Question to EURCAW-Pigs: Welfare indicators for sow feed
17 October 2025

Question
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EURCAW-Pigs received the following questions from a Competent Authority in one of the Member States:

According to Article 3, paragraph 7 of Directive 2008/120/EC laying down minimum standards for the protection of pigs, Member states shall ensure that all dry pregnant sows and gilts, in order to satisfy their hunger and given the need to chew are given sufficient quantity of high fibre food as well as high energy food:

1. *Which welfare indicators can be used for the inspection of this requirement?*
2. *Which definition can be used for bulky or high fibre feed?*
3. *What is the relation between the welfare of sows and the amount of high-fibre feed in relation to the occurrence of stereotypies?*

Several EURCAW-Pigs experts contributed to the response below. The EURCAW-Pigs secretariat did the final editing, and may be contacted for queries: info.pigs@eurcaw.eu.

Answer
In short, the answer is:

1. Stereotypic behaviours and aggression can serve as indicators to assess whether dry pregnant sows and gilts have adequate amounts of high-fibre and high-energy feed to meet their hunger and chewing needs.

2. Bulky feeds are low available energy density feeds that are rich in fibre.

3. Increasing dietary fibre in pregnant sows' diets can reduce stereotypic behaviours. However, this effect depends on factors such as the source of fibre, individual parity number, the method of delivery and inclusion level. While the optimal fibre content is still unclear, diets containing more than 12% crude fibre have been shown to improve welfare. Nevertheless, excessively high levels may be less effective. In addition, combining high-fibre diets with foraging materials like straw can further enhance welfare, particularly in small, static groups.

Background

- *Question 1: Which welfare indicators can be used for the inspection of this requirement?*

In commercial production, pregnant sows are typically fed at a restricted level for most of the gestation period to prevent excessive weight gain and reduce the risk of complications during farrowing (Hoorweg et al., 2022). However, restricted feeding often fails to keep the animals satiated and leaves the sows feeling hungry.

Hunger in pregnant sows coupled with a reduced access to foraging material leads to the performance of **stereotypies**. Stereotypic behaviours are repetitive actions without any apparent function (Meunier-Salaün et al., 2001). Examples on stereotypies in sows include sham chewing, tongue rolling, teeth grinding, bar biting, and floor licking. These oral redirected behaviours reflect frustration and may indicate inability of the sow to satisfy her innate motivation to forage and eat to satiety (Lawrence and Terlouw 1993; Hoorweg et al., 2022).

In addition to stereotypies, the restricted feeding level can lead to increased **aggression** due to heightened competition for feed (Hoorweg et al., 2022). Such aggression often involves one sow displacing another from the feeding area by biting her sides, rear, or vulva (Verdon et al., 2015; Hoorweg et al., 2022). The frequency and intensity of these interactions are influenced by the type of feeding system used. Aggression related to competition over food is generally persistent and occurs frequently as long as access to food remains limited (Spoolder et al., 2009).

Resource based aggression can be distinguished from social aggression which typically occurs when unfamiliar sows are mixed or regrouped. Social aggression is primarily aimed at establishing dominance hierarchies. Although it is usually more intense than food-related aggression, social aggression tends to subside within a few hours or days following regrouping (Spoolder et al., 2009). This form of aggression is commonly directed at the opponent's head, shoulders, and flanks. During such encounters, pigs may use their canine teeth to bite or strike at opponents, often resulting in skin lesions (Turner et al., 2006).

Aggression can be assessed either directly through behavioural observations or indirectly by evaluating the resulting skin lesions (Velarde & Geers, 2007). According to Buré (1991) and van Putten & van de Burgwal (1990), feeding sows diets high in dietary fibre may reduce aggressive behaviours—such as vulva biting. Similarly, Whittaker et al. (1999) reported that a combination of a high-fibre diet and access to straw within the pen led to reductions in vulva biting.

EURCAW-Pigs has published Indicator Factsheets on stereotypies, on skin lesions and on vulva lesions in sows, which can be used to assess signs of frustration due to hunger and inappropriate foraging behaviour during inspections.

EURCAW-Pigs was designated by the European Union on 5 March 2018 through Regulation (EU) 2018/329, in accordance with Articles 95 and 96 of Regulation (EU) 2017/625.

- *Question 2: Which definition can be used for bulky or high fibre feed?*

Bulky feeds are low in digestible, metabolizable or net energy per unit volume, but high in fibre, including both soluble and insoluble fibre. Examples include roughage, silage, straw and oat hulls. These feeds increase gut fill and influence gastrointestinal transit time (Lee & Close, 1986).

- *Question 3: What is the relation between the welfare of sows and the amount of high-fibre feed in relation to the occurrence of stereotypies?*

Stereotypic behaviours typically occur in situations where animals experience frustration and boredom. These behaviours are closely associated with poor welfare, as they reflect chronic stress and negative emotional states. Oral stereotypies develop in sows when they are unable to respond to hunger in a species-specific manner, which is often because feeding motivation persists in the absence of sufficient feed to promote satiety (Lawrence and Terlouw, 1993).

Increasing the fibre content in the diets of pregnant sows has been shown to significantly enhance animal welfare by reducing activity levels, decreasing the expression of stereotypic behaviours, and increasing resting time (Danielsen & Vestergaard, 2001; Boyle et al., 2010). In addition, feeding sows diets high in dietary fibre may reduce excessive drinking and pen manipulation which are behaviours associated with a lack of satisfaction of feeding motivation (Whittaker et al., 1999).

High-fibre diets can also modulate digestion and metabolism in ways that promote satiety (Agyekum & Nyachoti, 2017). However, the effectiveness of such diets depends on several factors, including the type of fibre (soluble vs. insoluble), the delivery method, and the characteristics of the individual animal, such as its parity number (Meunier-Salaün et al., 2001). Furthermore, the optimal fibrous ingredient or combination of ingredients, as well as the ideal inclusion rate, remains unclear.

In some Member States, there are recommendations regarding the fibre content in the diets of dry pregnant sows and gilts. In Germany, the *Handbook on Animal Welfare Monitoring in Livestock Farms (Handbuch-Tierschutzkontrollen-2025-01.pdf)* recommends that pregnant sows (up to one week before farrowing) receive a complete feed containing at least 8% crude fibre, or a minimum of 200 g of crude fibre per day.

Studies also show that fibre-rich diets improve sow welfare, with fewer non feeding oral behaviours (sham chewing and bar biting) when rations contain more than 12% crude fibre (Ramonet et al., 1999; Boyle et al., 2010). However, a diet containing 20.4% crude fibre was less effective in reducing stereotypies and increasing resting time over 24h than a diet containing 10.1% crude fibre (Robert et al., 1993).

In their study, Robert et al. (1993), compared the effects of different concentrations of dietary fibre (2.2, 10.1 and 20.4%) during the first two gestations of sows on the long term development of sterotypies and general activity. They found that including high levels of fibre in the sows' diet can reduce stereotypic behaviour, increase resting time and decrease excessive drinking provided the diet meets the animals' nutritional and energy requirements.

In addition to dietary adjustments, providing foraging materials can help redirect the feeding motivation of unsatiated sows into foraging behaviours, while also offering a supplementary source of nutrition (Lawrence and Terlouw, 1993; Spoolder et al., 1995). According to the report by Boyle et al. (2010), offering straw racks alone had no significant effect on sham chewing and provided limited welfare benefits for sows housed in large dynamic groups. However, combining a high-fibre diet with access to straw racks yielded positive effects in small static groups, including a reduction in stereotypic behaviours such as sham chewing and bar biting

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