UNIVERSITI PUTRA MALAYSIA

EFFECT OF CONCRETE AND ANTI-SKID RUBBER FLOOR TYPES ON SOME BEHAVIOURAL TRAITS AND STRESS LEVEL IN JERSEY COWS

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EFFECT OF CONCRETE AND ANTI-SKID RUBBER FLOOR TYPES ON SOME BEHAVIOURAL TRAITS AND STRESS LEVEL IN JERSEY COWS

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It is hereby certified that we have read this project paper entitled "Effect of Concrete and Anti-Skid Rubber Floor Types on Some Behavioural Traits and Stress Level in Jersey Cows" by Nur Raihan Ab Razak and in our opinion it is satisfactory in terms of scope, quality and presentation as partial fulfilment of the requirement for the course VPD 4999 – Final Year Project.

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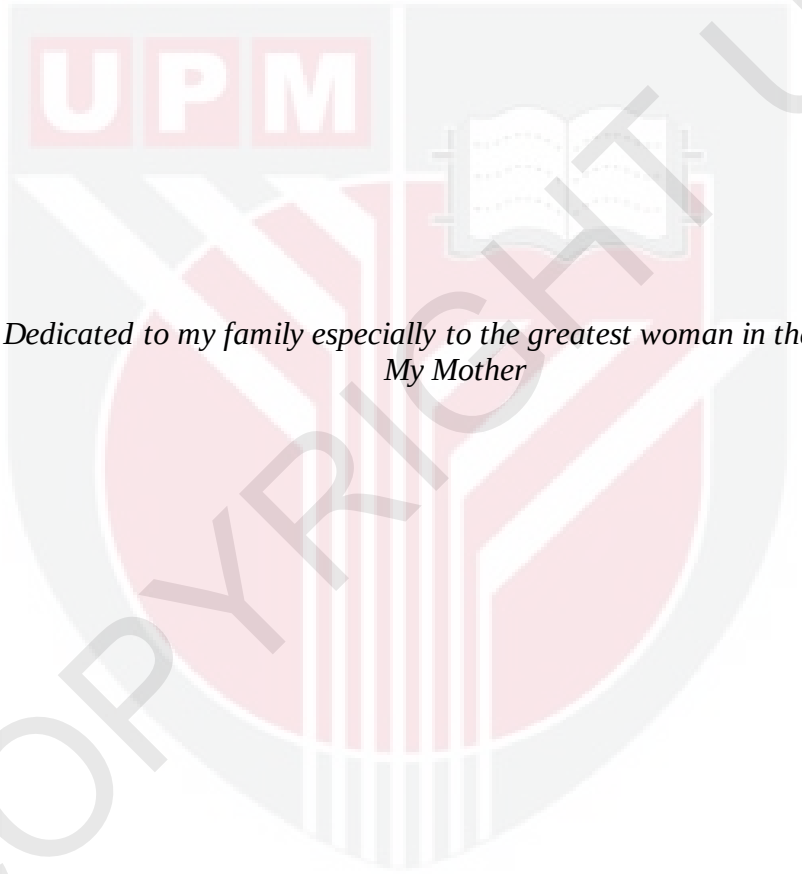
Dedicated to my family especially to the greatest woman in the world,
My Mother



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ABSTRAK

Abstrak daripada kertas projek yang dikemukakan kepada Fakulti Perubatan Veterinar untuk memenuhi sebahagian daripada keperluan kursus VPD 4999 – Projek Ilmiah Tahun Akhir.

KESAN LANTAI KONKRIT DAN LANTAI GETAH ANTI GELINCIR PADA BEBERAPA TRAIT TINGKAHLAKU DAN TAHAP TEGASAN LEMBU JERSEY

Oleh

NUR RAIHAN AB RAZAK

2015

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Lantai getah telah digunakan oleh peladang di ladang tenusu di negara-negara Barat kerana kelebihan dari segi pengeluaran dan kesihatan kuku berbanding dengan lantai konkrit. Tidak banyak yang diketahui tentang kesan lantai getah pada ciri-ciri tingkah laku dan tahap tegasan pada lembu tenusu. Oleh itu, kajian ini bertujuan untuk membandingkan kesan lantai konkrit (CF) dan lantai getah anti-gelincir (RF) pada beberapa ciri-ciri tingkah laku dan tahap tegasan lembu tenusu dari baka jenis Jersey. Tiga puluh ekor lembu masing-masing dari ladang yang menggunakan lantai getah (n=15) dan lantai konkrit (n=15) dipilih berdasarkan umur, laktasi dan

baka yang sama iaitu semua lembu berumur 5 tahun, berada pada laktasi yang kedua dan dari baka jenis Jersey. Sistem pengurusan pemakanan lembu di kedua-dua ladang tersebut adalah sama. Kekerapan tingkahlaku berdiri, berbaring, berjalan, makan dan minum diperhatikan dan direkod menggunakan ethogram sepanjang tempoh pemerhatian selama 2 jam setiap hari selama 9 hari. Pemerhatian dijalankan dari pukul 9 pagi hingga 11 pagi untuk ladang lantai konrit dan pukul 12 tengah hari hingga 1 petang untuk ladang lantai getah anti-gelincir. Sampel darah diambil dari kesemua haiwan yang dikaji pada hari kesepuluh dan dianalisa untuk beberapa parameter hematologi. Kekerapan tingkahlaku lembu berbaring, berdiri dan berjalan ternyata dipengaruhi oleh jenis lantai ($p<0.05$). Bilangan lembu berbaring adalah lebih tinggi dalam RF (10.1±0.5) berbanding CF (3.9±0.3) manakala bilangan lembu berdiri dan berjalan adalah lebih tinggi dalam CF (masing-masing 13.8±0.2 dan 7.6±0.4) berbanding RF (masing-masing 8.7±0.5 dan 5.1±0.3). Tingkahlaku makan tidak dipengaruhi oleh jenis lantai kerana tidak ada perbezaan yang signifikan di antara RF dan CF dalam tingkahlaku ini. Terdapat perbezaan yang signifikan antara RF dan CF dalam kiraan neutrophil, kiraan limfosit dan kiraan monosit ($p<0.05$) dimana CF mempunyai neutrophil lebih tinggi dan kiraan limfosit lebih rendah berbanding RF. Lantai jenis CF mempunyai nisbah neutrophil kepada limfosit yang lebih tinggi ($p<0.05$) berbanding dengan RF dimana nisbah neutrophil kepada limfosit yang tinggi dikaitkan dengan tekanan fisiologi.

