derived bovine IgG inhibits antibody secretion by pokeweed mitogen (PWM)-stimulated human peripheral blood mononuclear cells (PBMC), and has higher effect due to serum-derived bovine IgG. Inhibition of local immune response due to bovine IgG1 may be important for activity on the mucosal surface where the predominant action is due to IgA and may help if the mucosa is impaired and absorption is compromised, where there is IgA deficiency or immaturity as it is for children [6].

Studies in newborn babies show that it is vital that within 24-48 hours of their lactation they receive colostrum so as to provide an IgG over 10 g L^{-1}. Absorption of immunoglobulins in the intestine is by passive transfer, and colostrum is the most nutritious source of nutrients in this category [7].

Of the bioactive compounds in colostrum and cow's milk – growth factors, lactoperoxidase, lyzozyme, lactoferrin, cytokines, nucleosides, vitamins, peptides, etc., IgG is found in the higher amount, 0.72 mg mL^{-1} versus 0.04 mg mL^{-1} in human milk. Compared to other species, including IgA predominant in humans, in ruminants, the IgG1 accounts for approximately 80% of the total Ig in milk [8].

In ruminants, IgG1 is predominant in milk and originates primarily from blood circulation through alveolar mammary cells, whereas IgG2 is derived from blood but is also synthesized by mammary glandular and epithelial cells and transferred to secretory breast cells, as with IgA and IgM. In the rest of the breast, immunoglobulins accumulate in the mammary gland and then are secreted into colostrum and milk [9].

Studies have also shown that fresh milk from non-immune cows contains antibodies specific for human rotavirus, *Escherichia coli*, *Salmonella enteriditis, S. typhimurium, Shigella flexneri* [10].

Compounds with hypertensive role from whey

More than half of the amount of whey albumin and globulin is represented by beta-lactoglobulins (β-Lg). In their composition, antihypertensive peptides have been isolated, which gives them antihypertensive properties due to angiotensin I converting enzyme (ACE) that block the conversion of angiotensin I to angiotensin II, the molecule with a very strong vasoconstrictor effect [11].

It has also been shown that whey β-Lg has the ability to inhibit cholesterol absorption by altering its solubility in the intestine [12].

Use of whey in support diets and for various clinical conditions

Using whey in diets or as dietary supplement for athletes, in order to synthesize proteins and increase muscle mass, is no longer a novelty, many studies now demonstrate the benefits. A study by Burke et al. (2001) shows that after 12

weeks, following whey consumption (1.2 g/kg body mass/day), whey (1.2 g/kg body mass/day) plus supplement (creatine monohydrate, 0.1 g/kg body mass/day) and placebo (1.2 g/kg body mass/day of maltodextrin) including exercise for muscle mass by three groups of men aged 18 to 31 years, the effects were obvious for gain lean tissue mass and knee flexion peak torque, from the group that consumed whey plus supplement to the group that consumed placebo [13].

A systematic review and meta-analysis performed by Colonetti et al. (2017) on a number of 632 studies on whey consumption shows an association between it and a higher total protein ingestion and an average change in plasma leucine concentration; growth of mixed muscle protein fractional synthesis rate was also observed [14]. Digestion and absorption of kinetics of dietary protein modulate postprandial muscle protein accretion. Whey protein is obtained by separating casein from milk [15].

This is evidenced by a good profile of amino acids, especially leucine, and by its rapid solubility in acids, which gives an increased availability of amino acids, while casein coagulates and precipitates resulting in a moderate but sustained amount of circulating amino acids [16].

On the other hand, some studies show that beneficial effects of whey may be limited under certain conditions or situations that have both nutrition and as well as the peculiarities of the individual. Whey Growth Factor Extract (WGFE) is a protein concentrate whose composition is distinguished by 62% lactoperoxidase and 16% lactoferrin, as well as other growth factors [17]. Supplementing with 1.6 g/day of WGFE during physical training has been beneficial for beginners compared to those accustomed to strength training exercises [18].

It is known that a five percent reduction in body fat may reduce the risk of obesity. At the same time, whey amino acids act as a substrate for protein synthesis, and the effect is all the more obvious as whey consumption is associated with exercise [19].

Numerous studies show the benefits of whey consumption on health by reducing serum glucose, impaired glucose tolerance in diabetes mellitus and obesity, reducing body weight but maintaining muscle mass and even increasing it, increasing the amount of anorectic released hormones (cholecystokinin, leptin, etc.) but also reducing the production of orexigenic hormone ghrelin [20].

A randomized study of the effect on fat and lean muscle loss was performed on a group of 106 obese female patients aged between 25 and 50 years. Participants received 500 calories per day and half of the group received a whey protein drink while the remainder received an isocaloric maltodextrin control beverage, 2 times a day. Body weight, body fat and lean muscle mass were monitored every 4 weeks, during the 12 weeks of the study. Loss of at least 2.25 kg of BW was observed. The results showed that patients in the whey group lost significantly more body fat (2.81 kg vs. 1.62 kg in the control group) and less muscle mass (1.07 kg compared to 2.41 kg in the control group). Also, blood analysis revealed a significant decrease in cholesterol, triglycerides and LDL cholesterol in the whey versus control group [21].

