

INTEGRATED HYGIENE ASSESMENT OF DAIRY FARMS OF DIFFERENT CAPACITY

Tch. Miteva*¹, V. Dimova*, A. Iliev*, Zh. Gergovska*, J. Mitev*, K. Uzunova**

* *Agricultural Faculty, Trakia University, Stara Zagora*

***Faculty of Veterinary Medicine, Trakia University, Stara Zagora*

ABSTRACT

The purpose of this study was to evaluate the hygiene parameters in dairy farms of different capacities and technological solutions and to find out to what extent the established values corresponded to those set out in regulations. Subjects of estimation were 6 dairy farms divided into three groups depending on their capacity – 1st group: over 50 dairy cows; 2nd group: from 10 to 50 dairy cows and 3rd group: up to 10 dairy cows. The farms were situated in the village Yastrebovo, region of Stara Zagora. The main problems in assessing the overall condition of the farms included a lack of disinfection sites, lack of sanitary facilities, lack of manure depots, lack of isolation and quarantine facility, and non-systematized, incomplete or missing documentation and reporting, lack of an action plan in extreme situations. The existing practices in the investigated farms were risky and a prerequisite for environmental pollution. There was no action to limit the odour of manure, to reduce exhaust emissions of greenhouse gases in the atmosphere and to monitor the uncontrolled leakage of slurry and sewage in the soil. After completing all control charts and analyzing responses to questions, the final result of the integrated hygiene assessment of the farm was negative.

Keywords: integrated hygiene estimation, dairy farms, check lists

INTRODUCTION

The state of family cattle farms is of particular importance for both the welfare and comfort of animals, as well as for their productivity, which determines the economic profitability of a farm. Most of now existing small cattle farms are not compliant to the requirements set in Ordinance 7/1992 for the hygiene safety zones between animal rearing facilities and residential areas, which is part of the integrated ecological assessment of livestock farms (Kostadinova et al., 2001; Petkov et al., 2002; Petkov, 2004).

The numerous small family dairy farms in the country complicated their detailed investigation and integrated hygiene assessment. Nevertheless, the evaluation of their present status and potential would help the accurate assessment of their compliance to hygiene sanitary requirements set in regulations (Ordinance 44/2008) and the animal welfare standards (Ordinance 30/1999; Ordinance 14/2000).

The purpose of this study was to evaluate the hygiene parameters in small dairy farms in order to establish the extent of their regulatory compliance.

MATERIAL AND METHODS

The survey was conducted in Yastrebovo, region of Stara Zagora, in 2009-2010 on 6 dairy cattle farms for milk production with total of 133 cows, distributed as followed:

- **I group** – farm No 1 (farms were numbered from 1 to 6 for confidentiality reasons) with 86 cattle (32 lactating cows, 18 dry cows, 12 heifers, 8 bull sires, 16 calves >6 months of age by the time of the survey).

- **II group** – farm No 2 with 22 cattle (8 lactating cows, 2 bulls, 7 calves >6 months of age and 5 calves < 6 months of age by the time of the survey).

- **III group** – farm No 3 (3 lactating cows, and 2 calves >6 months of age); farm No 4 (3 lactating and 3 dry cows); farm No 5 (8 lactating cows and 1 heifer) and farm No 6 (8 lactating cows and 2 calves >6 months of age).

The hygiene parameters of surveyed farms were determined as per Manual of Animal Hygiene (Iliev et al., 2008) using the control charts (CC) developed and published by the Animal Hygiene unit of the Department of Applied Ecology and Animal Hygiene" at the Faculty of Agriculture, Trakia University. Control charts were development on the questionnaire principle. The compliance of each parameter to the regulations is evaluated depending on the answer.

After all control charts for a given farm were filled in, the final assessment of each key issue was performed. The total assessment of the facility was a sum of final key issues assessments. A positive final assessment was given to a facility with positively assessed key issues.

RESULTS AND DISCUSSION

Control chart I: Hygiene safety zones

The sanitary protection zone between animal farms and the boundary of the residential area of settlements was adequate only for the farm with 86 cattle. It was at a distance of 300 m from the outmost buildings vs the allowance of 100 m set in regulations (Ordinance 7 of the Ministry of Health) (Table 1).