Kata kunci: lantai konkrit, lantai getah anti-gelincir, lembu tenusu, tingkahlaku, tegasan

ABSTRACT

An abstract of the project paper presented to the Faculty of Veterinary Medicine in partial fulfilment of the course VPD 4999 – Final Year Project.

EFFECT OF CONCRETE AND ANTI-SKID RUBBER FLOOR TYPES ON SOME BEHAVIOURAL TRAITS AND STRESS LEVEL OF JERSEY COWS

By

NUR RAIHAN AB RAZAK

2015

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Rubber flooring has been used in dairy farms by farmers in the Western countries because of its advantage in terms of production and hoof health compared to concrete flooring. Little is known about the effect of rubber flooring on the behavioral traits and the stress level of dairy cows. Therefore, this study aimed to compare the effect of concrete flooring (CF) to anti-skid rubber flooring (RF) on some of behavioral traits and stress level of Jersey cows. Thirty dairy cows from two different farms that uses anti-skid rubber flooring (n=15) and concrete flooring (n=15) were selected based on their age which is 5 years old, in second lactation and of Jersey breed. Both farms practice similar feeding management system. Behavior

of these cows such as standing, lying, walking, feeding and drinking was observed and recorded using an ethogram for a period of 2 hours daily for nine days. Observation of the behavior was done from 9 am until 11 am for the farm equipped with rubber flooring and 12 pm until 1 pm for the farm equipped with concrete flooring. Blood samples were collected from these animals on the tenth day and were analyzed for some hematological parameters. Frequency of cows lying down, standing and walking behaviours were significantly ($P<0.05$) affected by the types of floor. The number of cows lying down was significantly higher in RF (10.1±0.5) compared to CF (3.9±0.3) while the number of cows standing and walking is significantly higher in CF (13.8±0.2 and 7.6±0.4, respectively) compared to RF (8.7±0.5 and 5.1±0.3, respectively). Feeding and drinking behaviour were not affected by types of floor as there was no significant difference in these behaviour between RF and CF systems. The neutrophil count, lymphocyte count and monocyte count were significantly different between RF and CF farms ($p<0.05$),) where CF farm had higher neutrophil and lower lymphocyte numbers than RF farm. The CF farm had higher neutrophil to lymphocyte ratio ($p<0.05$) compare to RF farm where a high neutrophil to lymphocyte ratio is often associated with physiological stress.

Keywords: concrete flooring, anti-skid rubber flooring, dairy cows, behavior, stress

1.0 Introduction

Dairy farmers strive to provide dairy cows comfortable enviroment as comfortable cows can result in higher production. It is essential that dairy cows have adequate rest to maintain good health and high level of productivity (Tucker and Weary, 2004) which is why dairy cattle prioritize resting over other behaviour (Norring *et al.*, 2008). Cattle have a nearly constant daily need for lying where approximately 50-60% of the day spent lying down and the duration of time cow spent lying was suggested as an indicator of welfare and cow comfort (Herlin, 1997).

Therefore, efforts have been undertaken to improve welfare and comfort of dairy cows by providing better housing enviroment range from stall design to the type of flooring used in these stalls. Concrete, which is the common type of flooring used nowdays, does not provide the best walking and lying surface area because it is too hard and does not provide sufficient traction which lead to lower walking speed and greater risk of the cow slipping (Rushen and de Passile, 2006). The use of concrete flooring in cattle farms has been shown to be one of the important factors that predisposes dairy cows to lameness which can be detrimental to the animal's health, welfare and production (Eicher *et al*., 2013). Graunke *et al*. (2011) also reported that concrete flooring cause more interrupted lying down movement and fewer lying bouts, and less prefered lying area compared to softer material. This will not only affect the hoof health and mobility of dairy cows but also lead to increase of stress level which directly reduces the feed intake and subsequently reduce in milk production (Kremer *et al.*, 2012). Thus, many research was done to improve flooring of dairy cows by comparing concrete flooring with other softer surface material.

Thus, a great body of research was done to compare the effect of concrete flooring to other softer surface material and to assess its impact on herd health and milk production in general.

According to Tucker and Weary (2003), dairy cattle prefer to rest on softer surface compared to concrete and this is supported by Yanar *et al.* (2010) and Vanegas *et al.* (2006) who reported that dairy cattle had a clear preference for rubber mats in their stalls. Rubber flooring have been reported to improve locomotion where it increases walking speed, stride length and generally improves the gait of the cows (Yanar *et al.*, 2010; Kremer *et al.*, 2012). The use of rubber flooring has been shown to improvemeof the welfare, claw health, and some behavioral traits regarding activity, gait and mounting (Kremer *et al.*, 2012).

Thus, the objectives of this study were: (i) to assess the behaviour of cows kept on concrete and anti-skid rubber floors and, (ii) to determine the hematological indicator of stress level of dairy cattle reared in a farm equipped with either anti-skid rubber flooring system (RF) or concrete flooring system (CF).

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