Kawase et al. (2000) carried out a study in a group of 20 males for 8 weeks and administering 2 times/day a fermented milk supplement containing

Lactobacillus casei and *Streptococcus thermophylus* and added whey. The biochemical analyzes and medical investigations showed differences between the control group and those who tested the whey supplement: low systolic pressure, HDL cholesterol (not total cholesterol, for which the differences were not significant) and low triglycerides [22].

Conclusions

Lately, more and more studies show the value of whey as a functional food, recommended in the diet of performance athletes, in preventing diseases such as cardiovascular disease, osteoporosis. The content of whey in beta-lactoglobulin, alpha-lactalbumin, bovine serum albumin, immunoglobulins, IgG in special, also in substances with an antioxidant, antibacterial role such as: lactoferrin, lyzozyme, glycomacropeptides is superior to the milk it comes from and has many detoxifying, antioxidant, immune, hypertensive properties.

References

1. Whey Protein. (2008). *Alternative Medicine Review*, *13*(4), 341–347. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=36459242&site=ehost-live.
2. Król, J., Brodziak, A., Zaborska, A., & Litwińczuk, Z. (2017). "Comparison of whey proteins and lipophilic vitamins between four cow breeds maintained in intensive production system." *Mljekarstvo / Dairy*, *67*(1), 17–24.
3. Troost, F. J., Steijns, J., Saris, W. H. M., Brummer, R.-J. M., Troost, F. J., Steijns, J., … Brummer, R. J. (2001). "Gastric digestion of bovine lactoferrin in vivo in adults." *Journal of Nutrition*, *131*(8), 2101–2104. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=5035255&site=ehost-live.
4. Walzem, R. L., Dillard, C. J., & German, J. B. (2002). "Whey Components: Millennia of Evolution Create Functionalities for Mammalian Nutrition: What We Know and What We May Be Overlooking." *Critical Reviews in Food Science & Nutrition*, *42*(4), 353. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=7073033&site=ehost-live.
5. Whey Protein. (2008). *Alternative Medicine Review*, *13*(4), 341–347. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=36459242&site=ehost-live.
6. Nash, G. S., Macdermott, R. P., Schloemann, S., Bertovich, M. J., O'Neal, J., Porter, L., & Kulczycki, A. (1990). "Bovine IgG1, but not IgG2, binds to human B cells and inhibits antibody secretion." *Immunology*, *69*(3), 361–366. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=13327977&site=ehost-live.
7. Singh, A. K., Pandita, S., Vaidya, M. M., Singh, S. V., Chandra, G., Pampoori, Z. A., … Sharma, V. K. (2011). "Bovine Colostrum and Neonate Immunity." *Agricultural Reviews*, *32*(2), 79–90. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=63030685&site=ehost-live.
8. Golding, M. (2005). "Advanced Dairy Chemistry – 1 Proteins, 3rd edn. Parts A&B." *International Journal of Food Science & Technology*, *40*(5), 576–577.
9. Gapper, L. W., Copestake, D. E. J., Otter, D. E., & Indyk, H. E. (2007). "Analysis of bovine immunoglobulin G in milk, colostrum and dietary supplements: a review." *Analytical & Bioanalytical Chemistry*, *389*(1), 93–109.

