



2022: Special Issue "Medical Ethics and Professionalism" ISSN: 2660-4159

Hygienic Assessment of the Impact of Poultry Farms on Atmospheric Air

1. Qosimov X.O.

2. Qosimov I.X.

^{1, 2} Bukhara State Medical Institute,
Bukhara Uzbekistan

Annotation: Poultry farming is one of the main branches of agriculture in the Republic of Uzbekistan, and their number is developing year by year in our country. However, the development of industrial-type poultry factories is also leading to an increase in the share of chemical factors (ammonia, hydrogen sulfate, nitrogen oxides, etc.) released into the atmosphere. This situation is causing the atmospheric air to have a negative impact on the sanitary living conditions of the population living around the factories.

Key words: atmospheric air, ammonia, hydrogen sulfate, nitric oxide, sanitary protection zone.

Introduction:

The air in the buildings where the birds are kept is polluted with gases, personally ammonia, hydrogen sulfate, intestinal gases, carbon dioxide. These gases are formed from the life activities of birds, the decomposition of organic matter (feed, bedding, feathers, poultry manure). The amount of gases formed in the air of buildings depends on the age of the birds, their storage conditions and the capacity of the air exchanger (V.S. Golenko, 2004, M.E. Egilte, 2002; L.N. Milova, 2004).

In addition, chemicals that must be used in poultry farms (formalin, formaldehyde, chlorophos, various alkalis, acids) lead to the formation of additional gases in the air. The amount of gases in the air of buildings where chickens, laying poultry and meat are kept in accordance with zootechnical requirements is determined as follows: ammonia-10 mg / m³, hydrogen sulfate 5mg / m³, carbon monoxide 0.2% (A.A. Verimiy, 2003, M.E.Egilte, 2009, X.O. Qosimov, 2020)

In the first 10 days in the rearing rooms of chickens, the amount of ammonia in the winter ranges from 0.7 to 10.7 mg / m³, and in the summer from 1.7 to 23.7 mg / m³. Ammonia in the rooms where mother birds are kept is 8.2 mg / m³, storage of birds in cell batteries) and in the soil method it was found to be 27.3 mg / m³ (S.W. Lenhard, 1984, B.C. Gollenko, 2007)

V.A. According to Kiryushin (2004), daily mechanized treatment of poultry wastes revealed high levels of hydrogen sulfate in the indoor air (up to 14.5 mg / m³).

G.G. According to Ladnova (2004), carbon monoxide, fatty acids, mercaptans, sulfates, indole, skotal, aerol-2 are formed in the air of buildings where birds are kept.

Mercury vapors are released into the air due to formaldehyde (0.2-8.7mg / m³) in the air of the incubator shop and in some cases technical failure of equipment used in poultry care (R.H. Rautianinen, 1995).

All toxic substances generated in the workplace are released into the atmosphere through suction ventilation.

Aim of the research: It consists of a hygienic assessment of the atmospheric air of poultry farm areas and its impact on the sanitary living conditions of the population.

Objects and methods of inspection

Scientific researches were carried out in the areas of poultry farms of limited liability companies "Chinor Chorva" of Jondor district of Bukhara region and "Omad Savdo" of Gijduvan district.

The amount of chemicals (ammonia, hydrogen sulfate) in the air of poultry farms "Hygienic norms of maximum permissible concentration (MPC) of harmful substances in the air in the working zone (SanPiN RUZ №0294-11)," in the air "MU3138-84 and instruction No. 012-3 / 0173-09" Hygienic assessment of harmful substances in the atmosphere in the atmospheric air".

The impact of polluted air on the sanitary living conditions of the population living around factories was also studied by questionnaire (E.I. Sokolov, 2006).

The results of all inspections were statistically processed on an integrated Pentium III computer using the Microsoft Office 2000 SR-1 Pentium office package.

Materials and their analysis

Poultry factories are one of the main sources of atmospheric air pollution.

They emit toxic gases (ammonia, hydrogen sulfate), physical factors (dust) and biological substances (bacteria, viruses, fungi) into the atmosphere.

In order to protect the atmosphere from waste and reduce its negative impact on the sanitary and hygienic activities of the population, the Republic adopted the Law "On Environmental Protection" (1992).

Based on the above, the purpose of this research was to study the atmospheric air and sanitary living conditions of the population in the area where the poultry farms of Jondor "Chinor-Chorva" and Gijduvon "Omad Savdo" LLC are located.

The impact of the factories on the air and living conditions of the population was based on laboratory tests and questionnaires.

