REVIEW ARTICLE

LEGISLATION ON ANIMAL USE IN *IN VIVO* RESEARCH IN BOSNIA AND HERZEGOVINA AND ITS IMPLEMENTATION IN PRACTICE

Lejla Šatrović[1*], Naida Kapo[2], Sanita Maleškić Kapo[3], Martina Perše[4], Aida Kulo Ćesić[3]

[1]Department of Veterinary Public Health and Legislation, University of Sarajevo-Faculty of Veterinary Medicine, Sarajevo, Bosnia and Herzegovina
[2]Department of Veterinary Clinical Sciences, University of Sarajevo-Faculty of Veterinary Medicine, Sarajevo, Bosnia and Herzegovina
[3]Institute of Pharmacology, Clinical Pharmacology and Toxicology, University of Sarajevo-Medical faculty, Sarajevo, Bosnia and Herzegovina
[4]Medical Experimental Centre, Institute of Pathology, University of Ljubljana-Faculty of Medicine, Ljubljana, Slovenia

[*]**Corresponding author:**
Doc. dr. Lejla Šatrović
Adress: University of Sarajevo-Veterinary Faculty, Zmaja od Bosne 90, 71000 Sarajevo/Bosnia and Herzegovina
Phone: +38733729130
ORCID: 0000-0001-5962-6794
E-mail: lejla.satrovic@vfs.unsa.ba

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ABSTRACT

In Bosnia and Herzegovina, the fundamental legal framework for animal protection is the Law on Animal Protection and Welfare (Official Gazette of Bosnia and Herzegovina, No. 25/09 and 9/18). This law represents a significant step forward, establishing basic ethical standards for the treatment of experimental animals. The aim of this paper was to present the current legislative framework governing animal experiments in Bosnia and Herzegovina and its implementation in practice.

Keywords: Bosnia and Herzegovina, experimental animals, legislation, protection, welfare.

INTRODUCTION

Despite progress in non-animal methods, animal experimentation continues to play an indispensable role in research, and it results in legal requirements to implement the 3Rs principles. The codification of the 3R principle - Replacement, Reduction, and Refinement (Russell and Burch, 1959) - into Directive 2010/63/EU underscores the importance of animal welfare in animal research, which is now a central tenet of regulatory frameworks. The legislation regarding the protection of experimental animals is based on the fundamental principle that, under certain conditions, it is morally acceptable to use animals for research or other scientific purposes.

The United Kingdom introduced the first law safeguarding animals used in experimentation in 1876 (The Cruelty to Animals Act 1876). It was produced because of extensive discussions among scientists, politicians, and animal rights activists. For a long time, the United Kingdom was the first and only country that legally protected animals used for scientific purposes. This law prohibited the use of animals for teaching and painful experimentation, emphasizing the responsibility of researchers conducting experiments.

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The regulation of animal experimentation in Europe began in the 1980s with the adoption of two pivotal international agreements: the European Convention for the Protection of Vertebrate Animals Used for Experimental and Other Scientific Purposes (Convention ETS 123) in 1985, and the Directive for the Protection of Vertebrate Animals Used for Experimental and Other Scientific Purposes (Directive 86/609/EEC) in 1986. These two documents initiated significant legislative advancements concerning experimental animals, established a legal framework for the formation of the European Centre for the Validation of Alternative Methods (ECVAM), and stimulated the development of Laboratory Animal Science (LAS). LAS is an interdisciplinary science encompassing a wide range of scientific disciplines concerned with the ethical use, care, and welfare of animals in research on one side and the genetics, molecular biology, immunology, confounding factors, and the quality of scientific studies on the other side. The significant progress of LAS has led to a deeper understanding of the physiological and ethological requirements of experimental animals, resulting in revised housing standards in 2006 (ETS 123-Appendix A, 2006; Euroguide, 2007) and the Directive on the protection of animals used for scientific purposes (Directive 2010/63/EU) in 2010.

Legal regulations establish essential benchmarks based on scientific evidence, with the primary objective of safeguarding animals from unnecessary suffering while simultaneously reinforcing the foundational principles that underpin the validity and reproducibility of scientific research outcomes.

This paper aimed to provide an overview of the current legislative landscape regarding animal experimentation in Bosnia and Herzegovina (BiH), along with an analysis of its practical implementation.