The other farms were within the settlement area, and when animals were moved to pastures, they crossed the main roads and streets where people, vehicles and other animals were also moving. The sanitary protection zones between all groups of farms and railroads, main roads and highways, and plants with harmful emissions were adequate and compliant to regulations (Table 2).

Table 1. Sanitary protection zones between animal farms and the boundary of the residential area of settlements

Capacity of animal farms (number of animals)	Hygiene safety zone, m	I group	II group	III group
500 to 1000	500	-	-	-
100 to 500	300	-	-	-
50 to 500	100	Yes	-	-
10 to 50	50	-	No	No

Table 2. Sanitary protection zones between a cattle farm and adjacent objects and infrastructure

Minimum distance allowance to:	Distance, m	I group	II group	III group
Railroad lines	360	Yes	Yes	Yes
Main roads and highways	300	Yes	Yes	Yes
Plants emitting harmful substances	6000	Yes	Yes	Yes
Cattle farms	1000	Yes	No	No
Sheep farms	1000	Yes	No	No
Pig farms	2000	No	No	No
Poultry farms	2000	No	No	No

The allowances about the distance from other types of farms (from 1000 to 2000 m) were severely violated, especially in the third group of farms, where the distances from other private yards in the settlement where animals of various number and species were kept, were between 12 and 40 m. On the basis of these results it could be concluded that the proximity between animals from the third group of farms and backyard animals of other owners could be a prerequisite for the very rapid spread of an emerging infectious disease.

Control chart II: General characteristic of the farm

The questions in this chart are about the general characteristic of the animal rearing facilities (Table 3). All groups of farms were supplied with water from the settlement's water supply network. Only farm No 1 had an own water source with a flow rate sufficient to respond to all potential needs of the farms.

The analysis of answers to the question "Is the farm fenced?" all owners replied with "yes" but our observations showed that the fence of farms from group III was actually the fence of the residential plot.

Table 3. A general characteristic of the farm

Questions:	I group	II group	III group
Are there landfills, slaughterhouses, processing plants and industrial facilities, which could have an impact on the farm's hygiene status through prevailing winds	No	No	No
Is the farm supplied with water from the water supply network of the nearest settlement	Yes	Yes	Yes
Does the farm possess own water supply			
- probes	Yes	No	No
- wells	Yes	Yes	Yes
- natural water basins	No	No	No
Is the water flow rate sufficient for drinking, industrial and fire protection purposes	Yes	Yes	Yes
Is the farm fenced	Yes	Yes	Yes
Are the fences adequately maintained	Yes	Yes	Yes
Is there an outer road networks in farm's vicinity			
- first class	No	No	No
- second class	Yes	No	No
- third class	No	Yes	Yes
- fourth class	No	Yes	Yes
Is there an inner road network (roads to buildings, pastures, cultivated land)	No	No	No
Is there a disinfection drive-through pool for vehicles at farm's entrance	No	No	No
Are the disinfectant solutions replaced on a regular basis	No	No	No
How are residential buildings in the farm's region oriented towards production and auxiliary premises with regard to prevailing winds - windward	No	Yes	Yes
How are the manure depots oriented towards residential, production and auxiliary premises with regard to prevailing winds - leeward	Yes	No	No
How are the silage depots oriented towards residential, production and auxiliary premises with regard to prevailing winds - leeward	No	No	No
Is there a built carcass collection site	No	No	No
Is there a quarantine facility	Yes	No	No
Is there an isolation facility for ill animals	Yes	No	No
Is there an action plan in case of emergencies and disasters	No	No	No
Are technical service and maintenance, and technology record keeping regular	No	No	No

The fences of all farms were not well maintained and could allow for an uncontrolled access of other animals (cats and dogs) as well as domestic and wild birds to cattle rearing facilities.

Only farms from group I possess an external road network.

None of farms had a classic type of disinfection area. Farm No 1 used a polyurethane foam mattress soaked with disinfection solution and put into a plastic tray, which was used for disinfection of shoes of workers and visitors. The waste disinfection solution is poured into a septic tank. There was no drive-through disinfection pool for vehicles.

In none of the farms a modern sanitary unit compliant to the requirements for this type of animal rearing facilities could be found. Only in farm No 1, workers changed obligatorily their clothes and shoes on arrival and leaving the farm with a special work wear. The flaws with respect

to meeting the minimum standards for vehicle disinfection accessing the farm are a substantial risk factor for spread of infection for all groups of farms. The used method for disinfection of shoes of workers and visitors at the farm's entrance was not regular, but rather occasionally performed.

