Evaluation of Biosecurity Practices on a Dairy Cattle Farm in Algeria

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ABSTRACT

Biosecurity is a set of measures designed to optimize the protection of livestock farm against health risks. It is also a preventative tool to avoid the spread of pathogens to other farms. The objective of this study was to conduct a survey on a dairy farm to evaluate the various zootechnical and health measures implemented by the farmer. Data analysis was performed using the biocheckUGent system developed by Ghent University. During this evaluation, the farm's average external biosecurity score (77%) was slightly higher than the global average (64%). The same was true for internal biosecurity (71% vs. 38%). The overall biosecurity status score for the farm was 73%, compared to the global average of 53%. This study demonstrates that on this farm, husbandry practices and sanitary prevention are rigorously applied. However, these results are not representative of larger-scale dairy farming. It is desirable to generalize this method to all farms nationwide to obtain more representative results.

Keywords: animal welfare, BiocheckUGent, prophylaxis, dairy cattle

INTRODUCTION

In recent years, biosecurity has become increasingly important in livestock farming. Its objective is to minimize risks to animal health (Laanen et al., 2013; Villaamil et al., 2019; Kruse et al., 2020; Alloui et al., 2021). However, numerous constraints sometimes make biosecurity measures difficult to implement due to a lack of familiarity with the prescribed procedures (Renault et al., 2018).

In Algeria, a national program developed by the Ministry of Agriculture focuses on livestock farming practices to develop the dairy sector (Mamine et al., 2021). This program was designed to harmonize the various stages of dairy cattle farming to increase milk production. All biosecurity measures are outlined in the program. These measures include the regular disinfection of equipment and facilities, the control of animal movement within the farm, rigorous waste management, the introduction of new animals, the quarantine of incoming animals, milking and milk collection, as well as control measures for visitors and vehicles entering farms (Gelaude et al., 2014; Fabbri, 2022, Alquati et al., 2025).

Inadequate biosecurity means exposing animal herds to various infectious diseases, which can lead to significant economic losses (Dewulf, 2018b). Regular monitoring and assessment of compliance with various biosecurity practices on farms are necessary to prevent health disasters. Most of the tools used for biosecurity assessment are developed in the form of checklists or systematic surveys (Dewulf et al., 2018a). As qualitative methods, they simply indicate whether a particular biosecurity measure is applied or not, or whether it is present or not. This type of descriptive assessment is useful, but a quantitative method would be much more practical and valuable. Very few studies have assessed the current state of biosecurity in ruminant livestock farms in Algeria. This first preliminary study aims to quantify the biosecurity status of a dairy cattle farm in the High Plateaus region of Batna (Djerma), Algeria, using the biocheckUGent online method.

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MATERIALS AND METHOD

Dairy farm Characteristics

The dairy farm is located on the High Plateaus, in the commune of Djerma, El Madher district, Batna province, Algeria (Figure 1). The region is situated in the Aurès Mountains. It has a cold, semi-arid climate characterized by long, very cold winters and hot, dry summers. Temperatures generally vary from -3°C to 37°C throughout the year. It is an agro-pastoral region where dairy cattle and small ruminants (sheep and goats) are the main agricultural activities. The region is also known for its cereal production (wheat, barley) and arboriculture (apricots and apples). The farm consists of several buildings: a cowshed, a farrowing pen, a feed storage shed, a dairy, and the farmer's house. It houses a herd of 28 lactating cows, 25 heifers, 3 dry cows and 2 calves. The animals' diet consists of barley bran and green fodder.

Evaluation Protocol using the BiocheckUGent Method

After accessing the website platform (http://www.biocheck.UGent.be), new users can register by going to the "My Biocheck" tab and then logging in. All saved or shared reports are stored here. All surveys can be viewed in the corresponding tab of the main menu or on the "Start BiocheckUGent" homepage. After selecting a survey, users can download a printable offline version or complete it online. Once the survey is completed, the actual data will be included in the global database of the Biocheck.UGent platform and the national database, if one exists. Our results will be presented in tabular form.

The main report will include a table with our results and a global average. For each subcategory of the survey, we will receive our own score, an overall global average, and a national average, if available. The average of all scores per subcategory in the area of external and internal biosecurity gives a score for total biosecurity. The 'BiocheckUGent' rating system assesses biosecurity using a computer algorithm. It comprises 79 questions divided into several subcategories for external and internal biosecurity.
[https://biocheckgent.com/en/questionnaires/dairy-cattle].