Poultry factory of Jondor Chinor Chorva LLC

There are the following villages and streets around the poultry factory:

1000 meters south of Oromgoh village (Steel MFY)

800 meters to the east Rabotiog'lon village (Steel MFY)

- Dustlik Street (Zarafshan MFY) 1500 meters to the west
- 950 meters to the north Zarafshan street (district center)

In order to study the impact of the plant's emissions on the lives of the population, special questionnaires were distributed to the population:

- 150 questionnaires at a distance of 1000 m from the north, 150 questionnaires at a distance of 1500 m;
- 200 questionnaires at a distance of 1000 m from the south, 200 questionnaires at a distance of 15000 m;
- 100 questionnaires at a distance of 1000 m from the west, 100 questionnaires at a distance of 1500 m;
- 100 questionnaires were distributed at a distance of 1000 m from the east, and 100 questionnaires at a distance of 1500 m.

Distributed questionnaires were collected after 48 hours. The survey showed that all of the factory's four-sided residents living between 1,000 m and 1,500 m reported a persistent unpleasant odor in the air, and such odors mainly intensified between 6:00 in the morning and 7:00 in the evening and 17-18:00 in the evening. It was found that there were no such complaints in the population living 2000 m from the factory.

As a result of laboratory tests, the ammonia content of atmospheric air at a distance of 1000 m from the plant was 0.32 ± 0.03 and 0.35 ± 0.05 mg / m³, which is 1.2-1.5 times higher than the established norm.

Table 1. Poultry factory of Jondor Chinor Chorva LLC.

Checked ingrids	Sampling time (hours)	The amount of detected gases is mg / m ³					
		Sampling distance, meters					
		200	400	800	1000	1500	2000
Ammonia	7 ⁰⁰	0,92±0,05	0,65±0,04	0,46±0,03	0,32±0,03	0,25±0,02	0,03±0,00
	10 ⁰⁰	0,96±0,06	0,67±0,06	0,45±0,05	0,33±0,04	0,28±0,03	0,03±0,00
	12 ⁰⁰	0,76±0,05	0,61±0,06	0,41±0,05	0,29±0,04	0,21±0,03	0,02±0,00
	16 ⁰⁰	0,81±0,06	0,65±0,05	0,39±0,05	0,28±0,04	0,20±0,04	0,02±0,00
	19 ⁰⁰	0,89±0,05	0,66±0,04	0,46±0,06	0,35±0,05	0,27±0,05	0,04±0,00
Hydrogen sulfate	7 ⁰⁰	0,92±0,05	0,04±0,005	0,03±0,002	0,02±0,002	0,011±0,00	0,04±0,00
	10 ⁰⁰	0,06±0,008	0,04±0,005	0,03±0,002	0,02±0,002	0,009±0,00	0,04±0,00
	12 ⁰⁰	0,06±0,008	0,03±0,004	0,03±0,002	0,01±0,001	0,008±0,00	0,03±0,00
	16 ⁰⁰	0,05±0,007	0,05±0,003	0,04±0,003	0,02±0,001	0,009±0,00	0,02±0,00
	19 ⁰⁰	0,06±0,007	0,04±0,005	0,04±0,003	0,03±0,003	0,009±0,00	0,04±0,00

At a distance of 1000 m from the plant, the amount of ammonia was found to increase 1.5 times (Table 1). At a distance of 1500 m, the concentration of ammonia was observed to be 0.5-0.7 times higher than normal. At a distance of 2000 m, 10-20 times less ammonia was observed. It should be noted that the maximum concentration of ammonia in the atmosphere was observed at 7 o'clock in the morning and 19 o'clock in the evening.

Similar cases were observed in the concentration of hydrogen sulfate in the atmospheric air. The amount of this gas at a distance of 1000 m exceeded the established norm by 10-15 times, in the morning by 10 times and in the evening by 15 times. At a distance of 1500 m from the plant, the amount of hydrogen sulfate ranges from 0.007 to 0.009 mg / m³ (Hygienic norm is 0.008 mg / m³). At a distance of 2,000 meters, the amount of hydrogen sulfate gas was found to be several times lower than the established norm.

Poultry factory of Gijduvon "Omad savdo" LLC.

Due to the fact that the factory is located in the northern, eastern and western parts of the country, and the nearest village in the southern part is located at a distance of 3,500 meters, we considered it inexpedient to conduct a survey among the population. In laboratory tests, the ammonia content in the air at a distance of 1000 m from the plant ranged from 0.35 ± 0.04 to 0.36 ± 0.06 mg / m³ (Table 2).

At a distance of 1500 m, it was found to be 0.26 ± 0.02 to 0.27 ± 0.04 mg / m³, which is 0.2 to 0.07 more than the established norm (hygienic norm 0.2 mg / m³). Maximum concentrations of this gas were observed in the morning at 7⁰⁰ (0.26 ± 0.02 mg / m³) and in the evening at 19⁰⁰ (0.28 ± 0.04 mg / m³). Low ammonia levels were detected in the air at a distance of 2000 m.

The same pattern was observed with the concentration of hydrogen sulfate in the atmospheric air. Hydrogen sulphate was detected in the air at a distance of 1000 m from the factory in the amount of 0.03 ± 0.002 to 0.04 ± 0.004 mg / m³ (Hygienic norm is 0.008 mg / m³), and at a distance of 1500 m its

content was 0.008 ± 0.00 to 0.010 ± 0.002 mg / m³. noted.