LEGISLATION ON ANIMAL EXPERIMENTATION IN BOSNIA AND HERZEGOVINA

Bosnia and Herzegovina took significant steps to regulate animal experimentation with the adoption of the Law on the Protection and Welfare of Animals, further called LPWA (Official Gazette (OG) of Bosnia and Herzegovina, No. 25/09 and 9/18). Originally enacted in 2009 and revised in 2018, this law highlights the ethical duty of humans to protect the lives, health, and well-being of animals.

The LPWA establishes a comprehensive legal framework for regulating animal experimentation, safeguarding animal welfare, and ensuring the oversight and supervision of experiments involving animals. This framework includes the formation of two national expert bodies tasked with overseeing compliance with the law and ethical standards, i.e. the Ethics Committee responsible for providing advice on ethical issues, and the Advisory Council for the Protection and Welfare of Animals, as outlined in Article 40. Additionally, the LPWA prescribes penalties for those who violate its provisions.

In 2010, two important subsidiary legal acts were introduced to further refine the regulatory landscape. The first, the Regulation on the Protection of Experimental Animals and the Conditions to be Met by Legal Persons Engaged in Carrying Out Animal Experiments (OG of BiH, No. 46/10), further called Regulation 46/10, sets forth the technical and housing requirements that organizations must adhere to when conducting animal experiments. It also outlines the animal species on which experiments are allowed and the specific requirements necessary for the approval of experiments.

The second act, the Regulation on the Method of Record-Keeping for Experimental Animals and Types of Experiments (OG of BiH, No. 19/10), further called Regulation 19/10, mandates documentation practices to ensure transparency and accountability in animal experimentation.

While the national legislation provides a robust framework for the protection of experimental animals, the entity of Republika Srpska (RS) also has its own regulations, specifically the Law on Animal Protection and Welfare of the RS (OG of RS, No. 111/08).

However, this paper will focus exclusively on the regulations established at the state level, since local laws and their accompanying bylaws are expected to be in line with national standards.

ANIMAL EXPERIMENTS

An animal experiment is defined as any intervention or procedure performed on animals for scientific research or educational purposes that may induce pain, suffering, distress, lasting harm, or death. This definition excludes the least painful methods of euthanasia and identification methods (as outlined in the law and regulations) (Article 2, LPWA; Article 2, Regulation 46/10). The legislation regulating the use of animals in *in vivo* research is multifaceted, addressing ethical, scientific, and societal considerations. A key challenge lies in balancing the pursuit of scientific progress with the obligation to ensure the humane treatment of animals.

The regulatory framework in BiH permits animal experimentation conditionally, imposing numerous requirements. As stipulated in Article 31, Paragraphs (2) and (3) LPWA, animal experimentation in BiH is permitted only when the benefit for human or animal health or an advancement in scientific knowledge is expected, and when the research objectives cannot be achieved through acceptable non-animal scientific methods.

For experiments that are likely to cause severe pain, suffering, or distress, a special notification, justification, and approval from the competent authority are required. For example, experiments involving the deprivation of water and/or food beyond the physiological limits necessary for a specific species will not be approved unless they are adequately justified and demonstrate a clear benefit to humans or animals (Article 11, Paragraph (1), (2), Regulation 46/10).

The legislation permits the use of animals for educational purposes only in exceptional circumstances, specifically when satisfactory results cannot be achieved through alternative teaching aids, such as images, models, specimens, or computer programs (Article 33, LPWA). Experiments can only be conducted in organizations or institutions that are registered by the relevant authorities and possess a permit issued by the Veterinary Office of BiH. This permit may be granted for a specific experiment or for a series of experiments over a defined period (Article 31, Paragraph (6), LPWA). Also, approval from the Local Ethics Committee is mandatory prior to conducting any animal experiments (Article 34, Paragraph (4), LPWA). Additionally, designated persons must be responsible for animal welfare and the management of the facilities where the experiments occur.

On the other side, animal experimentation in BiH is explicitly prohibited for research and testing of military weapons, cosmetic products, tobacco, alcoholic beverages, and chemical agents for cleaning and disinfecting (Article 31, Paragraph (5), LPWA).

ANIMALS USED IN EXPERIMENTS

The law in BiH protects animals with developed sensory and nervous systems capable of registering stimuli that may cause pain (Article 1, Paragraph (2), LPWA). Additionally, the legislator mandates compliance with the law's provisions even in cases where there is uncertainty as to whether certain organisms possess the properties of animals (Article 1, Paragraph (3), LPWA).

