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The importance of straw for pig and cattle welfare: A review

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Abstract

The provision of straw in animal production systems is widely presumed to be beneficial for the welfare of the animals. The aim of this paper is to review the scientific basis of this assumption for pigs and cattle. As there are important disadvantages (cost, labour, hygiene and incompatibility with manure drainage systems) associated with the use of straw, studies investigating whether there are suitable alternatives to straw that fulfil the same welfare functions are also reviewed.

It is concluded that straw has many positive effects on the welfare of pigs. Bedding improves the physical comfort of the floor, and—unless temperatures are high—straw enables pigs to somewhat control their microclimate thereby increasing thermal comfort. Straw also functions as an important stimulus and outlet for exploration, foraging, rooting and chewing behaviours. Pigs that are feed restricted or housed in barren environments, in particular, can be strongly motivated to express these behaviours and the inability to do so may result in behavioural problems or anomalies. In addition, it has been demonstrated that preparturient sows are highly motivated to obtain nesting material and that straw can have a beneficial effect on maternal behaviour after farrowing. Although there may be superior alternatives for each of these functions of straw separately, it remains unlikely that these alternatives can adequately replace the total combination of these functions and also offer advantages regarding hygiene, environment, labour and economics.

The importance of straw for the welfare of cattle mainly concerns floor-comfort. However, it appears that the provisioning of (high quality) synthetic lying mats, perhaps in combination with soft walking floors, may provide floor-comfort equal to that of straw. Although the consumption of straw reduces feeding motivation, and hence, the development of oral stereotypies, the behavioural function of straw is less for cattle compared to pigs. Moreover, it is possible to compose more appropriate roughage-feeds that better fulfil the behavioural as well as the dietary needs of cattle.

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For both pigs and cattle, there is weak evidence that concrete flooring rather than straw is a risk factor for increased overall morbidity and mortality. However, the relation between straw and health is complex, equivocal and disease specific.

Keywords: Bedding; Housing; Comfort; Floor; Lying area; Leg injuries

1. Introduction

In Europe, animal farming systems using straw have a welfare-friendly image. What *appears to be* good welfare, however, does not necessarily *mean* good animal welfare. The answer to the question whether straw is favourable to animal welfare should be based on scientific research. The aim of this contribution is to analyse scientific literature regarding the implications of providing straw on pig and cattle welfare.

Evaluating the welfare relevance of straw from scientific literature is far from easy for several reasons viz.: (1) the composition, structure, quality and quantity of straw can be very varied; (2) there is hardly any consensus amongst scientists about the definition of animal welfare or on the way it can be assessed; (3) most studies do not specifically investigate the welfare impact of straw but discuss this item as one of many aspects of animal housing or animal management; (4) the importance of straw may vary with the age of the animals and their housing conditions and management.

With these caveats in mind, I review the effect of straw on the welfare of pigs and cattle with respect to the following categories (adapted from Fraser, 1985): (1) *comfort requirements*, provided by the texture and the draining and (thermal) insulating properties of straw; (2) *behavioural needs*, since straw can be used for expressing behaviours that they are strongly motivated to perform; (3) *nutritional requirements*, since the lack of bulk feed can be compensated by the intake of straw. In addition to the above functions, the effect of straw on (4) *hygiene and health* is also discussed.

The use of straw has considerable disadvantages as well. These include for example, higher production costs (e.g. due to the cost of straw itself, increased labour, and/or facilities to store straw) and incompatibility with slatted flooring and liquid manure handling systems. Moreover, organic bedding such as straw provides ideal conditions for the growth of many bacteria and pathogens. In this paper, it is also investigated therefore whether there are suitable alternatives to straw that fulfil the same welfare functions.

2. Pigs

The provision of straw is generally considered to improve the comfort and welfare of pigs (Arey, 1993). Although the influences of straw are complex and depend largely on pig breed, management and housing (Schouten, 1986; Edwards and Furniss, 1988), experts on pig welfare assign considerable importance to the availability of a substrate such as straw in their welfare assessments of housing systems (Anonymous, 2001; Spoolder et al., 2003). Also, many quality assurance schemes for pork such as Freedom Food (RSPCA, UK)