



Effects of different enrichment devices on some welfare indicators of post-weaned undocked piglets



E. Nannoni^{a,*}, L. Sardi^a, M. Vitali^a, E. Trevisi^{b,c}, A. Ferrari^b, F. Barone^a, M.L. Bacci^a, S. Barbieri^d, G. Martelli^a

^a Department of Veterinary Medical Sciences, University of Bologna, Via Tolara di Sopra 50, 40064 Ozzano Emilia (BO), Italy

^b Istituto di Zootecnica, Facoltà di Scienze agrarie, alimentari e ambientali, Università Cattolica del Sacro Cuore, via Emilia Parmense 84, 29122 Piacenza, Italy

^c PRONUTRIGEN – Centro di Ricerca sulla Nutrigenomica e Proteomica, Università Cattolica del Sacro Cuore, via Emilia Parmense 84, 29122 Piacenza, Italy

^d Università degli Studi di Milano, Dipartimento di Scienze Veterinarie e Sanità Pubblica, Via G. Celoria 10, 20133 Milano, Italy

ARTICLE INFO

Article history:

Received 8 March 2016

Received in revised form 18 July 2016

Accepted 24 August 2016

Available online 28 August 2016

Keywords:

Animal welfare

Blood parameters

Environmental enrichment

Intensive husbandry

Pig

Weaners

ABSTRACT

Two experimental trials were carried out in order to test the effectiveness of different environmental enrichments in improving the welfare of weaned pigs. A total of 120 undocked piglets was used. In trial one, group C1 received a metal chain and group WL a wooden log mounted on a frame. In trial two, the enrichments proposed were a hanging chain (group C2), an edible block (group ED) and a wooden briquette (group WB) mounted on a frame. The effectiveness of the enrichments was assessed in terms of animal behaviour, cortisol from bristles, hematologic and hematic profiles, cutaneous (skin and tail) lesions. Growth parameters were also recorded. Although some differences were detected in growth parameters in trial 1 (with C1 group having better productive outcomes than WL group) and some minor differences were observed in animal behaviour in both trials, the overall welfare status did not differ among the experimental groups. On the other hand, no welfare issues emerged in groups C1 and C2, receiving the enrichment device which is generally believed to be scarcely attractive, i.e. the hanging chain. We can therefore conclude that, if no managerial errors are made (floor space availability, feed inadequacy, group stability, microclimate, illumination), under the tested experimental conditions, hanging chains can provide a sufficient environmental enrichment for undocked piglets, even when compared to more attractive enrichments (e.g. an edible block).

© 2016 Elsevier B.V. All rights reserved.

1. Introduction

The term “environmental enrichment” is used widely in the literature to indicate improvements to captive animal environment. However, from a scientific point of view, it should only be applied to modifications capable of improving the biological functioning of captive animals (Newberry, 1995). In the case of pigs, a successful enrichment should decrease the incidence of abnormal patterns of behaviour (stereotypies, belly nosing, ear and tail biting) and increase the frequency of species-specific behaviours such as social interactions, foraging end exploration (Petersen et al., 1995; Van de Weerd and Day 2009; Telkänranta et al., 2014a).

The provision of manipulable materials to pigs of all ages is mandatory in the European Union since January 2013 (Directive

2008/120/EC). However, the use of substrates listed in the directive (straw, hay, wood, sawdust, mushroom compost, peat) is not always feasible for farmers. Although straw indeed has the highest potential to be the “gold standard” enrichment material (Bracke et al., 2006), its use, especially in slatted systems, can cause difficulties for slurry management (Scott et al., 2007; EFSA, 2007). On the other hand, indestructible objects such as metal chains or tyres are considered not sufficient to provide for the exploratory needs of pigs and, according to EFSA (2007) recommendations, they may be used as a supplement to destructible and rooting materials but not as a substitute for them. The main reason for such a provision is that such enrichments, according to the literature, can apparently provide only marginal welfare benefits in terms on animal welfare, since they allow pigs to perform manipulatory behaviours, but not actual rooting behaviours (i.e., “to turn up by digging with the snout or nose” – American Heritage® Dictionary of the English Language, 2011), therefore the need for exploration may not be met by indestructible objects (EFSA, 2007). However, there is some evi-

* Corresponding author.

E-mail address: eleonora.nannoni2@unibo.it (E. Nannoni).

dence that it could be possible to design successful point-source enrichment-objects, provided that they are able to sustain interest for a protracted period of time (Van de Weerd and Day, 2009) and that no competition for access to the enrichment occurs (Jensen et al., 2010). According to Bulens et al. (2016), the provision of straw blocks reduced pen mates manipulation (e.g., tail and ear biting, belly-nosing) in finishing pigs. As it has been extensively reviewed by Bracke et al. (2006), various enrichment tools and materials have been proposed for piglets, including: cloth strips, rubber hoses, different amounts of straw, ropes, wood blocks, wood beams, straw racks, dog toys, mineral blocks, roughage and substrates (compost, earth, sawdust, peat). Their main conclusions were that metal objects show very few significant welfare benefits; and that rubber, rope, wood, roughage and substrates have more benefits than metal objects, but less than straw and compound objects. However, the review highlights how relatively little has been reported about mineral blocks and wood used as environmental enrichments for piglets. Trickett et al. (2009) compared the use of rope and wood as enrichments for weaned piglets and found that rope had a good attractiveness but, despite object alternation, habituation still occurred reducing the long-term attractiveness of the enrichments. Similar results were found in weaners by Blackshaw et al. (1997), who observed a progressive decrease over time in interactions with the toy. However, both studies agreed that suspended or fixed objects are the most hygienic and attractive way to effect enrichment.

