

CONSTRUINDO SABERES, FORMANDO PESSOAS E TRANSFORMANDO A PRODUÇÃO ANIMAL

## **PEN HOUSING WITH LITTER: SANITARY STATUS AND CARCASS TRAITS OF RABBITS**

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**Resumo:** Os sistemas alternativos de alojamento podem influenciar a saúde e a produção de coelhos. Este estudo objetivou avaliar o status sanitário e as características de carcaça, gordura e pernil de coelhos criados, durante a fase de crescimento, em piso com cama em relação à gaiola convencional. Aos 35 dias, cinquenta e quatro coelhos machos e fêmeas mestiços (Nova Zelândia Branco vs. Botucatu) foram alojados aleatoriamente em piso com cama (seis boxes; seis coelhos por box; 2,3 coelhos/m<sup>2</sup>) ou em gaiolas (seis gaiolas; três coelhos por gaiola; 8,3 coelhos/m<sup>2</sup>) e mantidos até a idade de abate, aos 77 dias. Houve maior intensidade de sujeira e ocorrência de muco nos coelhos alojados em piso no primeiro período, mas esta ocorrência praticamente desapareceu no período posterior. Não houve efeito ( $P>0,05$ ) de sistema de alojamento para os rendimentos de carcaça referência, de gordura dissecável e de pernil. De acordo com os resultados, pode-se sugerir a ocorrência de adaptação dos coelhos ao piso, ao longo do tempo.

**Keywords:** alternative system, cage, health, housing condition, rabbit production

### **Introduction**

Scientists, decision-makers of the food industry and even consumers need information on the effect of alternative breeding systems on animal welfare as well as on meat quality and animal health. To meet the expectations of customers,

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several researchers have studied the effects of alternative production methods on the performance traits of fattening rabbits. One of the most important conclusions of the studies is that breeders have to keep in mind the new trends of animal husbandry which are directed toward a better quality of the whole production process, including the improvement of the life-quality of animals. Many methods of keeping rabbits on deep litter have been examined. From these trials increasingly clear tendencies are emerging (Metzger et al., 2003)

Enhanced knowledge on housing system would be of great value for the advancement of rabbit meat production. It is known that housing systems can influence the growth of animal tissue due to the possibility of mobility and greater social interaction. It can lead to changes in carcass properties, as well as sanitary status (Szendrő and Dalle Zotte, 2011) However, the effect of pen housing with litter on those traits is not well known. This study had the objective of investigating the effects of housing systems (pen vs. cage) on the sanitary status and carcass traits of growing rabbits.

### Material and methods

The study was carried out at the Federal Institute of Minas Gerais (IFMG) in partnership with the University of Brazil. The approval of the Institutional Animal Care and Use Committee (CEUA/UNIFENAS) was registered under protocol number 28A/2016. The experimental period started at weaning (35 d) and finished at slaughter (77 d). A total of fifty-four male and female rabbits, crossbreeds between New Zealand White and Botucatu, were randomly assigned to groups housed in pen on deep litter (six pens of 2.0 x 1.3 m each; six rabbits per pen; 2.3 rabbits/m<sup>2</sup>; n = 36) or in cage (six cages of 0.6 x 0.6 m each; three rabbits per cage; 8.3 rabbits/m<sup>2</sup>; n = 18). The average body weight of the rabbits at the beginning of the experiment (35 d) was the same across both housing system ( $P > 0.05$ ). The pens were equipped with drinkers and feeders used for poultry and the cages were equipped with nipple

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water drinkers and semi-automatic feeders. The rabbits were allowed *ad libitum* access to water and feed over the entire experimental period. A commercial pelleted diet was provided (CP: 13.7%, ADF: 20.8%, DE: 2200 kcal kg<sup>-1</sup>). At 56 d, rabbits received sulfaquinoxaline via drinking water, to prevent coccidiosis. The 5 cm thick rice straw litter placed on the concrete floor was refreshed with a new layer every three weeks. PVC pipe was used for both housing systems as environmental enrichment.