Farms of all groups were properly oriented with respect to the prevailing winds in the region. The residential buildings were on the windward side against the production facilities. The answer "no" for the farm from group I was due to the fact that it was outside the settlement and there were no residential buildings on its territory.

The manure depots were improperly situated in farms from groups II and III. Only the manure depot of the farm from group I was situated on the leeward side of production facilities.

At the farms, there were no silage depots, nor fenced carcass collection sites. An isolation facility was found out only in farm No 1, but it was used predominantly as a warehouse.

With regard to the documentation, it should be said that at farms from groups II and III, the record keeping and bookkeeping were not maintained, and if practiced, they were not complete. The existing data and financial records at the farm from group I was not systematized and with a lot of erroneous data. The records of treated animals were not regularly maintained. The best was the status of insemination records carried out at the farm. None of farms possessed a developed action plan in case of emergencies and disasters.

The poor status of record keeping and bookkeeping at all farms could be a hazard related to the quality of produced milk, whereas the lack of emergency action plan showed that the farm personnel was not trained to act in extreme situations, which would present a particular risk in such cases.

Control chart III: Risk assessment of air, water and soil pollution from farm's activities

The answers to the question "Is manure cleaning technology appropriate with respect to the used production system and is it compliant to requirements for reduction of environmental malodours" (Table 4) were all negative. A specific finding in all surveyed farms was the strong, specific and unpleasant odour of manure. The presence and spread of this odour in the environment was particularly enhanced by that fact, that none of farms, except for farm No 1, had a specially built manure depot.

The manure was cleaned and removed from the rearing facilities on a daily basis. In one farm from group III, the cleaning system was not compliant to the requirements for minimum water consumption. The manure storage areas at all farms (even that with a manure depot) failed to provide 6-month storage of the slurry, which did not ensure its quality as a natural fertilizer. The way of manure removal from the facilities to the storage areas created prerequisites for uncontrolled leakage of slurry at all farms, i.e. for soil pollution. Manure was transported to storage areas with wagons and carts that the slurry leaked out of.

Table 4. Risk assessment of air, water and soil pollution from farm's activities

Questions:	I Group	II group	III group
Is manure cleaning technology appropriate with respect to the used production system and is it compliant to requirements for reduction of environmental malodours	No	No	No
Is the manure cleaning technology used at the farm compliant to the requirements for minimum water consumption	Yes	Yes	Yes
Are the manure and the litter cleaned on a daily basis from animal rearing facilities	Yes	Yes	Yes
Is the capacity of farm's manure depot sufficient for 6-month storage of the slurry	No	No	No
Is the way of manure removal from rearing facilities related to uncontrolled leakage of slurry	Yes	Yes	Yes

Science & Technologies

Are any chemical substances added to manure depot for reduction of harmful gas emissions in the environment	No	No	No
Is the manure depot covered	No	No	No
Are the standards for the distance between the farm's manure depot and water supply sources met	Yes	Yes	No
Are the standards for the distance between farm's silage depots and water supply sources met	No	No	No
Are the floor and wall of farm's manure and silage depots built from water- and corrosion-resistant materials	No	No	No
Do manure and silage depots possess a drain system and is there a free flow of liquid slurry to a collection tank	No	No	No
Is the waste water from cleaning of facilities, milking parlours and equipment, as well as the unsold or culled milk drained to the manure depot through a system of ducts	No	No	No
Is the waste water from cleaning of facilities, milking parlours and equipment, as well as the unsold or culled milk drained and collected separately in a purposefully built waste water collection tank	No	No	No
What the manure is used for:			
- fertilizer	Yes	Yes	Yes
- biogas production	No	No	No
- feed	No	No	No
Is there a developed plan for dispersing the organic waste onto arable land at the farm	No	No	No
How is manure applied on arable land:			
- surface spreading	Yes	Yes	Yes
- injection	No	No	No
Is the manure ploughed down after being spread	Yes	Yes	Yes
Are manure spreaders washed and disinfected prior to and after work	Yes	No	No
Plastic and nylon waste, and old tyres collected at a defined area in the farm	Yes	No	No
Plastic and nylon waste, and old tyres are burnt at the farm	No	Yes	Yes
Plastic and nylon waste, and old tyres are collected by a licensed company for recycling	No	No	No
Is there a specified and safe place for collection of dangerous waste at the farm	No	No	No
Dangerous waste at the farm are collected by a licensed company for destruction	No	No	No
The incineration of dead animal carcasses is done at the farm	No	No	No
Is stubble burning applied	No	No	No
Is the developed plan for stubble burning at the farm	No	No	No
Are machines and engines properly maintained in operation according to manufacturers' instructions	Yes	Yes	Yes
No machines with power higher than the needed for specified activities are used at the farm	Yes	Yes	Yes
Is the traffic at the farm properly organized for faultless operation (so that the machines would not have to be moved around more than necessary)	Yes	Yes	Yes
Are any non-conventional energy sources (solar batteries, heating systems with straw fuel and fuel from other waste, biogas produced from manure, wind and water energy) utilized at the farm	No	No	No
Are the quality of air, water and soil at the farm checked on a regular basis	No	No	No