10. Jack, N. Losso, Jyoti Dhar, Angela Kummer, Eunice Li-Chan & Shuryo Nakai (2008). "Detection of antobody specificity of raw bovine and human milk to bacterial lipopolysaccharides using PCFIA." *Food and Agricultural Immunolgy,*Volume 5, Issue 4, 231-239.
11. Pihlanto-Leppälä, A., Koskinen, P., Piilola, K., Tupasela, T., & Korhonen, H. (2000). "Angiotensin I-converting enzyme inhibitory properties of whey protein digests: Concentration and characterization of active peptides." *Journal of Dairy Research, 67*(1), 53-64.
12. Nagaoka S. (1996). "Studies on regulation of cholesterol metabolism induced by dietary food constituents or xenobiotics." J Jpn Soc Nutr Food Sci 49:303-313.
13. Burke, D. G., Chilibeck, P. D., Davison, K. S., Candow, D. G., Farthing, J., & Smith-Palmer, T. (2001). "The Effect of Whey Protein Supplementation With and Without Creatine Monohydrate Combined With Resistance Training on Lean Tissue Mass and Muscle Strength." *International Journal of Sport Nutrition & Exercise Metabolism*, *11*(3), 349. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=6627612&site=ehost-live.
14. Colonetti, T., Grande, A. J., Milton, K., Foster, C., Alexandre, M. C. M., Uggioni, M. L. R., … Rosa, M. I. (2017). "Effects of whey protein supplement in the elderly submitted to resistance training: systematic review and meta-analysis." *International Journal of Food Sciences & Nutrition*, *68*(3), 257–264.
15. Norton, C., & Jakeman, P. (2013). "Towards a Sustainable Dairy Sector: The underappreciated role of dairy protein in the preservation of lean tissue mass in the elderly." *International Journal of Dairy Technology*, *66*(3), 317–320.
16. Pennings, B., Boirie, Y., Senden, J. M. G., Gijsen, A. P., Kuipers, H. & van Loon, L. J. C. (2011). "Whey protein stimulates postprandial muscle protein accretion more effectively than do casein and casein hydrolysate in older men." *American Journal of Clinical Nutrition* 93 997-1005.
17. Collier, R.J., Miller, M. A., Hilderbeandt, J. R., Torkelson, A. R., White, T. C., Madsen, K. S., Vicini, J. L., Eppard, P. J. and Lanza, G. M. (1991). "Factors affecting insulin like growth factor 1 concentration in bovine milk." *Journal of Dairy Science* 74, 2905-2911.
18. Dale, M. J., Coates, A. M., Howe, P. R. C., Tomkinson, G. R., Haren, M. T., Brown, A., … Buckley, J. D. (2017). "No Effect of a Whey Growth Factor Extract during Resistance Training on Strength, Body Composition, or Hypertrophic Gene Expression in Resistance-Trained Young Men." *Journal of Sports Science & Medicine*, *16*(2), 230–238. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=124286457&site=ehost-live.
19. Burke, D. G., Chilibeck, P. D., Davison, K. S., Candow, D. G., Farthing, J., & Smith-Palmer, T. (2001). "The Effect of Whey Protein Supplementation With and Without Creatine Monohydrate Combined With Resistance Training on Lean Tissue Mass and Muscle Strength." *International Journal of Sport Nutrition & Exercise Metabolism*, *11*(3), 349. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=6627612&site=ehost-live.
20. Dietary whey protein lessens several risk factors for metabolic diseases: a review. (2012). *Lipids in Health & Disease*, *11*(1), 67–75.
21. Frestedt, J. L., Zenk, J. L., Kuskowski, M. A., Ward, L. S., & Bastian, E. D. (2008). "A whey-protein supplement increases fat loss and spares lean muscle in obese subjects: a randomized human clinical study." *Nutrition & Metabolism*, *5*, 1–7.

22. Kawase, M., Hashimoto, H., Hosoda, M., et al. (2000). “Effect of administration of fermented milk containing whey protein concentrate to rats and healthy men on serum lipids and blood pressure.” J Dairy Sci 83:255-26 https://www.ncbi.nlm.nih.gov/pubmed/10714858.

SUSTAINABLE DEVELOPMENT IN CONDITIONS OF BIOPHYSICAL AND BIOCHEMICAL INFECTIONS IN THE VETERINARY SANITATION

Ioana Andreea MARINESCU
Spiru Haret University, Faculty of Veterinary Medicine
256 Basarabia Ave., 30352, Bucharest, Romania
e-mail: andreea_marinescu1975@yahoo.com

Abstract

The paper presents an algorithm for deepening the important directions of improvement of the management methods of the biochemical and biophysical control structures in the sanitary veterinary field, by using the classification of the steps and the solutions for achieving the sanitary sustainability. It is useful to recommend building a system for collecting the results from the bio-monitoring of farms, food distribution infrastructures, laboratories and veterinary centres in Romania and establishing a knowledge base on sanitary veterinary sustainability, this being the premise of a good practice base of bioservices.

Sanitary veterinary control means the permanent or regular verification of an activity, a situation, etc., in order to follow its course and to take improvement measures. It involves a complex circuit of knowledge and decision-making to master some phenomena, processes, activities, such as in the zootechnics and sanitary fields, in farms and laboratories using biochemical and biophysical structures. It is concluded that if biochemistry is assembled with biophysics, analysis of the biochemical and biophysical elements group allows identification of the specific organization of control structures in the sanitary veterinary field and, on this basis, proposals can be developed to improve general sanitary sustainability.

Keywords: *biophysical damage, biochemical damage, sanitary sustainability, sanitary veterinary field*

Introduction

Following the unprecedented advent of knowledge in contemporary society, the sciences that study the sanitary veterinary field, respectively, improve, ensure and maintain the quality of human life become multidisciplinary, integrated, and global.

In the economic and social system in Romania, biochemical and biophysical sources and structures in the sanitary veterinary field become more complex, having a positive role in the life of the citizens, and on the other hand negative, damaging environment, affecting the life, disturbing the health of the creatures and the vegetable kingdom.

Because, new responses and solutions to the extent to which biochemical and biophysical structures affect people's lives through dental health dysfunctions need to be organized and managed through their specific management so that positive consequences be larger than the unwanted ones.

From the analytical and synthetic systems in the field it is considered that such a situation implies the need of a new type of management, necessary for solving new problems in new sanitary conditions imposed by the need for general social sustainability.

Solutions should be effective in organizing and managing sanitary veterinary control structures in biochemical and biophysical control in the veterinary health environment so that the animal stock is not affected by possible aggressive biochemical and biophysical transformations, making sanitary veterinary variants available.