For sanitary status, the rabbits were evaluated at 56 and 77 d for dirt (0-2 scale: 0 for rabbits without dirt, 1 for rabbits with some dirt and 2 for rabbits with at least 1/3 of the body covered by dirt) and mucus below the nostrils (0-2 scale: 0 for rabbits without mucus, 1 for rabbits with spots and 2 for visible mucus). The rabbits were also inspected for any health problems, especially the occurrence of diarrhea, and mortality was recorded. The occurrence of lesion in the ears or loin and fights were registered. For carcass study at 77 d, a total of twenty-four rabbits (twelve male and twelve female) were weighed and slaughtered by physical stunning and bleeding. Reference carcass (no head, blood or viscera) and dissectible fat (scapular and inguinal deposits) were weighed and their yields (in %) were determined relative to slaughter weight. The hind leg was weighed and the yield (in %) was determined relative to the reference carcass weight.

The sanitary status data were compared descriptively. Carcass data were submitted to analysis of variance using the Statgraphics Centurion software and means were compared by the SNK test, at the 5% probability level. The experimental unit for carcass traits was the individual rabbit.

## Results and discussion

According to the sanitary status (Table 1), an average of 91.5% of the rabbits housed in pen showed dirt at the level 1 at 56 and 77 d. It means that the color of the hair from those rabbits was compromised by dirt. The presence of mucus at the level

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1 was observed at 56 d in 56% of the rabbits raised in pen and 6% of the rabbits raised in cages, however, the mucus practically disappeared at 77 d. Only two lesions in the ears were observed in the group raised in pen, at 77 d. There was no occurrence of diarrhea or fights between the rabbits for both housing systems. No mortality was registered over the entire experimental period.

The reference carcass, dissectible fat, as well as the hind leg yield were not influenced ( $P>0.05$ ; Table 2) by the housing system. These findings are different from those obtained by Dal Bosco et al. (2002) and Metzger et al. (2003) who reported lower carcass yield and slaughter weight, respectively in rabbits raised in pen. The difference between the body weight in the housing system could be caused by the consumption of litter material (Dal Bosco et al., 2000) and also by the different locomotor activities (Metzger et al., 2003). It is known that the locomotor activity may be related with the building of fat depots (Metzger et al., 2003). Therefore, in our study it was expected higher locomotor activities in rabbits housed in pen and, thus, higher percentage of hind leg and lower dissectible fat.

Table 1 - Descriptive results (%) of sanitary status of rabbits in two housing systems (pen vs. cage)

Trait	Cage housing			Pen housing		
	0	1	2	0	1	2
Dirt (56 d)	89	11	0	11	89	0
Dirt (77 d)	100	0	0	06	94	0
Mucus (56 d)	94	06	0	44	56	0
Mucus (77 d)	100	0	0	88.9	11.1	0

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Table 2 - Mean and standard deviation of the carcass traits of rabbits in two housing systems (pen vs. cage), from 35 to 77 d

Trait	Cage housing	Pen housing	P-value
Slaughter weight (g)	2272 (12) <sup>a</sup>	2205 (07) <sup>a</sup>	0.0916
Reference carcass weight (g)	11903 (10) <sup>a</sup>	1133 (08) <sup>a</sup>	0.1482
Reference carcass (%) <sup>1</sup>	52.34 (0.26) <sup>a</sup>	51.39 (0.32) <sup>a</sup>	0.5202
Dissectible fat (%) <sup>1</sup>	1.37 (0.03) <sup>a</sup>	1.41 (0.02) <sup>a</sup>	0.9310
Hind leg (%) <sup>2</sup>	30.56 (0.31) <sup>a</sup>	31.47 (0.27) <sup>a</sup>	0.5328

<sup>1</sup>Reference carcass (no head, blood or viscera) and dissectible fat (scapular and inguinal deposits): % of slaughter weight. <sup>2</sup>Hind leg: % of reference carcass weight. <sup>a</sup>Values followed by the same letter in a row are not significantly different (P>0.05) by SNK test.

## Conclusion

Rabbits appeared to have adapted to the pen housing over time, resulting in absence of mucus and similar carcass traits compared to the rabbits housed in cage.

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