None of farms applied chemical substance to reduce the harmful gaseous emissions in the environment.

The utilisation of open sites for manure storage was related to a negative environmental impact. Extensive rain and snow dilute the manure, which leaks to penetrate in a soil nearby the

storage sites. The pollution then penetrates, spreads, and could directly contaminate superficial groundwater.

The standards for the distance between the farm's manure depot and water supply sources were met in farms from groups I and II. The small yards where the cattle at farms from group II were reared did not permit the observance of this requirement. The distances from manure storage sites to water supplies at farms from group III were from 6 to 12 m provided that the minimum allowance for distance from probes, wells and springs is 50 m.

The negative answers to the question "Are the standards for the distance between farm's silage depots and water supply sources met" given by owners of farms of groups II and III were due to the absence of such depots.

The floor and walls of farm's manure depots were not built from materials, which could prevent the leakage of slurry and waste water. There is no a system to drain waste water to a collection device, tank or septic tank. Farms from all three groups had no system of ducts for removal of waste water from cleaning of buildings, milking equipment and household water to a separate collection tank (cistern). Waste water is poured into the common sewerage system of the farm (I and II group), whereas at farms from group III, they were drained into a septic tank, common for the farm and the residential building. During the winter months, waste water is often poured directly on the soil in order to prevent overflowing of septic tanks.

None of farms possess a developed plan for dispersing the organic waste onto arable land. The manure at all surveyed farms was used for surface fertilization of agricultural land, followed by plough-down.

Only the farm from group I had a partial practice for storage of production waste (old tyres, plastic and nylon waste) which were then collected by retailers or suppliers for recycling or destroying.

The collected production waste at farms from groups II and III were burnt, as was the common practice of all agricultural producers in the settlements. This resulted in emission of harmful gases in the atmosphere and air pollution, which is not acceptable by good farming practices and environmental protection regulations.

None of farms collected dangerous waste at a safe place, nor used the services of licensed companies for their safe destruction. In all surveyed farms, improperly collected and stored veterinary drug packages, pesticides, poisons, infected material etc. could be found. A major problem in this case was the unawareness and the lack of comprehension about the possible risk of the presence of all those waste for people and animals at the farm, and for the environment.

Stubble burning was not done at any the farms, nor were there any plans for such a practice.

The available machines and equipment were operated according to manufacturers' instructions. In general, the used equipment was not heavy and powerful. No machines with power higher than the needed for specified activities were used at the farms. The positive answer to the question "Is the traffic at the farm properly organized" came possibly from the fact, that machines were used only when justified by an extreme necessity due to the poor financial status of farms and attempts to reduce operation costs. None of farms used alternative energy sources as, according to farmers' opinion, this was rather expensive.

In general, the assessment of farms according to this control chart was negative. The good hygiene practices for protection of air, water and soil were not respected. Prerequisites for environmental pollution were established, which was in contradiction with both national and EC regulations. A major problem in the future would be the uncontrolled spread of malodour, the leakage of slurry and waste water, the harmful gaseous emissions from waste burning.

Control chart IV: Assessment of disinsection and deratization control at the farm

Only farm No 2 has responded that the rearing facilities, feed stores and the other auxiliary facilities were protected against infestation with parasites, insects or rodents (Table 5). There were

neither a map of the specific stations for baits against pests, nor instructions or records for disinsection and deratization carried out at the farm.