Table 2. Poultry factory of Gijduvan “Omad savdo” LLC The amount of exhaust gases in the atmosphere

Checked ingrids	Sampling time (hours)	The amount of detected gases is mg / m ³					
		Sampling distance, meters					
		200	400	800	1000	1500	2000
Ammonia	7 ⁰⁰	0,89±0,06	0,67±0,05	0,49±0,04	0,35±0,04	0,26±0,02	0,05±0,00
	10 ⁰⁰	0,91±0,06	0,68±0,06	0,47±0,05	0,36±0,04	0,28±0,03	0,06±0,00
	12 ⁰⁰	0,79±0,05	0,63±0,05	0,43±0,06	0,32±0,05	0,23±0,02	0,04±0,00
	16 ⁰⁰	0,86±0,07	0,66±0,05	0,41±0,05	0,30±0,04	0,22±0,03	0,05±0,00
	19 ⁰⁰	0,90±0,08	0,66±0,05	0,48±0,05	0,36±0,06	0,28±0,04	0,06±0,00
Hydrogen sulfate	7 ⁰⁰	0,07±0,006	0,04±0,005	0,03±0,002	0,03±0,002	0,009±0,00	0,005±0,00
	10 ⁰⁰	0,07±0,007	0,05±0,005	0,04±0,002	0,03±0,002	0,008±0,00	0,004±0,00
	12 ⁰⁰	0,05±0,006	0,04±0,004	0,04±0,002	0,02±0,002	0,008±0,00	0,003±0,00
	16 ⁰⁰	0,06±0,005	0,05±0,006	0,03±0,004	0,04±0,003	0,009±0,00	0,003±0,00
	19 ⁰⁰	0,08±0,008	0,06±0,006	0,05±0,005	0,04±0,004	0,010±0,00	0,005±0,00

From the above, it can be concluded that toxic gases emitted into the atmosphere from poultry farms (ammonia, hydrogen sulfate) spread to a distance of 1,500 m from these enterprises, which has a detrimental effect on the health of the population living in the area. Therefore, it is advisable to increase the distance between poultry farms and residential areas (sanitary protection zone) by 2,000 meters.

References

1. Веримий А.А. Влияние условий труда на состояние здоровья работников на птицеводческих комплексах. Врачебное дело. 2003, № 8 – С 100-102.
2. Голенко В. С. Гигиена труда в птицеводческих хозяйствах на промышленной основе. – М: Медицина 2001, С 455
3. Голенко В. С. Гигиеническая оценка воздушной среды производственных помещений птицефабрик. Гигиена труда – Киев: Наука, 2007 – Вып 17. – С 43-46
4. Қосимов Х.О. Қишлоқ хўжалиги гигиенаси. Бухоро, 2020, 78-82-бет.
5. Кирюшин В.А. Санитарно-гигиеническая характеристика условий труда рабочих промышленного птицеводства. Агроэкология. – Горький, 2004, - Вып 1. – С 81-84
6. Ладнова Г. А. Гигиеническая оценка условий труда и показателей здоровья птицеводов. Гигиена и санитария, 2004, №9, - С 8-10
7. МУ 3138-84 “Проведение исследований на производства при обосновании, проверке и корректировке, ПДК вредных веществ в воздухе”
8. Милова Л.Н. Состояние здоровья работающих на птицефабриках в зависимости от условий труда. Факторы риска и здоровья населения в регионах России: Науки труды ФНЦГ им.Ф.Ф Эрисмана. Липецк, 2004. – Вып. 13 – С 304-306
9. Методическая указания №12-3/0173-09. “Гигиеническая оценка содержание вредных веществ при совместном присутствии в атмосферном воздухе”
10. СанПиН РУЗ №0294-11 “Гигиенические нормативы. Предельно допустимые концентрации (ПДК) вредных веществ в воздухе рабочей зоны”
11. Соколов Е.И. Эмоциональное напряжение и реакции сердечно-сосудистой системы. М: Наука, 2006, С 204

12. Эглите М.Э. Динамика бактериальной загрязненности воздуха животноводческих помещений. Гигиена и санитария, 2009, - № 11, - С 78-79
13. Эглите М.Э. Проблема Гигиены труда и профессиональной патологии в птицеводстве на промышленной основе. Гигиены труда и проф. заболевания. – 2002, - № 2, - С 3-6
14. Lenhart S. W. Sources of respiratory insult in the poultry processing industry S. W. Lenharts // Amer.industr. Med. – 1984, - p 89-96
15. Rautianinen R. H. Mortality and morbidity in agroculture in the United States / Rautianinen R. H., S.J. Reynolds // Occup.Envirop. Med. – 1995 – Vol 52, - P 48-53