Each subcategory comprises 2 to 19 questions. The answer to each question yields a score ranging from zero (when the measure is not implemented at all) to one (when the measure is fully implemented). Depending on the importance of a particular biosecurity measure, the score per question is multiplied by a weighting factor (Gelaude et al., 2014). The final score for internal and external biosecurity can range from zero, indicating a complete absence of the described biosecurity measures, to 100, indicating full implementation of the described measures. The questionnaire can be accessed on the biocheckUGent website.

Scores will be highlighted in red when they are below average (below the national average or below the global average when no national average is available). The scores obtained are also visualized in star charts. Blue represents our score, and purple represents the global average. The larger the area, the better the score. The letters on the different axes correspond to the various subcategories of the survey. These letters also appear before each subcategory in the table of the same report. For example, "A" corresponds to the subcategory "purchase and reproduction" in the cattle survey. If we want to know which questions contributed to this score, we can easily consult the paper/online version of the survey. For subcategory A, this corresponds to questions 1 to 19 of the cattle survey. These elements are discussed in detail on the platform, and a distinction is made between external and internal biosecurity. Our survey was conducted on the farm during 2024 with the farmer's consent.

RESULTS AND DISCUSSION

The results of our survey are described in Table 1 and Figure 2. The farm's overall biosecurity score is estimated at 73%, which is higher than the global average of 53%. In this biosecurity status assessment, the average external biosecurity score (75%) is slightly higher than the internal biosecurity score (71%) (Table 1). Within the external biosecurity category, the two subcategories with the lowest average scores are: carcass transport and removal (26%) and feeding and watering (44%), which are below the global values of 48% and 58%, respectively.

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The subcategory, purchasing and breeding, achieved the maximum score of 100%, which is exceptional and higher than the global score of 78%. Our results do not corroborate those of Benader (2016), who conducted a systematic survey on several farms in Algeria. However, other researchers have found variable results depending on the number of farms, the methodology, and the parameters studied (Dewulf et al., 2018a; Renault et al., 2021; Dhaka et al., 2023; Behluli et al., 2025).

Within the external biosecurity subcategories, the two subcategories with the lowest average scores were: milking and dairy management, and work organization and equipment, with scores of 40% and 17%, respectively. These scores are lower than the global averages (47%) for the former and 39% for the latter. Conversely, the management and health subcategory achieved the highest score at 95%, which is higher than the global average of 33%. The overall external and internal biosecurity score for the farm is higher than the global average (75% vs. 67%) for external biosecurity and (71% vs. 38%) for internal biosecurity. The overall biosecurity score for the farm studied is higher than the global average (73% vs. 58%). Some authors have also mentioned this variation in scores in their work (Laanen et al., 2010; Damiaans, 2020; Ferreira et al., 2024; Laban et al., 2024; Mehemedi et al., 2026).

The biosecurity score obtained for this farm is above global standards. In our opinion, this is an exception that cannot be generalized to other farms in the region or nationally. This leads us to conclude that further investigations are needed on a larger sample of farms to obtain data reflecting the reality of biosecurity in dairy cattle farming in Algeria.

Table 1: Results of the biosecurity in dairy cattle farming by Biocheck.UGent

Sub-category	Results(%)	Global average(%)
External biosecurity		
A. Purchase and breeding	100	78
B. Carcass transport and removal	26	48
C. Feeding and watering	44	58
D. Visitors and farm workers	83	69
E. Pest and other animal control	77	64
Sub–total- External biosecurity	75	67
Internal biosecurity		
F. Health management	95	33
G. Calving management	94	32
H. Calf management	68	45
I. Milking and dairy management	40	47
J. Adult livestock management	55	43
K.Work and equipment organization	17	39
Sub-total – internal biosecurity	71	38
Total	**73**	**53**

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Figure1. Geographical location of dairy farm in the Djerma region (Algeria)

