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Taste, nutrient sensing and feed intake in pigs (130 years of research: then, now and future)

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Abstract

Farm pigs are fed nutritionally balanced diets with no choice, a practice that implies that voluntary feed intake is based on nutritional needs rather than sensory profiles. The taste system brings together the sensory aspects with the nutrient content of foods. However, only a handful of nutrients are systematically controlled in commercial pig diets. A chronological review of porcine taste shows its potential impact on voluntary feed intake. Early studies established anatomical and behavioural features relevant to pig taste and preferences, with animals showing a high preference for glucose and sucrose that was not easily matched when substituted with non-caloric sweeteners such as saccharin. Studies by-passing the oral cavity demonstrated that glucose sensing in the upper gastrointestinal tract (GIT) elicits endocrine responses that may determine feed intake. A network of chemosensory cells (expressing taste and nutrient receptors) in the GIT seems to mediate these hormonal responses orchestrating the hunger-satiety cycle. These mechanisms are also relevant to dietary protein and amino acids. Dietary essential amino acids (i.e. Lys, Met, Trp and Thr) are important drivers of feed selection and intake in pigs. In addition, glutamic acid, have been also reported to enhance feed intake in young pigs. However, the long-term effect of sugars, amino acids and fatty acids on feed intake in pigs remains unclear. In particular, the effect of excess nutrients such as amino acids in the diet has received little or no

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