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USE OF DEJECT POND IN A CONTAINMENT IN DAIRY PROPERTY IN THE MUNICIPALITY OF DOURADINA-MS

BENEFÍCIOS DO USO DE LAGOA DE DEJETOS EM UM CONFINAMENTO EM
PEQUENA PROPRIEDADE DE ATIVIDADE LEITEIRA, NO MUNICÍPIO DE
DOURADINA-MS

BENEFICIOS DE UTILIZAR UNA LAGUNA DE RESIDUOS EN UN CONFINAMIENTO
EN UNA PEQUEÑA GRANJA LECHERA, EN EL MUNICIPIO DE DOURADINA-MS

Thamiris Wolff Gonçalves
Universidade Federal da Grande Dourados
Érika Ceccília Pereira da Costa
Universidade Federal da Grande Dourados
Euclides Reuter de Oliveira
Universidade Federal da Grande Dourados
Hellén Felicidade Durães
Universidade Federal da Grande Dourados
Janaina Tayna Silva*
Universidade Federal da Grande Dourados
Nathálie Ferreira Neves
Universidade Federal da Grande Dourados
Rosilane Teixeira Alves
Universidade Federal da Grande Dourados
Andréa Maria de Araújo Gabriel
Universidade Federal da Grande Dourados
Jefferson Rodrigues Gandra
Universidade Federal da Grande Dourados
Eduardo Lucas Terra Peixoto
Universidade Federal da Grande Dourados
Alzira Salete Menegat
Universidade Federal da Grande Dourados
Daniely Pereira Gonçalves
Universidade Federal da Grande Dourados

Abstract: The correct handling and storage of waste (stool, urine and wasted water from drinking fountains) produced by cattle in feedlots is a concern for producers. This procedure, if performed incorrectly, can cause serious problems for the environment and for the animals themselves. However, when the management is carried out properly, manure can bring many

* Autor para Correspondência: janaina_tayna@hotmail.com

benefits to the property, as they are fertilizers that can be used in grain and forage production, in addition to reducing endo and ectoparasite infestations. In this context, the objective of this work was to characterize the benefits of using a manure pond in a demonstrative unit of milk production in Douradina, MS. The property has a confinement of dairy cows, in three covered sheds, kept in the compost barn system. The areas are separated so that the straw bed has no contact with the wet part, in which animal waste is washed and channeled to the ponds through pipes. The lakes are on average 20 meters long, 6 meters wide and 2 meters deep, with a capacity of 240m³, covered with a plastic blanket, to avoid contamination of the soil and water. The wet area is washed daily so that waste does not accumulate in the area. The lakes are emptied approximately every 20 days and the residues are sent to be sprayed on the crops, serving as a substitute for chemical fertilizers. The use of the waste pond resulted in greater welfare for these animals, better environmental sanitation and less risk of disease, with no harm to the soil. There was also greater profitability for the producer due to their use as biofertilizers, which resulted in greater pasture production per hectare. It is concluded that the use of ponds is an excellent option for the proper destination of manure, which avoids the undue disposal of manure, which guarantees soil conservation and improves the development of dairy production and pasture growth.

Keywords: Animal feeding, environmental control, university extension, milk production.

Resumo: O manejo e o armazenamento correto de dejetos (fezes, urinas e águas desperdiçadas dos bebedouros) produzidos pelos bovinos em confinamentos, é uma preocupação dos produtores. Este procedimento, se realizado de forma incorreta, pode acarretar em sérios problemas para o meio ambiente e para os próprios animais. Entretanto, quando o manejo é realizado adequadamente, os dejetos podem trazer muitos benefícios para a propriedade, visto que são fertilizantes os quais podem ser utilizados nas produções de grãos e volumosos, além de reduzir as infestações de endo e ectoparasitas. Neste contexto, objetivou-se com este trabalho caracterizar os benefícios do uso de lagoa de dejetos em uma unidade demonstrativa de produção de leite em Douradina, MS. A propriedade possui um confinamento de vacas leiteiras, em três barracões cobertos, mantidas no sistema de compost barn. As áreas são separadas, de maneira que a cama de palha não tem contato com a parte úmida, no qual os dejetos dos animais são lavados e canalizados até as lagoas através de tubulações. As lagoas possuem em média 20 metros de comprimento, 6 metros de largura e 2 metros de profundidade, obtendo uma capacidade de 240m³, revestidas por uma manta plástica, para evitar contaminação do solo e