1. Sustainable development and biophysical and biochemical impacts in the sanitary veterinary field

Sustainable development is the ability to meet the requirements of the present generation without compromising the ability of future generations to meet their own needs. Sustainable development has an intergenerational dimension.

Veterinary health services, along with human health, education, equality of opportunities / chances and the protection of human rights, are subject to their distribution as resources of human society / collectives.

Sanitary veterinary sustainability has its original operations in sanitary veterinary services distributed on matrix alignments of the bio-social subsistence needs of human collectives and participates in the operational framework of sustainable development.

We find that biochemical and biophysical phenomena and processes in the field of natural and man-made sanitary veterinary, promoted by man and his direct or indirect activities, are involved in defining and ensuring overall sanitary sustainability.

Control structures (in the present case, specialized for biochemical control, respectively biophysical sanitary veterinary), in turn, must be organized and managed.

The management of the control structures is oriented towards the formalization of as many reactive loops of input corrections as possible, and of adjusting the processing to achieve the final orderly values that are synthetically characterized in the health sustainability provided in the sanitary veterinary field.

Biochemical and biophysical phenomena and processes in the sanitary veterinary field cannot be considered as exclusively "aggressive" to the bio-sociological and functional condition of the animal fund, as long as they (the phenomena and processes involved) can be mastered, corrected, adjusted, restructured, and so forth with the help of specific / particular sanitary-veterinary control structures.

Starting from the sanitary veterinary sanitation initialization structures with the help of the processual-operational algorithm followed, the sanitary veterinary

sustainability stage is achieved, using organized and efficiently managed bio-chemic and bio-physics control structures, with resulting efficiency obtained in the sanitary veterinary field.

For Romania, the prerequisites for achieving sustainability in the sanitary veterinary field are encouraging, because conceptually, the state itself is based on the level of zootechnical development and advanced medical scientific level.

It is appreciated that innovation (including in the sanitary veterinary field, in our opinion) is the most appropriate formula to bring Romanian livestock back to conventional conventions, to identify solutions and alternatives, alternatives to the societal challenges of the global economy.

It is considered that in the veterinary health sphere, new material and managerial conditions are needed, namely actions to support the evolution of ideas from the market to sustainable sanitary veterinary services.

However, it is necessary to achieve a smart sanitary veterinary consolidation, a new original phrase, introduced in the literature by the present lines.

As a matter of fact, sanitary veterinary conditions can also be considered as new, more conventional sanitary conditions, in the context of a more robust recovery of the healthcare / national system in the medium and / or long term.

Consequently, the thesis of the need for self-assessment and re-evaluation of livestock and veterinary health systems is advancing in the context of innovation policies.

Generally speaking, veterinary knowledge requires the urgent and dense systematization of innovative bio-veterinary knowledge.

For the success of the innovative development of sustainability in the sanitary veterinary field, more intensive exploration of synergies, risk sharing and specific resources is needed.

2. **Participation of sanitary veterinary sustainability to the inter-generational dimension of sustainable development**

Biochemistry, based on epistemological, systematized observations, is the scientific field that studies the chemistry of life and has long been considered interdisciplinary at the border between chemistry and biology. Biochemistry is generally considered to have two sub-branches: metabolism biochemistry and structural biochemistry.

Due to the unprecedented development of knowledge, biochemistry is currently a multidisciplinary science, which uses disciplines such as: analytical chemistry, chemistry synthesis, chemical kinetics, thermochemistry, structural biology, physics, data acquisition, and so on. In such a situation, in the sanitary veterinary system in Romania the sources and biochemical structures become more complex, having a positive role in the animal health, but also a negative role, destroying the environment, affecting life, disturbing the health of the creatures and the kingdom plant.

It is considered that the most significant responses and solutions to the proportions in which biochemical structures affect human or animal life should be studied and given. As such, biochemical structures need to be organized and

managed, so their specific management is necessary, so that positive consequences are greater than the unwanted ones.

In the case of biochemical aggressions on life, there may also be economic consequences in human collectives, as the deterioration of the environment and the elimination of people from safe sanitary situations, respectively their maintenance in poor health conditions, are economic and social losses.

It is also noticed that in the scientific world and modern practice, there are mainly strong connections between biochemistry and genetics, respectively interlinked with molecular biology.

From the epistemological systematizations in the field, it is appreciated that the basic scientific problem that appears to be necessary to solve is the organization and management of the biochemical control structures in the sanitary veterinary field, so that the animal fund found in the sanitary and the medical / zootechnical system, in laboratories, would not be affected by possible aggressive biochemical transformations.

Very close to biochemistry, biophysics is the study of life and the environment. This is the science that studies the physical and physico-chemical phenomena and processes that take place in living organisms, as well as the influence of the physical factors on them, respectively the applications of physics in biology.

Sanitary veterinary control means the permanent or regular verification of an activity, a situation, etc., in order to follow its course and to take improvement measures. It involves a complex circuit of knowledge and decision-making to master some phenomena, processes, activities, such as in the zootechnics and sanitary fields, in farms and laboratories using biochemical and biophysical structures.