Usually, the legislation protects animal species for which the scientific community has a consensus that they are sentient animals, i.e. capable of experiencing positive and negative feelings such as pleasure, joy, distress, and pain. European Union (EU) legislation protects all living vertebrates, including cephalopods and larval forms and the last third of foetal and embryonic stages (Directive 2010/63/EU).

The term "experimental animals" encompasses animals used in experiments that are protected by

the legislation, while the term "laboratory animals" refers only to animals that are bred explicitly for experimental purposes in the registered breeding facilities, i.e. mouse (*Mus musculus*), rat (*Rattus norvegicus*), guinea pig (*Cavia porcellus*), golden hamster (*Mesocricetus auratus*), rabbit (*Oryctolagus cuniculus*), quail (*Coturnix coturnix*), dog (*Canis familiaris*), cat (*Felis catus*), and non-human apes (Article 6, Regulation 46/10). Thus, to obtain a permit, the animal species must originate from the registered breeding facilities/organizations.

However, BiH legislation allows that experiments can be carried out also on domestic animals, such as cattle, pigs, poultry, sheep, goats, horses, donkeys, and their hybrids, as well as birds, fish, anthropoid apes, other primates, other mammals, and other carnivores (Article 7, Regulation 46/10). Unlike laboratory animals, domestic animals are not typically housed under strictly controlled conditions, which can make their use in experiments less scientifically preferable.

For experiments involving wild animals, a competent authority can issue a permit only if there are scientifically sound justifications proving that the purpose of the experiment cannot be achieved using other species. Experiments on endangered species are not permitted, except in cases where research is conducted for the conservation of these species, or if the research is biomedical, and the species in question is the only suitable species for that purpose. Additionally, experiments on abandoned and stray animals are strictly forbidden (Article 8, Paragraphs (1), (2), (3) of the Regulation 46/10).

HOUSING CONDITIONS OF EXPERIMENTAL ANIMALS

The environmental conditions in which experimental animals are housed are critical from both welfare and scientific perspectives. The laboratory animal facilities operate under controlled housing conditions and must be constructed to ensure conditions appropriate for the specific species of animals that allows for minimum freedom of movement, adequate food and water, prevent animal escapes, restrict access to unauthorized persons and other animals, incorporate barrier measures to ensure the animals are free of pathogens that may jeopardize human (zoonoses) or animal health (species-specific pathogens) or may confound scientific results and result in misleading research outcomes. (Howard et al., 2004; Cait et al., 2022).

Controlled housing conditions address not only microbiological factors but also other important factors such as temperature, light (Lucas et al., 2024), noise, cage cleaning (Castelhano-Carlos and Baumans, 2009), circadian rhythm (Reardon, 2016), social interactions, nesting material and enrichment (Schipper L et al., 2018; Heimer-McGinn et al., 2020), diet (Pellizzon and Ricci, 2020; Tuck et al., 2020), etc., all of which can influence animal physiology, molecular and immunological mechanisms leading to increased biological and experimental variability as well as increased use of animals. Thus, the conditions under which animals are housed are integral to the integrity of scientific research.

In BiH, Regulations 46/10 outline minimum requirements for space, equipment, and environmental conditions in both breeding and experimental settings. The environment in which the animals are kept, as well as the animals' health and welfare, should be under constant supervision to prevent pain, suffering, distress, exhaustion, or permanent injury. Any restriction on the fulfilment of physiological and ethological needs must be minimized (Article 31, Paragraphs (7), (8), LPWA; Article 19, Regulation 46/10). Animal housing, depending on the species, can be organized in various ways, including cages, pens, and similar options. It is crucial to prevent contact between animals and ensure that the housing does not restrict their ability to satisfy ethological needs, such as climbing, hiding, and providing shelter (Article 35, Regulation 46/10). The legal guidelines regarding the temperature, isolation duration and housing conditions for rodents are presented in Table 1 and 2. Detailed conditions for other animal species are outlined in the appendices of this manuscript (Annex; Tables I–VIII)

Table 1 Temperature and isolation duration in rodent facilities

Animal species	Room temperature (°C)	Quarantine (days)
Mouse, rat, Syrian hamster, albino mouse, guinea pig	20–24	5–15
Rabbit	15–21	20–30

Note: In special cases, such as when housing sick animals, very young animals, or hairless animals, a higher temperature than indicated may be required.