das águas. A lavagem da área úmida é realizada diariamente para não ocorrer acúmulo de dejetos no local. As lagoas são esvaziadas aproximadamente a cada 20 dias e os resíduos são destinados a pulverização nas lavouras, servindo como substituto de fertilizantes químicos. O uso da lagoa de dejetos acarretou maior bem estar para estes animais, melhor saneamento ambiental e menor riscos de doenças, não havendo malefícios para o solo. Houve, ainda, maior rentabilidade para o produtor devido ao uso como biofertilizantes, o que resultou em maior produção de pastagem por hectare. Conclui-se que a utilização das lagoas é uma ótima opção para o destino adequado dos dejetos, o que evita o descarte indevido dos dejetos, o que garante a conservação do solo e melhora o desenvolvimento na produção leiteira e no crescimento da pastagem.

Palavras-chave: Bem Estar Animal, Fertilizantes, Saneamento.

Resumen: El correcto manejo y almacenamiento de los desechos (heces, orina y agua desperdiciada de los bebederos) producidos por el ganado en confinamiento es una preocupación para los productores. Este procedimiento, si se realiza de forma incorrecta, puede provocar graves problemas para el medio ambiente y para los propios animales. Sin embargo, cuando se gestionan adecuadamente, los residuos pueden traer muchos beneficios a la propiedad, ya que son un fertilizante que se puede utilizar en la producción de granos y a granel, además de reducir las infestaciones de endo y ectoparásitos. En este contexto, el objetivo de este trabajo fue caracterizar los beneficios del uso de una laguna de residuos en una unidad demostrativa de producción de leche en Douradina, MS. La propiedad cuenta con un confinamiento de vacas lecheras, en tres galpones cubiertos, mantenidas en el sistema de granero de compost. Las zonas están separadas, de manera que la cama de paja no tenga contacto con la parte húmeda, donde los desechos animales son lavados y canalizados a las lagunas a través de tuberías. Las lagunas tienen en promedio 20 metros de largo, 6 metros de ancho y 2 metros de profundidad, con una capacidad de 240m³, cubiertas con una manta plástica para evitar la contaminación del suelo y el agua. La zona húmeda se lava diariamente para evitar que se acumulen allí residuos. Las lagunas se vacían aproximadamente cada 20 días y los residuos se utilizan para pulverizar cultivos, sirviendo como sustituto de fertilizantes químicos. El uso de la laguna de desechos resultó en mayor bienestar para estos animales, mejor saneamiento ambiental y menor riesgo de enfermedades, sin causar daños al suelo. También hubo mayor rentabilidad para el productor por su uso como biofertilizantes, lo que se tradujo en mayor producción de pastura por hectárea. Se concluye que el uso de lagunas es una

excelente opción para la disposición adecuada de residuos, lo que evita la disposición indebida de residuos, garantiza la conservación del suelo y mejora el desarrollo de la producción de leche y el crecimiento de las pasturas.

Palabras clave: Bienestar animal, Fertilizantes, Saneamiento.

INTRODUCTION

Dairy farming is one of the agricultural segments that has undergone the most significant changes, due to the use of technology in milk production and the greater number of producers seeking options to ensure greater productivity and better sanitation conditions for these animals (OLIVEIRA et al., 2020).

The confinement system in milk production has gained more space on farms, which allows for better animal welfare, comfort and greater productivity. In this system, animals receive food in troughs, which requires comfortable and functional facilities that provide a better environment in terms of thermal comfort, to reduce animal stress, which increases the level of welfare and their productive response (GANDRA et al., 2019).

The increased use of confinement for dairy cattle is due to the need to increase the size of the property, as it is necessary to be productive at low costs. Therefore, producers choose to increase the number of heads in their herds, without expanding the size of their areas, avoiding larger investments, given the current increase in land values.

