

## **Topic Summary:**

Under natural conditions, pigs spend significant time exploring large home ranges searching for unevenly distributed food (Studnitz et al., 2007). Despite being housed indoors, fed, and watered, domestic pigs still express exploratory behaviours (Kittawornrat and Zimmerman, 2011). Exploratory behaviour in pigs includes the rooting, sniffing, biting, and chewing of items in their environment, which may be redirected towards pen-mates if unfulfilled (Studnitz et al., 2007).

Environmental enrichment can be used to ensure the exploratory behaviour of pigs housed indoors is stimulated and fulfilled (Studnitz et al., 2007). To develop enrichment strategies, one needs to understand why pigs explore. Day et al. (1996), interested in the function of exploratory chewing, observed using scan sampling that pigs fed a low energy diet chewed a sucrose-filled treatment-tube more than a simultaneously offered water-filled tube. This suggests exploratory chewing is used to obtain nutritional information that can be used to modify foraging behaviour (Day et al., 1996). Therefore, enrichment materials should contain edible parts to stimulate appetitive foraging (Studnitz et al., 2007).

As well as being motivated to explore for their immediate needs, pigs are also intrinsically motivated by curiosity to search for novelty (Studnitz et al., 2007). Hence, enrichment materials should have novelty value to stimulate exploration (Studnitz et al., 2007), but pigs can quickly habituate to enrichment objects, reducing effectiveness (Trickett et al., 2009). Trickett et al. (2009) and Kauslmann et al. (2021) studied methods to minimize habituation. Trickett et al. (2009), investigating the effect of alternating between two objects weekly, observed via scan sampling that object interaction was lower the second time objects were presented, indicating habituation occurred. However, Kauslmann et al. (2021) found exploration duration, measured using radiofrequency tags, remained constant when six flavours of straw pellets were alternated weekly, indicating habituation had not occurred. This suggests time between re-presentation of an object impacts novelty value, so further research is needed to understand how memory and habituation influence exploration (Trickett et al., 2009).

Straw has novelty value and stimulates appetitive foraging, making it a suitable enrichment material to promote exploratory behaviour in pigs; however, the amount of straw provided impacts effectiveness (Studnitz et al., 2007). Day et al. (2002) and Pedersen et al. (2014) studied how the amount of straw influenced exploration. Day et al. (2002) found, using time sampling, that as the amount of straw increased, exploration increased while pen-mate-directed behaviour decreased. Building on this, Pedersen et al. (2014) continuously observed for oral manipulation of pen-mates as increasing amounts of straw were given and determined using bioequivalence that more than 387 g uncut straw per pig and day did not further decrease oral manipulation of pen-mates. These results suggest straw is an effective

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enrichment material that fulfills exploratory behaviour and reduces oral manipulation of pen-mates when provided in sufficient amounts.

Full-length straw can plug liquid slurry systems, so Day et al. (2008) studied the influence of reduced straw length on exploration. Day et al. (2008) observed using ad libitum sampling that straw of any length reduced oral manipulation of pen-mates, however in the chopped straw treatment, tail-biting and straw-directed behaviour lick were elevated, and the straw-directed behaviour pick was reduced. This suggests, although chopped straw is better than no straw, its physical form prevents pigs from manipulating it the same way as full-length straw, decreasing its effectiveness (Day et al., 2008).

Another method of providing straw is in racks, so Fraser et al. (1991) and Zwicker et al. (2012) sought to understand how this impacts exploration. Fraser et al. (1991) found via zero-one sampling that straw in a rack reduced rooting and chewing of pen-mates but immediately after the provisioning of fresh straw, biting of pen-mates increased, potentially due to competition. Building on this, Zwicker et al. (2012) found as the number of straw racks increased, aggression (measured continuously) decreased, and the proportion of pigs exploring (measured via scan sampling) increased. This suggests providing straw in racks may be effective if enough rack space is provided.

Through reviewing these articles, it is clear much is still unknown about the mechanisms underlying exploratory behaviour in pigs, so future research should investigate the hormones and genes involved in the expression of this behaviour.

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