Table 2 Minimum cage area and height for housing small rodents and rabbits

Animal species	Minimum cage area (m²)	Minimum cage height (cm)
Mouse	180	12
Rat	350	14
Syrian hamster	180	12
Guinea pig	600	18
Rabbit		
1 kg	1400	30
2 kg	2000	30
3 kg	2500	35
4 kg	3000	40
5 kg	3600	40

Note: "Cage height" refers to the vertical distance between the bottom of the cage and the upper horizontal part of the lid or cage.

It is important to note that EU legislation sets the highest legal minimal standards on housing conditions worldwide. In EU countries, Annex III of the Directive 2010/63/EU sets minimal housing and accommodation conditions for animal facilities and various species, including recently adopted amendments for Zebrafish and Passerine birds (European Commission, 2024).

Moreover, over 1,100 institutions in 50 countries/regions worldwide earned voluntary accreditation from the Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC, www.aaalac.org) showing their commitment to state-of-the-art animal welfare beyond the laws.

To ensure the welfare of laboratory animals and the integrity of scientific research, the Federation of European Laboratory Animal Science Associations (FELASA), the leading European scientific association for laboratory animals, provided recommendations on health monitoring in breeding and experimental units for mice, rats, hamsters, guinea pig, rabbits (Mahler et al., 2014), rodents for animal transfer (Pritchett-Corning et al., 2014), ruminants and pigs (Caristo et al., 2021), and Zebrafish (Mocho et al., 2022). FELASA emphasizes the importance of health monitoring and the use of specific pathogen-free (SPF) animals to minimize the risk of contamination and to ensure reproducibility of results. For instance,

the composition of microorganisms and microbiota plays a pivotal role in the health and behaviour of animals, affecting their metabolic processes and immune responses (Franklin and Ericsson, 2017).

PERSONNEL QUALIFICATIONS

Current legislation in BiH recognizes the following persons/functions/roles within the organizations/institutions registered for conducting animal experiments, i.e. a person responsible for facility management, a person responsible for experiment management, and an animal welfare specialist. These persons are responsible for the facility, animals, and maintaining the prescribed records. No other position/role is defined.

According to the current legislation in BiH, permission to conduct experiments can be granted to professionals who understand animal physiology and behaviour, such as veterinarians and biologists with specializations in zoology, and, upon request, for a specific experiment, to doctors, agronomists specializing in animal husbandry, pharmacologists, and dentists (Article 32, Paragraph (3), LPWA). Persons conducting or participating or overseeing the experiment, as well as those caring for the animals during the experiment, must have adequate knowledge and a satisfactory level of training for the tasks (Article 32, Paragraph (4), LPWA).

However, even 15 years after the enactment of this Law, the existing practice for assessing the necessary level of knowledge and training for persons involved in experiments has been based solely on qualifications obtained through formal university education, as no official training programs for specialists are established. In this regard, the Ethics Committee's approval for conducting animal experiments is granted by the Law-stipulated professionals, and a veterinarian is considered as an animal welfare specialist (the person responsible for the protection and welfare of animals).

Recognizing that adequate qualifications are crucial for professional and humane animal care, FELASA has developed guidelines with the recommendations for the education and training of persons involved in work with experimental animals (FELASA, 1995; Nevalainen et al., 1999; Nevalainen et al., 2000; Convenor et al., 2010; Abelson et al., 2023) (Categories A-D). These guidelines enabled the establishment of high-quality courses on LAS in various countries in Europe and worldwide and set the standards and foundation for the education and training framework incorporated in the EU legislation. According to FELASA recommendations, BiH can also develop official education/training programs to ensure the licensing and qualification of its experts. These actions are crucial to ensuring good scientific practice and animal welfare in *in vivo* research.