The confinement system allows the producer to provide adequate food for each production phase and ensure animal welfare, which helps the animal to display its full genetic potential, which is reflected in increased milk production (OLIVEIRA et al., 2017).

One of the biggest problems in cattle confinement management systems is the amount of waste produced daily, which is a major challenge for the disposal of waste from animal facilities, involving technical, sanitary and economic aspects. The total amount of organic effluent produced in dairy cow confinements varies from 9.0 to 12.0% of the herd's live weight per day, and also depends on the volume of water used to clean and disinfect the production unit's facilities and equipment (DURÃES et al., 2021).

Many producers manage their waste inappropriately, throwing it directly onto pastures or plantations, or even offering the manure to the soil without any prior treatment. However, this practice is already being changed, even on small properties, as this method has a great

potential to pollute water, soil and air, which causes incalculable consequences to the environment (NICOLOSO and OLIVEIRA, 2016).

Cattle waste contains a large amount of nutrients that are considered essential for agriculture, generating a greater amount of forage mass produced per year, which contributes to more sustainable production, reducing the use of chemical fertilizers and influencing the recycling of nutrients (ALBUQUERQUE et al., 2016).

There are currently numerous ways to adequately treat this waste, such as stabilization ponds, composting, manure dumps, and anaerobic digestion. All of the methods mentioned are of great economic and environmental importance, as they prevent environmental pollution, which prevents this waste from having direct contact with the soil, water, and plantations before being treated, bringing savings to the producer, in addition to providing adequate sanitation (DURÃES et al., 2021).

In this sense, the objective of conducting this work was to report a university extension action characterized as a demonstrative unit, aimed at contributing to the productive potential of families, evaluating the benefits of using a lagoon for storing waste on a rural property located in the municipality of Douradina - MS.

MATERIALS AND METHODS

This extension work was developed on a rural property representative of dairy cattle farming, Sítio Nossa Senhora do Abadia, in the municipality of Douradina-MS. The property has 60 hectares, located in a tropical climate region with latitude 22° 13' 18" South and longitude 54° 48' 23" West.

On the property, the chronological order indicated by Menegat et al, (2019) was followed, which highlights the importance of exchanging knowledge between those involved (academic community and producers).

The main focus of the property is dairy farming, however it also has approximately 40 hectares dedicated to agriculture, where there are on average 3 harvests per year (corn for silage, soybeans and oats), in the rotation system and approximately 10 hectares dedicated to pasture. All agricultural production on the property is used to feed the animals.

On the property, the animals are kept in a confinement system, distributed in covered sheds, with average dimensions of 33mx12m, in a compost barn system. These sheds are divided into two areas, one with a rice bed (dry area) and the other with a cement floor (wet area).

The dry area is used for the animals to rest (Figure 1), and its floor is 40 cm thick with rice straw. The wet area (Figure 2) has a water trough and troughs for feeding the animals, where most of the waste produced by the animals is concentrated. The wet area is washed daily with a high-pressure hose to remove the waste, thus reducing the presence of flies and other parasites that can transmit diseases to the animals, in addition to causing discomfort, reducing consumption and consequently production.



Figures 1 and 2. Confinement with dry area and wet area, respectively. Images recorded by students during the extension action, in 2021.

The technology was implemented on the property at the request of the producer, who, when starting to use the confinement system, saw the need to provide an appropriate destination for the waste produced, given that inadequate disposal polluted the soil and he had observed an increase in the number of flies on the animals.

All waste from the wetland is channeled to the waste lagoon, which has been lined with plastic sheeting to prevent waste from permeating the soil. The property has a series of lagoons, each measuring on average 20 meters long, 6 meters wide and 2 meters deep, with a capacity of 240 m³ each. To prevent animals from entering and consequently reduce the risk of accidents, the lagoons were fenced and a shock system was installed around them as a safety measure (Figure 3).

The effluents remain in the lagoon for approximately 20 days, for biological treatment to occur, until the organic matter stabilizes, and bacteriological oxidation occurs. After this period, the waste is sprayed as fertilizer on pastures and grain crops.



Figure 3. Waste lagoon. Images recorded by students during the extension action, in 2021.