On the other hand, the structure is a way of internal organization, compiling biochemical and biophysical processes. Everything organized and arranged according to chemical and physical laws has negative or positive effects on animal life and on the environment. Control structures should be organized and managed to be oriented towards health and animal health and animal welfare and environment, including in laboratories and farms.

On the other hand, if biochemistry is assembled with biophysics, analysis of the biochemical and biophysical elements group allows identification of the specific organization of the control structures in the sanitary veterinary field and, on this basis, proposals can be developed to improve general sanitary sustainability.

Exemplary and case-by-case biochemical and biophysical control structures in the zootechnical laboratories and farms in Romania ensure the participation of sanitary veterinary sustainability to the intergenerational dimension of sustainable development.

By continuing to provide concrete explanations and definitions, it is stated that sanitary veterinary sustainability is part of the multidimensional concept of sustainable development of Romania, which expresses a permanent superior evolution toward a feasible, safe society.

Sustainability in the sanitary veterinary field is part of the multidimensional concept of sustainable development, which implicitly expresses the continuous evolution of the communities and entities in the human society.

Gro Harlem Brundtland has developed under the aegis of the World Environment and Development Organization (OMMD) the document entitled "Our Common Future", known as the "Brundtland Report" (1972), which was formally adopted at the World Summit in Rio de Janeiro (1992).

The text of the document finds the definition of sustainable development, which is the broadest agreement of all actors involved: "the ability to meet the requirements of the present generation without compromising the ability of the next generations to meet their own needs".

After another decade in 2002, at the World Summit on Sustainable Development held in Johannesburg, South Africa, when reviewing the progress made in the field since the previous Summit, health was designated as one of the five priority areas for humanity, alongside water, energy, agriculture and biodiversity (as a sectoral approach), known as the WEHAB Initiative (Water, Energy, Health, Agriculture, Biodiversity).

At the conference, a separate chapter was devoted to the field of health, which highlighted the dependency relationship between sustainability, health and environmental issues.

The most important message of the health agenda at this summit was that sustainable development cannot be achieved if there is a high incidence of disease and that the health of the population and animals cannot be maintained without a healthy environment.

The official view is that in fact at least a quarter of global health problems are attributed to environmental factors, including biochemical and biophysical factors.

Therefore, it is also observed in Romania that the sustainable development has an intergenerational dimension in which the sanitary veterinary field also participates.

3. **Inequalities in the distribution of sanitary veterinary services within the same generation**

We find that in fact every single animal / livestock animal generation, one after another in evolution, must have the capacity to meet its own veterinary safety needs, given the permanent distribution of income and other resources of the society.

It is noted that veterinary health services, together with education, equality of opportunities (opportunities) and protection of human rights, are subject to their distribution as resources of human society / collectives (Fig. 1).

The basic characteristic of the general process of distribution of resources in the modern society of Romania is given by the persistence of the inequalities of sharing and using the sanitary veterinary services within a zootechnical / animal breeding generation, and even more so in the intergenerational chain of evolution of the animal kingdom.

Health sustainability has its original functionality in sanitary veterinary services distributed on matricular alignments that participate in the operational framework of sustainable development.

It is understandable that highly structured sanitary veterinary services, operational in real time in corrective intervention and insurers' feedstocks for local,

regional and global livestock farms are contributing to shaping the sustainability of human society as a whole.

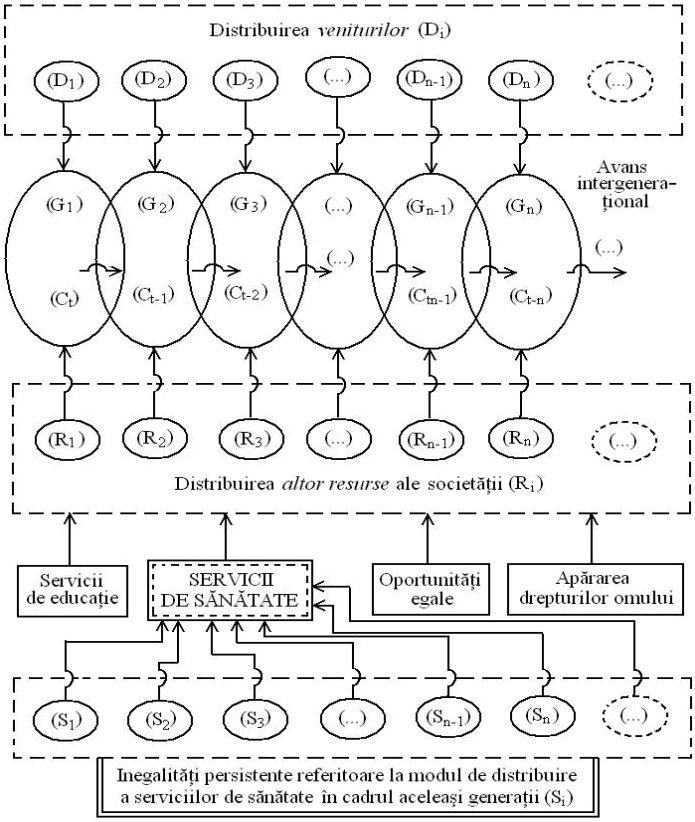

Fig. 1. *The attitude of the people / decision-makers towards the sanitary veterinary sustainability by the persistence of the inequalities on the distribution of sanitary veterinary services within the same generation / zoo / animal stock*
* (G1); (G2), ..., (Gn) = livestock / animal generations;
(C); (Ct-1), ..., (Ct-n) = capacities of a zootechnical / animal stock generation to meet their own sanitary veterinary needs (Source: the author)

As such, sustainable development is inconceivable without the operational and sustainable efficiency of sanitary-veterinary services, environmental protection and activities in laboratories and farms, given that the biochemical and biophysical structures have positive effects.