Table 5. Assessment of disinsection and deratization control at the farm

Questions:	I group	II group	III group
Are the rearing facilities, feed stores and the other auxiliary facilities protected against infestation with parasites, insects or rodents	Yes	No	No
Is there an instruction protocol for performing disinsection and deratization at the farm	No	No	No
Is there a chart of the specific stations for placement of baits and poisons to combat pests at the farm	No	No	No
Is there a record keeping of disinsection and deratization carried out at the farm, as well as of used preparations	No	No	No
Are safety instructions of workers directly engaged in prevention and extermination of pests at the farm performed on a regular basis	Yes	No	No
Disinsection and deratization at the farm is carried out by a licensed company	No	No	No
The substance for control of harmful insects at the farm are stored in a separate premise are stored in a separate room specifically designated for this purpose, with limited access	Yes	Yes	Yes

In general, each farmer has purchased chemical substances for pest control, which were stored separately from other consumables at the farm, with no access to outsiders. Usually, farmers placed baits alone and more frequently relied upon mechanical control (mousetraps) or natural enemies (cats).

Control chart V: Animal protection and welfare during transportation

The transport of animals is an important part of livestock husbandry practices. The production systems frequently involve moving or transportation of animals from one place to another both within the farm as well as outside – to pastures, to animal retail markets, hospitals, slaughterhouses etc. (Table 6).

Table 6. Animal protection and welfare during transportation

Questions:	I group	II group	III group
The cleaning and disinfection of transportation vehicles is done prior to loading	Yes	No	No
Are there specialized vehicles for transportation of animals at the farm	No	No	No
Does the equipment of the vehicle provides comfort for animals during transportation	No	No	No
Is there a loading/unloading ramp for animals at the farm	No	No	No
Is the ramp slope compliant to the animal species and their locomotion specifics	No	No	No
Is the ramp secured with side parapets, preventing animals from falling down and injuries	No	No	No
Is the attitude towards animals during loading/unloading compliant with animal welfare standards	Yes	Yes	No
Are transported animals accompanied by the documents required by the ordinance for veterinary requirements for protection of animals during transport	Yes	Yes	No
Do the driver and animal attendants possess sufficient knowledge, skills and experience to guarantee the welfare and comfort of animals during transport	Yes	No	No

The answer to the question "Are there specialized vehicles for transportation of animals at the farm" at all farms was negative. In the farm from group I, the vehicle for animal transport was cleaned, washed and disinfected before each use.

There were no ramps for loading/unloading of animals at the farms.

Only the vehicle driver in charge of the transport of animals from group I had a certificate for attendance of a course for animal welfare and protection during transportation. This allowed assuming that the driver and animal attendants possessed the sufficient knowledge and skills to guarantee the welfare and comfort of animals during transport. The working process would surely contribute to gain the needed experience needed for each specific element of animal transportation.

Control chart VI: Assessment of welfare, comfort and humane treatment of animals at the farm

Farmers and farm workers agreed with the concept and the regulations necessitating meeting animal welfare and comfort standards (Table 7). At the time of the survey, however, they believed that the facilities and equipment were not enough safe and harmless for animals. It was outlined, that some of technological solutions and consumables used at farms were not safe for animal health.

Only farms from groups I and II disposed with enough free space for comfortable rest and lying of animals. The same situation was observed for floorings and beds, and the used bedding. This was confirmed by the good hygiene of animals - they were maintained dry and clean.

Animals from all farms had visual contact one with the others.

The rearing facilities were adequately lightened and could provide the necessary light intensity. Except for farm No 1, all areas in the facility were not equally lightened.

All farmers and workers evaluated the microclimate as good although it was not controlled on a regular basis. This suggested that microclimate parameters should be determined in order to obtain a reliable answer to this question. Natural ventilation was available at all farms. There were no air moistening devices, nor "is mechanical ventilation, therefore the lack of answer to the question the equipment for maintaining optimal microclimate operating normally". The same was valid for the presence of sound signals to alarm in case of critical deviations in microclimatic parameters.