RESULTADS AND DISCUSSION

In the development of these reflections, with the implementation of the waste containment lagoon, the property had as a result greater animal well-being, since greater milk production was observed by the animals, as they always had a clean, comfortable and fresh environment, with a low contamination rate, reduction in the incidence of flies, due to the daily removal of waste, thus inhibiting the stress of these animals.

According to Orrico et al. (2016), with the use of adequate waste management, there is an increase in the comfort and well-being of animals, in addition to the treatment and adequate disposal as agricultural fertilizer, due to the large amount of nutrients present in waste. Another advantage cited by the same authors is the reduction of pollution, which can be caused by the evaporation of gases such as ammonia and methane.

After the implementation of the waste lagoons, there was an improvement in environmental sanitation, reducing the incidence of diseases and also the infestation of flies and ticks in animals. With the lagoons in operation, the effluent began to be treated biologically, preventing its penetration into the water body, or even preventing its use in crops containing high organic load (DURÃES et al., 2021).

The producer obtained greater profitability, due to the use of biofertilizers, in the pastures and grain plantations existing on the property, increasing its production. The

application of biofertilizer and the increase in sanitation generates an increase in savings on the properties, as it reduces the amount of inputs and chemical fertilizers in the pastures and plantations (MATOS et al., 2017).

The use of biofertilizers from waste has proven to be a viable and easily applicable reality, given the reduction in fertilization costs over time, since the bioavailability and concentration of nutrients is lower in this type of fertilizer, when compared to the chemical fertilizer used traditionally.

There is currently pressure for sustainable management of agricultural waste, avoiding potential problems that may be caused by accumulation or improper disposal. In this context, its use as fertilizer in agricultural production has been highlighted as a viable alternative to reduce pollution, improving soil quality because it keeps the soil covered, which reduces temperature, maintains moisture for longer, as well as microbial activity and biomass, which are essential for nutrient cycling.

These wastes are increasingly being used as sources of forage fertilizer, after undergoing adequate treatment, thus reducing environmental problems and problems with storage and adequate disposal (ORRICO et al., 2016).

In addition, the animals required fewer medications, as there is a low contamination rate and a reduction in the incidence of flies, due to the cleanliness of the place. There was also an increase in milk production, compared to without daily cleaning of the sheds due to the better comfort of these animals and an increase in the production of vegetable crops.

With the implementation of this extension project at Sítio Nossa Senhora da Abadia, there was an exchange of knowledge between producers and the academic community, in order to understand the importance of the proper disposal of waste generated in dairy production. Many producers who do not have access to information are unaware of the importance of proper waste management, which can influence the improvement in the quantity of milk and life, as highlighted by (OLIVEIRA, 2019, apud MENEGAT and CENCI, 2019).

University extension expands possibilities for student training, with the application of knowledge and, fundamentally, opportunities for exchanging this knowledge. The transfer of knowledge between the university and the community in general is fundamental for the production development process, in addition to providing knowledge that aims to improve the basis of production, corroborating the academic training of students (MENEGAT, et al., 2019).

In this sense, Menegat et al. (2019) highlighted that university extension has as its central axis the formation of the link between university and community groups, enabling the transfer of academic knowledge and redefining production procedures in the settlement, in

search of new practices for production, with the aim of improving the quality of life of the people who produce and/or those who consume the products, with attention to the environment.

The importance of this article is highlighted, in sharing results with the referred extension action, publishing them in an extension magazine, thus circulating the knowledge obtained in the on-site application, subsidizing new actions, thus expanding the reach of university extension, which only makes sense when exchanged.

CONCLUSION

The waste lagoon technology proved to be an efficient alternative in waste management at the Nossa Senhora do Abadia demonstration farm, with positive gains for the producer and the environment, since treating the waste before using it on crops reduces the risk of contamination of the soil and watercourses.

However, the cost of purchasing the tarps and the machinery to open the holes means that this type of technology is not widely used, which makes it difficult to use more lagoons on properties.

In this way, the implementation of waste lagoons can favor the development of properties because, in addition to being environmentally recommended, it provides income generation and encourages people to settle in the countryside.

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