PROCESS OF OBTAINING PERMIT FOR EXPERIMENTS

According to the legislation in BiH, the protection of experimental animals is primarily achieved through a mandatory system of experiment approvals. Experiments can be conducted only after obtaining Veterinary Office permit/approval (Article 9, Paragraphs (1), (2), Regulation 46/19). The permit to conduct animal experiments can be issued only to an organization registered for this purpose (Article 31, Paragraph (1), LPWA) and for a specific experiment or a series of experiments, with a clearly defined validity period (Article 31, Paragraph (6), LPWA). Organizations that conduct experiments are required to employ an animal welfare specialist responsible for managing and preparing the rationale for conducting experiments. Organizations registered for conducting animal experiments are higher education and research institutions, as well as professional institutions (Article 32, Paragraphs (1), (2), LPWA). To obtain a permit for an experiment, registered organizations are required to apply for approval for each planned experiment to the Veterinary Office of BiH (Article 9, Paragraph (2), Regulation 46/10). The application for a permit must include at least the following information:

- location of an experiment, which includes the

name and address of the institution conducting the experiment as well as the name and address of the location where the experiment will be conducted,

- title and the purpose of the planned experiment,
- species, breed, and number of experimental animals,
- name, surname, and professional qualifications of the experiment leader and their deputy,
- name, surname, and professional qualifications of the manager of the facility for experimental animals and his deputy,
- information on the duration of the experiment or the period for which approval is sought (Article 10, Regulation 46/10).

In cases where animals are planned to be subjected to intense pain, suffering, or distress, as previously mentioned, a special notice and justification are required (Article 11, Regulation 46/10).

The issuance of permits for conducting animal experiments is preceded by a process of reviewing the application and providing an expert opinion, i.e. a positive opinion of the Ethics Committee on the justification for animal testing (Article 34, Paragraph (4), LPWA).

To protect animal welfare and ensure control and supervision of experiments involving animals, the LPWA has provided a legal framework for the formation of two national expert bodies, i.e. the Ethics Committee responsible for providing advice on ethical issues, and the Advisory Council for the Protection and Welfare of Animals, an additional advisory expert body that provides opinions and proposals on issues related to the protection and welfare of animals. The law stipulates that the establishment of the Ethics Committee is under the authority of the relevant ministry of BiH, and should consist of seven members, including representative naturalists, medical professionals, veterinarians, scientists, as well as representatives of non-governmental organizations whose legal obligation is animal protection (Article 34, Paragraph (1), LPWA).

However, neither the Ethics Committee nor the Council for the Protection and Welfare of Animals has been established at the national level yet. The conduct of animal experiments in BiH currently occurs based solely on the ethical assessments and positive opinions issued by the Ethics Committees formed as independent expert bodies within the organisations/institutions registered for conducting animal experiments. Those Ethics Committees at the institutional level evaluate requests for approval of animal experiments, considering the ethical aspects of the experiment, taking positions, making decisions, and providing opinions on ethical issues significant for ensuring good scientific practice and preserving the fundamental principles, duties, and obligations established by the LPWA and beyond it.

Although ethical assessment of requests for conducting animal experiments has been ensured at the institutional level, the absence of a unified national Ethics Committee significantly complicates the maintenance of records regarding experiments conducted at the national level. Furthermore, the lack of a request form standardised at the national level prevents a unified approach to the ethical evaluation, which may negatively affect the welfare of experimental animals and the quality of the scientific research. These shortcomings significantly impact the assurance of good scientific practice and the transparency we all strive for.

RECORD KEEPING

The obligation to maintain records, including the format, content, and storage, is also prescribed by the legislation in BiH (Regulation on the Method of Record-Keeping for Experimental Animals and Types of Experiments (OG of BiH, 19/10, further called Regulation 19/10). Within the registered organization, the facility manager is required to maintain following records:

- records of the total number and species of experimental animals used,
- records of the number and species of animals used and the purpose of the experiment,

- records of the number and species of animals used in experiments for the protection of humans, animals, and the environment, and
- records of the number and species of animals used in experiments related to diseases and health disorders in humans (Article 2, Regulation 19/10).

The records must be submitted to the Veterinary Office BiH annually and kept for at least three years from the date of the last entry (Articles 3 and 4, Regulation 19/10), and presented to the competent inspection authority upon request (Article 20, Regulation 19/10).

SUPERVISION OF IMPLEMENTATION OF REGULATIONS

As stipulated by the LPWA, supervision of the implementation of the LPWA and the subordinate legislation adopted under it is carried out by the Veterinary Office BiH and the relevant authorities of the two entities and the Brčko District, through official veterinarians (Article 36, LPWA). As part of the inspection oversight during regular inspections and in cases of suspicion of improper handling of animals, an official veterinarian has the right to access all premises where animals are kept or used (Article 37, LPWA) and to prohibit the conduct of experiments if appropriate approval has not been issued (Article 38, LPWA).