Examination of sanitary veterinary sustainability has an identifying and important role for:

a) defining the structure of the veterinary health field;

b) knowing the contents of the local sanitary veterinary systems;

c) obtaining information regarding the properties and characteristics related to the veterinary health field in Romania;

d) obtaining opinions on the mission, objectives, goals and targets pursued by the sanitary veterinary services;

e) the programming of results, effects and consequences among the livestock producers for the sustainable veterinary health insurance within the general framework of sustainable development of the country and, last but not least;

f) measuring the participation of people and management in the process of controlling this process, based on the biochemical and biophysical control structures.

We appreciate that, in fact, the biochemical and biophysical control of the sanitary veterinary field must be established in specialized structures with delimited practices, materialized by applicative specificity.

In fact, sanitary veterinary control is an essential managerial approach to the feed-back circuit and, as a consequence, it must be organized and managed.

The control structures (in the present case specialized for biochemical control, respectively biophysical sanitary veterinary field), in turn, must be organized and managed.

The management of control structures in the sanitary veterinary field is oriented towards the formalization of as many as possible reactive loops of corrections of the inputs, respectively of adjusting the processing to reach the final order of synthetic characteristics in the sanitary veterinary sustainability ensured (Fig. 2).

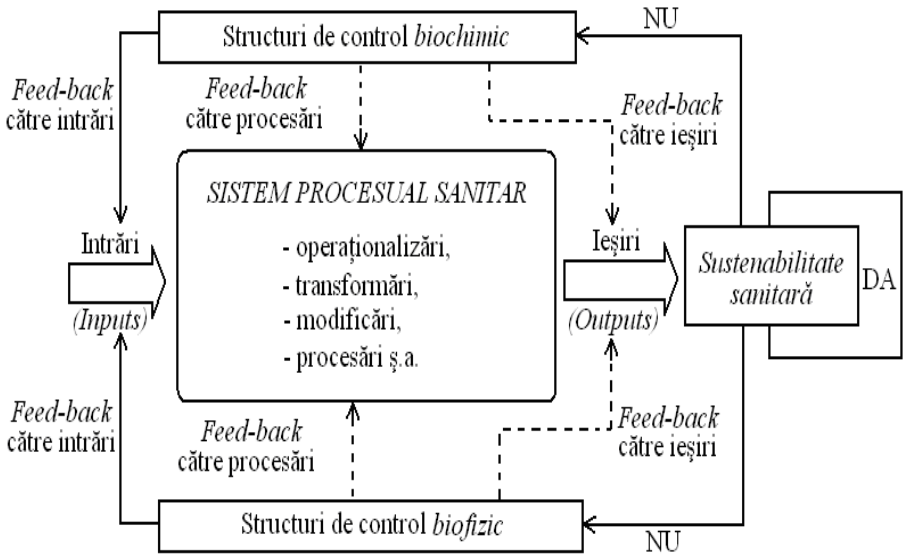

Fig. 2. *Use of biochemical and biophysical control structures in sanitary veterinary field for the correction of inputs, processing and outputs of sanitary systems to achieve sanitary veterinary sustainability considered final order value* (Source: the author)

Once the flow of inputs, processing and outputs, corresponding to the operational / operationalization of a sanitary veterinary system, is proven to be decisive for the steps taken to:

a) determine (by taxation) the value, (property, size, quality, etc.) resulting, in the present case, "the sanitary veterinary sustainability", respectively;

b) formalizing biochemical and biophysical control structures in the sanitary veterinary field, which become operators for reverse reactions (reactive loops) to apply corrections to inputs, processing and outputs, so that the final expected value can be obtained with a net grade, even of certainty.

The application of the corrective feed-back flow in the sanitary veterinary field can be done starting from the notional delimitation of sanitary veterinary sustainability.

In other words, the application of the corrective feed-back flow in the biochemical and biophysical field in the zootechnical laboratories and farms in Romania can be done starting from the understanding of the notions of sanitary veterinary service, respectively sanitary veterinary sustainability.

Based on the above findings, it is appropriate to study and discover what new resources can be allocated to the veterinary health care system so that the results obtained are more consistent, relevant and useful to health and sanitation general zootechnical fund throughout the national territory.