The aim of the present work is to gain new insights on the effectiveness in improving the welfare level of post-weaned piglets, assessed through behaviour, health, physiology, and performance traits. The investigated enrichment-objects were made with poorly investigated materials (poplar wood, sawdust briquette and edible block), and compared to metal chains which are widely used when animals are raised on slatted floors. To this aim, a wide array of haematological, biochemical and behavioural parameters was measured to assess possible differences depending on the enrichment material used. If effective (i.e., able to reduce stress indicators), the proposed enrichment tool might represent a viable alternative to straw especially on slatted floors, where the use of rootable substrates is ruled out by the constraints of manure collection and handling systems (Westin et al., 2013).

2. Materials and methods

The trials were carried out in the facilities of the Department of Veterinary Medical Sciences (DIMEVET) of the University of Bologna, Italy, in accordance with current Italian legislation implementing European Council Directive 2008/120 on swine protection. The institutional Ethics Committee of the University of Bologna approved the experimental protocol (Authorization Prot. n. 2-IX/9–27.02.2012). In order to mimic farm conditions (i.e., to provide environmental enrichment materials to all categories of pigs, according to the provisions set by the mentioned Directive), the experimental protocol did not include a negative control (i.e., without enrichment) group.

2.1. Animals, housing and feeding

A total of 120 crossbred (Landrace × Large White) castrated male weaners were used in two separate and independent trials (n = 60 per trial). Their tails were left undocked. Animals were weaned at 25 days of age and allowed to adapt to the new environmental conditions for three days. Animals' health status was monitored in order to identify possible health problems. At 28 days of age, the experimental groups were formed on the basis of their litter and body weight (BW), and the environmental enrichments were

provided. Piglets were kept in collective flat-deck cages on a slatted metal floor, with a floor space of 2 m² per cage. Each cage was equipped with a nipple drinker (water was available *ad libitum*) and a collective stainless steel feeder (0.2 m wide × 1 m long). Piglets were located in temperature- and humidity-controlled rooms equipped with a forced-air ventilation system (RH was kept at 65% during the whole trial; T was kept at 28° at the beginning of the trial and gradually reduced of approximately 0.5 °C per week, until the temperature of 24 °C was reached at the end of the trial).

Feed was provided *ad libitum*, in a pelleted form (3887 kcal DE/kg DM, CP 20.4% DM). Lighting was entirely artificial and was supplied by neon tubes (12 h of light per day, from 7:00 to 19:00). In both trials, each replicate experienced one enrichment device for all the duration of the trial. Pictures of the enrichment devices are given in the Supplementary material (Fig. S1).

Trial 1

Sixty animals were allotted to 2 experimental groups, each comprising 6 replications (i.e., cages) of 5 piglets, which were subjected to the following experimental treatments

- Chain (C1) group: the environment was enriched by providing a steel chain hanging in the middle on each cage;
- Wood Log (WL) group: the environment was enriched by providing a metal frame holding in horizontal position a poplar log (10 cm in diameter, 25 cm long). The frame was attached to the cage structure approximately 10 cm above the piglets' withers, in such a way that piglets could easily access them with their snouts and rotate or bite the wood.

The average Body Weight (BW) at the beginning of the trial was 6.76 ± 0.77 kg (average ± SD). Animals were kept under the experimental conditions for 48 days.

Trial 2

Sixty animals were allotted to 3 experimental groups, each comprising 5 replications (i.e., cages) of 4 piglets, which were subjected to the following experimental treatments

- Chain (C2) group: see trial 1
- Edible Block (ED) group: these cages were enriched by providing a metal frame (the same as in trial 1, installed in the same position) holding in horizontal position a cylindrical edible block (10 cm in diameter, 25 cm long). The block was specifically formulated for the experimental trial and its main ingredients were feed, alfalfa meal, sugar beet molasses, and minerals. The frame was mounted in such a way that piglets could easily access them with their snouts and rotate or bite the block;
- Wood Briquette (WB) group: in these cages, a cylinder of compressed wood shavings was mounted on the same frames described before. The briquette had the same size as the edible block.

The average Body Weight (BW) at the beginning of the trial was 6.35 ± 0.58 kg (average ± SD). Animals were kept under the experimental conditions for 43 days.

2.2. Growth parameters

All piglets were individually weighed at the beginning, in the middle (only in trial 1) and at the end of the trial, and average daily gain (ADG) was calculated for each period. Feed intake of each replication was recorded to calculate the feed conversion ratio (FCR) for

Download English Version:

<https://daneshyari.com/en/article/6379204>

Download Persian Version:

<https://daneshyari.com/article/6379204>

[Daneshyari.com](https://daneshyari.com)