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Dietary tryptophan supplementation and affective state in pigs

Jenny Stracke, Winfried Otten, Armin Tuchscherer, Maren Witthahn, Cornelia C. Metges, Birger Puppe, Sandra Döpjan



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**1 Dietary tryptophan supplementation and affective state in pigs**

2 Jenny Stracke<sup>1,#</sup>, Winfried Otten<sup>1</sup>, Armin Tuchscherer<sup>2</sup>, Maren Witthahn<sup>1,3</sup>, Cornelia C. Metges<sup>4</sup>, Birger  
3 Puppe<sup>1,3</sup>, Sandra Düpjan<sup>1,\*</sup>

4 \*corresponding author at: duepjan@fhn-dummerstorf.de

5 <sup>1</sup>Institute of Behavioural Physiology and <sup>2</sup>Institute of Genetics and Biometry, <sup>4</sup>Institute of Nutritional  
6 Physiology, <sup>1,2,4</sup>Leibniz Institute for Farm Animal Biology (FBN), Wilhelm-Stahl-Allee 2, D-18196  
7 Dummerstorf

8 <sup>3</sup>Behavioural Sciences, Faculty of Agricultural and Environmental Sciences, University of Rostock, D-  
9 18059 Rostock

10 <sup>#</sup>present address: University of Veterinary Medicine Hannover, Institute for Animal Hygiene, Animal  
11 Welfare and Farm Animal Behaviour, Bischofsholer Damm 15, D-30173 Hannover

12

**13 Abstract**

14 The assessment and provision of welfare in farm animals has become a major issue in animal science.  
15 A key element for providing good welfare is the enabling of positive affective states in the animals.  
16 As the serotonergic system plays a central role in regulating affective behavior, an increase in  
17 centrally available serotonin (5-HT) via dietary supplementation of its precursor, tryptophan (TRP),  
18 might be an approach to induce positive affective states. Therefore, the aim of our study was to  
19 investigate the effects of dietary TRP supplementation on brain TRP metabolism and 5-HT levels, but  
20 also on affective state and behavioral reactivity in pigs. All subjects were fed a standard diet until  
21 eight weeks of age, then feed was changed for all animals, with half the animals (control) receiving a  
22 diet with the recommended TRP content (2.5 g/kg), while the other half (TRP+) received a TRP  
23 enriched diet (10.2 g/kg). In part 1 of our study, we investigated the effects of the dietary TRP  
24 supplementation on TRP metabolism in brain areas related to affective and cognitive processing. We  
25 found significantly increased concentrations of TRP and its metabolites in nearly all analyzed brain  
26 tissues. In part 2 of our study, we analyzed the effects of these alterations on the affective state as  
27 measured in a cognitive bias test, namely the spatial judgement task (SJT), but also on behavioral  
28 reactivity as measured in a combined open field/novel object test (OFNO). The TRP enrichment  
29 revealed no significant behavioral changes in the OFNO tests. In the SJT, the TRP+-group showed  
30 more pessimistic behavior after dietary change than before. Thus, our results do not support the

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