Table 7. Evaluation of the animal welfare, comfort and humane treatment at the farm

Questions:	I group	II group	III group
Do you believe that the animal welfare and comfort standards at the farm should be met	Yes	Yes	Yes
Are the rearing facilities and their equipment safe and harmless to animals:			
- are there sharp edges which may injury the animals;	No	No	Yes
- are equipment's dyes and varnishes safe for animals;	Yes	Yes	Yes
- are used cleaning and disinfection preparations safe for both animals and the personnel	Yes	Yes	Yes
Is there a sufficient space in the facility (cubicles, beds, boxes) for each animal so that it could move freely	Yes	Yes	No
Does the flooring of beds, cubicles and boxes provide enough comfort for animals during resting	Yes	Yes	No
Is the flooring of boxes, beds and cubicles maintained dry and clean	Yes	Yes	No
Do the partitions of between boxes, beds and cubicles ensure a visual contact between animals	Yes	Yes	Yes
Is there a lighting (natural or artificial) with a minimum duration of 8 hours	Yes	Yes	Yes
Are all areas in the facility equally lightened	Yes	No	No
Is the microclimate of the facilities compliant to hygiene norms	Yes	Yes	Yes
Is the microclimate controlled on a regular basis	No	No	No
Is the equipment for maintaining optimal microclimate operating	-	-	-

Science & Technologies

normally			
Are rearing facilities supplied with sound signal to alarm in case of critical changes in air temperature and humidity	No	No	No
Are there action plans in case of emergency situations at the farm:			
-breakdown of ventilation systems	No	No	No
-breakdown of heating systems	No	No	No
-breakdown of cleaning systems	No	No	No
-breakdown of feeding systems	No	No	No
-breakdown of drinking devices	No	No	No
-natural disasters (fires, floods, earthquake etc.)	No	No	No
Is the personnel trained for action in case of emergency situations at the farm	Yes	No	Yes
Are the humane treatment standards met in cases of culling and slaughtering	No	No	No
Is the feeding of animals balanced and compliant to their age, weight and physiological condition	Yes	Yes	Yes
When animals are reared in groups, is the feed face allowance met	Yes	Yes	Yes
Is spilled feed and feeding areas cleaned and disinfected on a regular basis	Yes	Yes	Yes
Are the feeds used at the farm compliant to good hygiene practices with respect to:			
- presence of molds, bunt, rusts	Yes	Yes	Yes
- presence of mechanical impurities	Yes	Yes	Yes
- presence of undesired substances and products	Yes	Yes	Yes
- presence of poisonous plants	Yes	Yes	Yes
Do the animals at the farm have constant access to a sufficient amount of drinking water	Yes	Yes	No
When animals are reared in groups, is the drinking width allowance met	Yes	Yes	Yes
Are drinking troughs compliant with the animal welfare and comfort standards	Yes	Yes	Yes
Are drinking troughs at the farm cleaned and disinfected on a regular basis	Yes	Yes	Yes
Is the water supply network at the farm cleaned and disinfected on a regular basis	No	No	No
Do the farmers possess the needed knowledge and experience in:			
- skills for animal care	Yes	Yes	Yes
- skills for marking animals	No	No	No
- skills for prevention and basic knowledge about hoof care problems	Yes	No	No
- skills for prevention and treatment of endo- and ectoparasites	No	No	No
- skills for drug application and basic therapeutic manipulations	Yes	Yes	No
- skills for working with the milking equipment and for proper milking of dairy cows	Yes	Yes	Yes
- skills for assisting deliveries	Yes	Yes	Yes
- skills for neonate care	Yes	Yes	Yes

The farms did not have action plans in case of emergency situations as fires, water supply or feed breakdowns, technical failures or natural disasters (flood, earthquake, extreme weather, blizzards etc.).

As a result, the farm personnel was not appropriately training to act in an emergency situation although workers had a basic knowledge to counteract problems occurring at some steps of the production.

The answers to the question "Are the humane treatment standards met in cases of culling and slaughtering" in all farms were 'no'. Despite that slaughtering because of culling had not been

necessary so far, farmers were not informed on this issue and therefore, could not apply the respective standards in case of necessity.

All farms believed to practice a balanced nutrition according to the age and physiological state of animals as well as that feeds used at the farm were compliant to good hygiene practices with regard to their quality and safety. Positive answers were received about the adequacy of feeding and drinking widths.