For conducting animal experiments in violation of legal provisions, penalties ranging from 200 to 20,000 BAM are stipulated for both individuals and the directors of organizations involved. In addition to monetary fines that the LPWA provides for offenders, it is important to note that the Criminal Code of the Federation of Bosnia and Herzegovina (Article 318, Criminal Code of FBiH, OG of FBiH, No. 36/2003, 21/2004 - corrected, 69/2004, 18/2005, 42/2010, 42/2011, 59/2014, 76/2014, 46/2016, 75/2017, and 31/2023) recognizes animal cruelty and killing of animals as a separate criminal offense within the category of crimes against the environment, agriculture, and natural resources. Since this law does not impose explicit restrictions regarding an animal type as an object of the criminal act, conducting experiments in a manner that subjects animals to unnecessary pain, prolonged suffering, or that kills animals contrary to regulations can also be categorized as a criminal act and, accordingly, be punished with imprisonment.

CONCLUSION

While non-animal methods are progressing, they cannot yet fully replicate the complexity of *in vivo* systems, necessitating the ongoing use of animal models for specific research areas, such as pharmacokinetics and toxicology. The legal norms incorporated into the legislation of BiH aim to prevent unjustified and excessive exploitation of animals for the purposes of conducting *in vivo* research. These norms aim to ensure compliance with the basic framework for the ethical treatment of animals used in legally permitted, ethically justified, and unavoidable procedures.

However, despite the significant progress achieved with the adoption of the LPWA and its subordinate legislation, further improvements and more efficient practical implementation are needed. While the national regulatory framework provides a broad foundation for the ethical treatment of animals in experiments, it lacks more specific guidelines for ensuring animal welfare, research quality, and result reliability. Key areas, such as clearer guidelines for the application of the 3Rs, stricter monitoring standards, enhanced oversight of experiment implementation, and clearly specific competency requirements for involved personnel remain inadequately addressed compared to EU legislation and the guidelines of leading scientific associations for laboratory animals (FELASA).

Thus, considering that these deficiencies may hinder the consistent application of animal protection measures, and keeping in mind BiH's aspiration for EU integration, there is a pressing need to improve and align legal documents with the standards precisely regulated in the EU.

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CONFLICT OF INTEREST

The authors declared that there is no conflict of interest.

CONTRIBUTIONS

Conception: LŠ, NK, SMK, MP, AKĆ; Design: LŠ, NK, SMK, MP, AKĆ; Supervision: LŠ, NK, MP, AKĆ; Fundings: AKĆ; Materials: LŠ, MP; Data Collection and/or Processing: LŠ, NK; Analysis and/or Interpretation of the Data: LŠ, NK, MP, AKĆ; Literature Review: LŠ; Writing: LŠ, NK, MP, AKĆ; Critical Review: MP, AKĆ

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ANNEX

Table I Temperature in facilities for various experimental animals (cages, sections/boxes, or barns)

Animal species	Room temperature (°C)
Non-human primates	20–28
Cat, dog, African ferret, poultry, pigeon	15–21
Pig, goat, sheep, cattle, horse	10–24

Note: In special cases, such as when housing sick, very young animals or hairless animals, a higher temperature in facilities than indicated is required.

Table II Duration of isolation for various experimental animals

Animal species	Isolation Duration (days)
Cat	20–30
Dog	20–30
Non-human primate	20–30

Table III Housing of cats in experimental animal facilities

Cat weight (kg)	Minimum cage area (m^2)	Minimum cage height (cm)	Minimum cage area and bedding (m^2)	Minimum box area and bedding (m^2)
0.5–1	0.2	50	-	-
1–3	0.3	50	0.58	2
3–4	0.4	50	0.58	2
4–5	0.6	50	0.58	2

Note: Keeping cats in cages should be strictly limited. Cats confined in this way should be allowed out at least once a day to stretch, unless this is contrary to the purpose of the experiment. Cages for cats should be equipped with litter boxes, resting areas, and climbing and scratching items. "Cage height" refers to the vertical distance between the highest point at the bottom and the lowest point at the top of the cage. When calculating the minimum area, the space with bedding is also considered. The minimum area of the cage for a cat and bedding includes 0.18 m^2 for kitten cages.