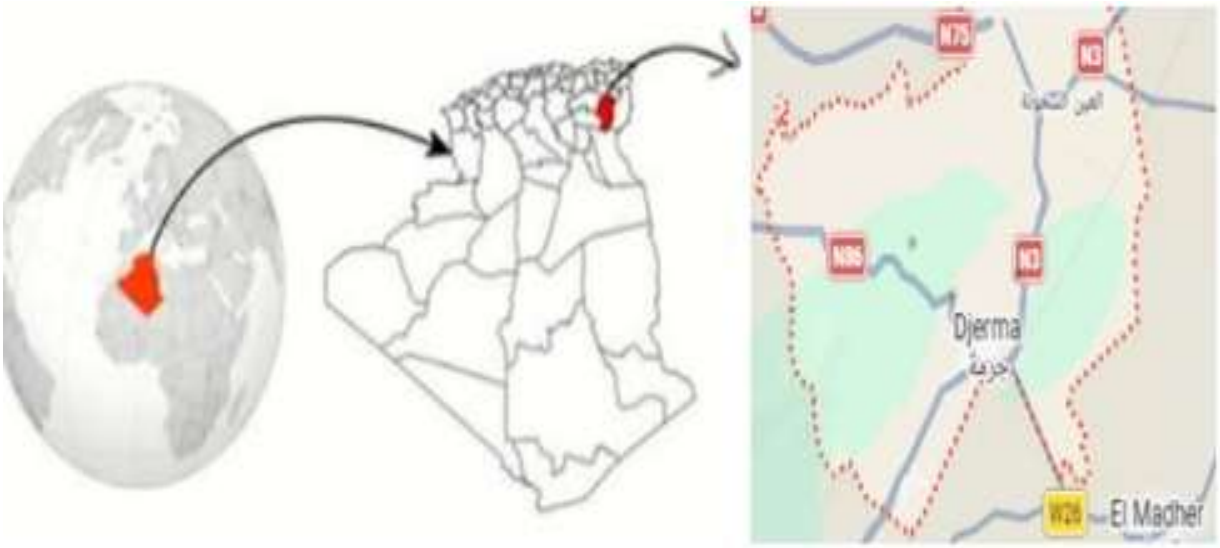
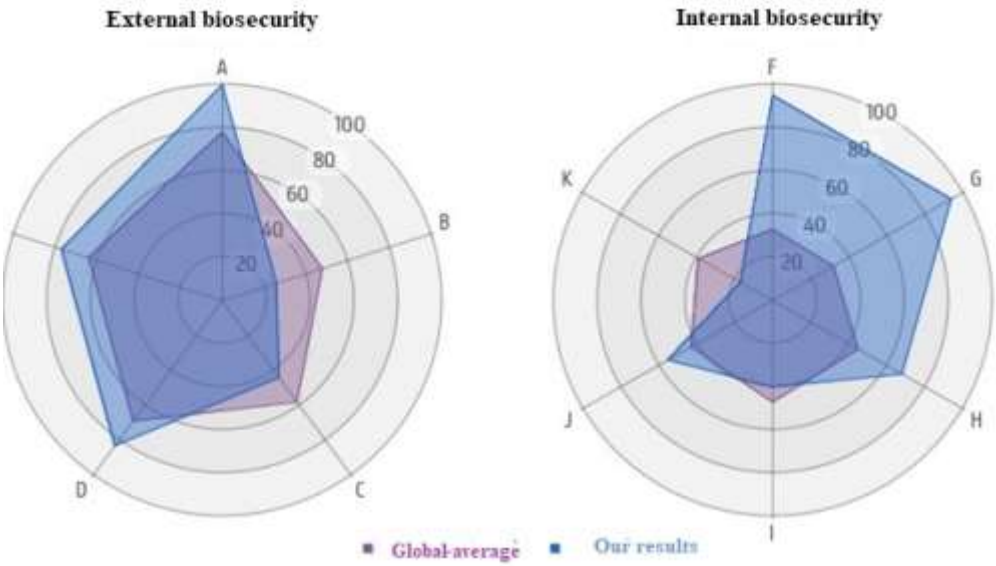


Figure 2: External and internal biosecurity compared to global average values (%).

The purple curve represents the global average, and the blue curve represents the average for the Batna farm. On both spider graphs, the blue area is larger than the purple one, indicating that the Batna farm's scores are above the global average in each section.

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A.Purchase and breeding G. Calving management

B. Carcass transport and removal H. Calf management

C. Feeding and watering . I. Milking and dairy management

D. Visitors and farm workers J. Adult livestock management

E. Pest and other animal control K.Work and equipment organization

F. Heath management

CONCLUSION

The results obtained in this assessment are more than satisfactory. The farm manager and his team are aware of the importance of rigorously applying hygiene rules and properly managing such a farm. Any route of pathogen transmission, even the least significant, can pose a risk of introducing and spreading an infectious disease. Therefore, vigilance at all levels of biosecurity is always crucial for the farm. The biocheckUGent system is a biosecurity assessment tool for livestock farms that can be used by animal health technicians and veterinarians to identify risk factors on a farm. This system does not focus on a specific disease but addresses biosecurity in general, emphasizing the common aspects involved in the transmission of many types of diseases to livestock.

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