Once is understood and retained "what sanitary veterinary sustainability is", it must be framed in a procedural-operational algorithm to ensure the sanitary veterinary sustainability as commendable value, imposed, expected in a dynamic, stochastic system, which takes into account the time factor, in the transformative concerns affected by natural and / or artificial biochemical and biophysical phenomena (Fig. 3).

In fact, a sanitary veterinary service is carried out with the help of instrumental / intrumentalized sanitary veterinary structures.

Once the relevant (configured) structures of the sanitary veterinary sector have been built, they have to be organized and managed, so we can talk about the need to operationalize the bio-physicochemical management.

Therefore, it is legitimate to introduce in the proposed procedural-operational algorithm the management of the biochemical and biophysical control structures in the sanitary veterinary field.

Accordingly, by extension and in the articulations, it is also appropriate to formalize the management of the bio-physicochemical / bio-chemical-physical control structures in the sanitary veterinary field.

The entire conceptual construction described above is only assumable under conditions of feasibility and operational efficiency.

As such, it is necessary to delimit the economic behaviour of control structures designed in the sanitary veterinary field.

Thus, starting from the structures for initiating the sanitary veterinary sustainability, the followed processual-operational algorithm reached the stage of the sanitary veterinary sustainability ensured (to ensure the sanitary veterinary sustainability), using organized structures (biochemical and biophysical) organized and efficiently driven, in terms of efficiency / achievement in the field.

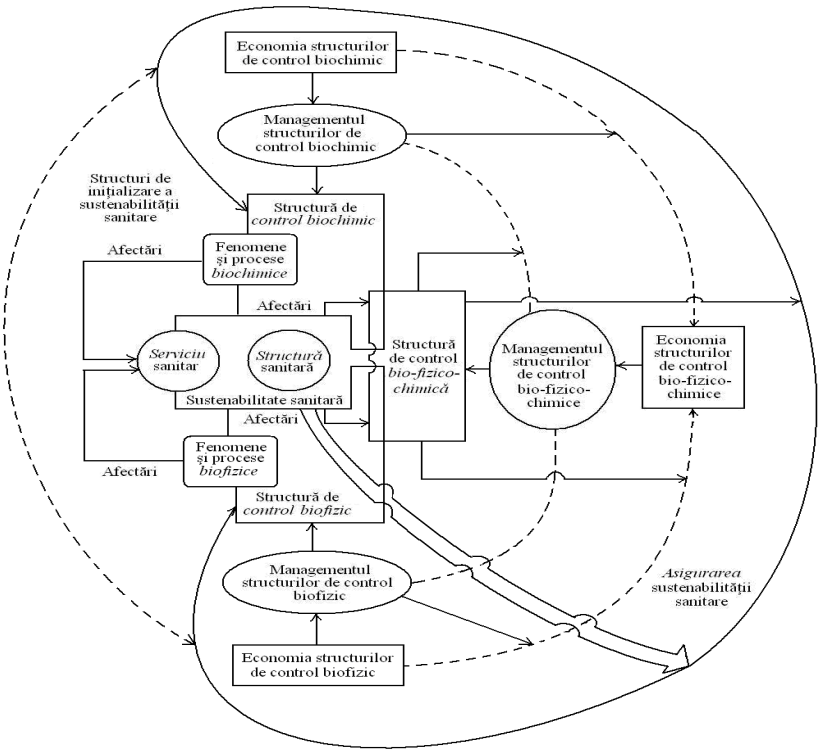

Fig. 3. *Delimitation of sanitary veterinary sustainability and process-operational algorithm to ensure sanitary veterinary sustainability with biochemical and biophysical control structures* (Source: the author)

Conclusions

The starting point of the sanitary veterinary survey should be from the composition of the human health requirements to those related to sustainable development.

Biochemical and biophysical aggressions have been shown to have significant negative implications on animal health, including from laboratory and farm activities.

Biochemical and biophysical structures, including those in laboratories and farms, frequently affect the safety and quality of food.

Infections or intoxications due to microbiologically contaminated foods lead to diseases such as trichinosis, salmonella and enteritis, which are the most common in Romania.

Additional concern in the healthcare environment in Romania is given by the transmission of antibiotic-resistant salmonella, thus being linked to the increase in antibiotic resistance cases, which is related to the decrease of the control potential of the specific biochemical structures.

Food safety issues are much wider both in Romania and in other EU countries.

Some are caused by the consumption of genetically modified animal products or those containing dangerous chemicals transformed into food consumed by the population, which also relates to the requirement to control biochemical structures.

Biophysical structures also determine risks associated with the environment and living conditions, including in Romanian laboratories and farms.

There are many biophysical risk factors for human health coming from the environment and the sanitary veterinary field.

In the account of the biochemical and biophysical structures of radical importance, the management of toxic chemicals is proven.

The production, handling and use of toxic chemicals in laboratories and zootechnical farms exert influence on human health.

Statistics show that there are about 30,000 chemicals that are produced or imported in quantities of more than one tonne per year in EU countries.

For most of them, basic information on their toxicological properties, different uses and market quantities is currently not available in Romania.

