Does rubber flooring improve welfare and production in growing bulls in fully slatted floor pens?

KL Graunke†, E Telezhenko†, A Hessle†, C Bergsten‡ and JM Loberg*

† Swedish University of Agricultural Sciences, Department of Animal Environment and Health, PO Box 234, SE-532 23 Skara, Sweden
‡ Swedish Dairy Association, PO Box 234, SE-532 23 Skara, Sweden
* Contact for correspondence and requests for reprints: jenny.loberg@slu.se

Abstract

This study compared the effects of concrete slats (CS), synthetic rubber slats on aluminium profiles (RS) and slotted rubber mats on concrete slats (RM) in fully slatted floor pens on behaviour, claw and leg disorders, claw horn growth, cleanliness and production parameters of growing dairy bulls from 225 to 650 kg average liveweight. Each pen housed five bulls up to 400 kg average liveweight and four bulls thereafter. On CS, lying bouts were less frequent and longer than on RM and RS at 250 kg. Lying down phase 1 was longest on CS and shortest on RM. Interrupted attempts at lying down occurred twice as often on CS as on the rubber floors. Severity scores for white line haemorrhage and sole haemorrhage were higher in bulls on CS than on RM. Swelling on legs had highest scores on CS, whereas the severity score for heel horn erosion was lowest on CS. Floor type had no effect on dermatitis, leg hairlessness and skin damage. Both claw horn growth and wear were greater on CS than on RS and RM. Bulls on RS and CS were cleanest. Slaughter age tended to be higher and carcase conformation score tended to be lower on CS than on rubber, whereas feed intake, feed efficiency and other carcase traits were unaffected. The results indicate that rubber flooring improves animal welfare compared with concrete.

Keywords: animal welfare, behaviour, cattle, claw health, cleanliness, performance

Introduction

Housing growing animals in fully slatted floor pens is a common system in many European countries. The animals are traditionally kept on concrete slats or, in some cases, wooden slats with the gaps between the bars serving as drainage of waste material. The advantages of the system are low labour and space demands and efficient manure management without litter, in combination with reportedly clean animals (Scott & Kelly 1989; Lenehan & Fallon 2002).

However, concrete is reported to cause more interrupted lying down movements and fewer lying bouts, to be more slippery and to be a less preferred lying area for growing cattle compared with softer materials, such as rubber mats and deep straw bedding (Ruis-Heutinck et al 2000; Gygax et al 2007a; Platz et al 2007; Zerbe et al 2008). Hard surfaces cause compression lesions and leg diseases, such as carpal bursitis and periarthritus (inflammation of the tissue around the joint) in growing cattle and overwork carpal joints during lying down and standing up (Metzner 1978; Stanek 1997; Schulze Westerath et al 2007). In a study on dairy cows, laminitis and claw injuries caused by trauma decreased when concrete alleyways were covered with rubber (Benz & Wandel 2004). Hygiene-related diseases, such as interdigital dermatitis and heel horn erosion, are reported to decrease on drained floors, irrespective of whether they are made of concrete or covered with rubber (Thysen 1987; Hultgren & Bergsten 2001). Floor abrasiveness affects claw horn growth and wear and claw conformation, which affects susceptibility to claw lesions (Telezhenko et al 2008).

Cleanliness is important for both animal welfare and food safety. A dirty coat causes discomfort and wounds in the skin, and increases the risk of meat contamination at slaughter (Bosilevac et al 2005). Having a higher proportion of drainage area influences cleanliness positively, which can be a disadvantage with rubber mats, which have less drainage area than slatted concrete floors (Lowe et al 2001; Fallon & Lenehan 2002). The cleanliness of the animals is also influenced by manure consistency, which is influenced by feed and diet (Davies et al 2000; Fallon & Lenehan 2002).

Hypothetically, improving animal welfare can result in higher production. However, Lowe et al (2001) did not find any effect of floor type on weight gain or carcase composition in growing cattle.

The aim of this experiment was to investigate the influence of a slatted concrete floor and two types of rubber flooring on behaviour, claw and leg disorders, claw horn growth, cleanliness and production in growing cattle. Unlike most other studies, we took a more comprehensive approach by studying multiple welfare parameters on the same animals.