Table IV Housing of dogs in experimental animal facilities

Dog height to shoulder level (cm)	Minimum cage area per dog (m^2)	Minimum cage height (cm)
30	0.75	60
40	1.00	80
70	1.75	140

Note: Dogs may be kept in cages only for as long as required by the experiment. If this does not conflict with the purpose of the experiment, closed dogs should be allowed out at least once a day to stretch. The supervisor of the experimental animal facility determines the maximum time dogs can be confined without daily stretching. The exercise area should be spacious enough to allow freedom of movement for the dog. Cages in which dogs are housed must not use wire mesh at the bottom, unless required by the type of experiment. The minimum height of the cage should be twice the height of the animal, measured to the shoulder level.

Table V Housing of dogs in sections/boxes

Dog weight (kg)	Minimum box area per dog (m²)	Minimum adjacent exercise space per dog
Up to 3 dogs per m²	More than 3 dogs per m²	<6
6–10	0.7	1.4 (2.1)
10–20	1.2	1.6 (2.8)
20–30	1.7	1.9 (3.6)
>30	2.0	2.0 (4.0)

Note: The numbers in parentheses indicate the total area per dog, i.e., the area of the box plus the area of the adjacent exercise space. Dogs kept outdoors must have access to a sheltered area to protect themselves from adverse weather conditions. If the bottom of the box is mesh, dogs must be provided with a solid surface for sleeping. Wire mesh at the bottom must not be used unless required by the type of experiment. Dividers between boxes must prevent mutual injury among dogs. All boxes must have appropriate drainage.

Table VI Housing of non-human primates in cages

Monkey weight (kg)	Minimum cage area for one or two animals (m²)	Minimum cage height (cm)
<1	0.25	60
1–3	0.35	75
3–5	0.50	80
5–7	0.70	85
7–9	0.90	90
9–15	1.10	125
15–25	1.50	125

Note: Due to large differences in sizes and characteristics of monkeys, it is crucial that the shape, internal equipment, and dimensions of the cage meet their needs. For monkeys, both the total volume and the surface area of the cage are equally important. In principle, the greatest dimension should be the height of the cage. The height of the cage must allow animals to stand upright. The minimum height of the cage for swinging monkeys must be such that they can swing from the ceiling at full swing without touching the bottom of the cage with their legs. Perches can be installed as needed to allow monkeys to use the upper part of the cage. Sociable monkeys can be housed in pairs. If they cannot be housed in pairs, their cages should be arranged so they can see each other. Likewise, if required by the type of experiment, measures should be taken to prevent monkeys from seeing each other.

Table VII Housing of pigs in cages

Pig weight (kg)	Minimum cage area per pig (m²)	Minimum cage height (cm)
5–15	0.35	50
15–25	0.55	60
25–40	0.80	80

Note: The indicated values also apply to piglets. In principle, pigs should not be confined in cages unless required by the type of experiment, and the duration of confinement should be as short as possible.

Table VIII Housing of domestic animals in sections/boxes

Animal type and dog weight (kg)	Minimum box area (m²)	Minimum box length (m)	Minimum box divider height (m)	Minimum box area for groups (m²/animal)	Minimum feeder length per head (m)
Pigs	10–30	2	1.6	0.2	0.20
	30–50	2	1.6	0.3	0.25
	50–100	3	2.1	0.8	0.30
	100–150	5	2.5	1.2	0.35
	>150	5	2.5	2.5	0.40
Sheep	<70	1.4	1.8	1.2	0.35
Goats	<70	1.6	1.8	2.0	0.35
Cattle	<60	2.0	1.1	1.0	0.30
	60–100	2.2	1.8	1.0	0.30
	100–150	2.4	2.8	1.2	0.35

PRAVNI PROPISI O UPOTREBI ŽIVOTINJA U *IN VIVO* ISTRAŽIVANJIMA U BOSNI I HERCEGOVINI I NJIHOVA PRIMJENA U PRAKSI

SAŽETAK

U Bosni i Hercegovini, osnovni pravni okvir za zaštitu životinja čini Zakon o zaštiti i dobrobiti životinja ("Službeni glasnik Bosne i Hercegovine", br. 25/09 i 9/18). Ovaj zakon predstavlja značajan iskorak, uspostavljajući osnovne etičke standarde tretiranja eksperimentalnih životinja. Cilj ovog rada jeste predstaviti postojeći zakonodavni okvir koji regulira upotrebu životinja u eksperimentalnim istraživanjima u Bosni i Hercegovini i njegovu provedbu u praksi.

Ključne riječi: Bosna i Hercegovina, dobrobit, eksperimentalne životinje, legislativa, zaštita