Those for which there is information on the toxicological properties for human health from the cases found in the veterinary field have been grouped into five classes, starting with the most dangerous: carcinogens (C), which produce mutations (M) and reprotoxic chemical (CMR); chemicals with chronic toxicity; very toxic chemicals and dangerous chemicals.

Conclusively, if biochemistry is assembled with biophysics, biochemical and biophysical elements are analyzed to identify the specific organization of control structures in the sanitary veterinary field and, on this basis, proposals can be made to improve general health sustainability.

References

1. Brehar-Cioflec, D., Chiciu, G., *Biological Risk in Clinical Laboratory: Unknown and Challenges*. Communication at the 17th EBSA Annual Conference: Gent. Belgium. May 13-16, 2014.
2. Drangert, J.-O., *Sustainable sanitation – a review*. Linkoping University, Sweeden, 2012.
3. Luebbert, P. P., "Infection Control in Clinical Laboratories." *APIC Text of Infection Control and Epidemiology*, 2000.
4. Mackensie, A., "Health Issues." *Harvard Business Review*, 1969.
5. Marinescu, Ioana Andreea, *Biophysics – Course Notes*. Piteşti: Publishing House of Knowledge-Based Development, 2012.
6. Marinescu, Ioana Andreea, *Biophysics – Laboratory Guidance*. Piteşti: Publishing House of Knowledge-Based Development, 2012.
7. Marinescu, Ioana Andreea, *Economics of Risk*, BlackBoard Learning Platform, http://bb.spiruharet.ro; http://94.176.180.33/.
8. Marinescu, Ioana Andreea, "Management of economic and social competitiveness through the contribution of sanitary sustainability." In the volume: *Economic and Financial Policies for Competitive Development*, International Scientific and Practical Conference, Chisinau: ULIM, CISE, 2013. pp. 185-188.
9. Marinescu, Ioana Andreea, "Intergenerational dimension of conceptualized sanitary sustainability with the help of higher learning, including at distance," *New Approaches to Quality in Higher Education National Conference*, 2nd Edition, 12

Dec. 2012, in the framework of the Project: "Academic Excellence in Distance Learning and Frequently Learning – a Demand for Quality", http: //www.excelenta-idifr.ro/.
10. Marinescu, Ioana Andreea, "Sanitary Sustainability within the General Framework for Sustainable Development." *Annals of Spiru Haret University*. *Veterinary Medicine Series*, 2012, p. 54.
11. Marinescu, Ioana Andreea, "Sanitary Sustainability in Subsistence / Bioscience Assurance Structures in Human Collectives." *Annals of Spiru Haret University*. *Veterinary Medicine Series*.
12. Marinescu, Ioana Andreea, "Biochemical and biophysical innovative management structures for bio-economic sustainability." The Annual Conference of the EuroMed Academy of Business: *Biochemical and Biophysical Innovative Management Structures for Bio-Economic Sustainability*, 23rd-24th, September 2013 (Col. C. Berghe, N.C. Marinescu).
13. Marinescu, Ioana Andreea, *Microbiological analyzes for water characterization*, Ed. Politehnica Press, Bucharest, 2008.
14. Marinescu, Ioana Andreea, *Exploitation and eco-technology exploitation of natural resources*, Infomin Deva Publishing House, 2010.
15. Marinescu, Ioana Andreea, *Guidance for Impact Assessment and Environmental Balance Surveys*, Ed. Printech, Bucharest, 2008.
16. Marinescu, Ioana Andreea, "Simultaneous Sorption of Cadmium, Zinc and Lead on Montmorillonite." *Revue Roumaine de Chimie*, Bucarest, 2008.
17. Marinescu, Ioana Andreea, "Sorption of Hg2 + and Pb2 + Ions from Aqueous Solutions on Corn Cobs Biomaterials." *Revue Roumaine de Chimie*, Bucarest, 61, No.1 / 2010.
18. Marinescu, Ioana Andreea, "Managerial Premises for Changes in Medical Higher Education Dominated by Telecommunications," *New Approaches to Quality in Higher Education National Conference*, Alba-Iulia, Bucharest, Sibiu, Timisoara 9 Decembre 2011 in the framework of the project "Academic Excellence in Distance Learning and Short-Learning – a Demand for Quality".
19. Poenaru, M., "A New Approach to Risk Factors for Public Health." *Scientific Review: Health Management*. 2011 no. 3/206, 2012, p. 21.
20. Poenaru, M., "Determinants and risk factors for public health. Evaluation indicators." In: Gh. Zaman, V. Vasile (coord.): *Elements of multidimensional analysis of sustainable development. Problem approach*. Bucharest: Ed. Expert, 2006.
21. Smith, M., *Development and Bioeconomy in South Australia. Crown in the South of Australia*. Department of the Premier and Cabinet. Adelaide, 2005.
22. *** *National Biosafety Guide for Medical Laboratories. Laboratory biosafety manual*. Ed and III, Geneva: WHO, 2004.
23. *** *Sanitary sustainability*, UN Commission for Sustainable Development, 2001.
24. *** *Alliance for Natural Health* (ANH) (UK, 2006).