Animals from farms of groups I and II were with constant access to drinking water of sufficient amount and the allowance for individual drinking width was met, whereas at farms from group III drinking was carried out at a periodical basis. Drinking troughs were not regularly cleaned and disinfected (cleaning was performed at different time intervals depending on the subjective assessment of animal carers about the need for cleaning), without any disinfection.

Farmers possessed the necessary knowledge to care for the animals, to work with the milking equipment and to milk cows, to assist deliveries and to take care of newborn calves. One of identified flaws in these skills was the lack of experience in prevention and treatment of hoof problems. Not all farmers were trained in prophylaxis or treatment of ecto- and endoparasites or to perform basic therapeutic manipulations (in III group).

According to the requirements, a positive integrated hygiene assessment is assigned to a rearing facility, with positive answers in all control charts. If one or more of questions in the control charts are answered with "no", the final assessment of the results of the control chart was also negative.

After filling in all control charts and analysis of answers to questionnaires, the final assessments of farms by groups were as followed (Table 8):

Table 8. Integrated hygiene assessment

Control charts	I group	II group	III group
№1 – Sanitary protection zones	Yes	No	No
№2 – General characteristics of the farm	No	No	No
№3 – Risk assessment of air, water and soil pollution from farm's activities	No	No	No
№4 – Assessment of disinsection and deratization control at the farm	No	No	No
№5 – Animal protection and welfare during transportation	No	No	No
№6 – Evaluation of the animal welfare, comfort and humane treatment at the farm	No	No	No
Final assessment	Negative	Negative	Negative

Despite that the number of answers "yes" in the different control charts was the highest in the farm from group I, its final hygiene assessment was negative. This farm was only compliant to requirements about the sanitary protection zones. Farms from groups II and III did not meet the requirements of any of control charts and the final assessments of hygiene were also negative

CONCLUSION

The main problems identified throughout the evaluation of the general status of the farm included lack of disinfection sites, lack of sanitary units, lack of manure depots, lack of quarantine and isolation facility, non-systematized, incomplete or lacking record keeping and bookkeeping, lack of emergency action plans. The existing production systems at the farms presented risks for environmental pollution. No action was undertaken to reduce the spread of unpleasant manure odour and harmful gas emissions. Uncontrolled leakage of liquid slurry and waste water into the soil was present.

The control during disinsection and deratization at all farms was low or absent. Production and auxiliary facilities were not protected against pest and rodent infestation.

The animal welfare and protection during transportation in surveyed farms was not ensured. Farms did not have safe loading/unloading ramps, did not use specialised vehicles and the personnel in charge was not qualified enough in animal transport.

The flaws related to the welfare and the comfort of animals at farms of all three groups were as followed: the rearing facilities and the equipment were not safe enough for animals; there was no control or systems for maintenance of optimal microclimate in rearing facilities; lack of alarm installations, lack of action plan in case of technical failure or disasters, lack of necessary knowledge and skills to ensure the good status and health of animals. The final hygiene assessment of the farms from the three groups was negative.

REFERENCES

1. Iliev, A., G. Petkov, Ch. Mitev, G. Kostadinova, 2008. Manual of Animal Hygiene, Stara Zagora, p. 198
2. Kostadinova, G., G. Petkov, V. Barakova, 2001. Indices of the interaction between ecotechnical agricultural systems and the environment. *Animal Sciences*, 2: 164-168.
3. Ministry of Health, 1992. Ordinance No 7 for the hygienic requirements for health protection of the urban environment, *Official Gazette* 46/1992, 44/1994, 89 and 101/1996, 101/1997.
4. Ministry of Agriculture and Forestry, 1999. Ordinance 30 of 29.11.1999 for the minimum standards and animal welfare aspects of breeding of calves, *Official Gazette*, 108/10.12.1999
5. Ministry of Agriculture and Forestry, 2000. Ordinance No 14 of 19.07.2000 on the protection and welfare of animals in farms using intensive technologies. *Official Gazette* 62/28.07.2000.
6. Ministry of Agriculture, 2008. Ordinance No 44 on veterinary medical requirements of animal rearing facilities. *Official Gazette* 90, 2008.
7. Petkov, G., 2004. Approach for integrated ecological assessment of livestock farms. *Animal Sciences*, XLI, 4:70-73.
8. Petkov, G., 2002. Procedures related to assessment of the environmental impact in livestock husbandry, *Animal Sciences*, 4-5: 149-153.