

## **Nutrient dilution and increased Nonstarch Polysaccharide concentration in rearing and laying diets reduced feather damage of rearing and laying hens**

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An experiment was conducted with 768 non-cage housed ISA Brown pullets, of which 576 hens were followed during the laying period, to investigate the separate effects of dietary dilution and Nonstarch Polysaccharides (NSP) concentration (oat hulls as NSP source) on eating behaviour and feather damage. Day-old pullets were allotted to one of 6 dietary treatments according to a 3 x 2 factorial arrangement (3 dilution and 2 NSP levels), with 8 replicates (pens) per treatment. At 17 wks of age, pens with hens were allotted to 1 of 8 dietary treatments according to a 4 x 2 factorial arrangement (4 dilution and 2 NSP levels), with 6 replicates per treatment. Compared to 0% dilution level, feed intake of laying hens of 10%, 15% and 20% dilution levels increased by 8.4% (9.5 g/hen/d), 16.5% (18.1 g/hen/d) and 20.9% (23.6 g/hen/d), respectively. ME intake was similar for all dilution levels. Hens fed standard NSP laying diets had similar insoluble NSP intake for all dilution levels (9.3 g/hen/d). Insoluble NSP intake of hens fed high NSP laying diets increased from 15.6 g/hen/d (0% dilution) to 18.9 g/hen/d (20% dilution). Providing high *vs.* standard NSP layer diet decreased proventriculus content (1.1 *vs.* 0.3 g/kg BW) and increased empty gizzard weight (14.3 *vs.* 24.4 g/kg BW). Hens that were fed standard NSP diets had more feather damage compared to hens fed high NSP diets (0.58 *vs.* 0.30). Increasing the insoluble NSP intake resulted in decreased proventricular weight and increased gizzard weight and its contents, which are indicators of improved functioning of the gut, thereby linearly reducing feather damage. Providing diluted rearing diets increased feed intake from the first weeks of life onwards. It was hypothesized that pullets were increasingly 'imprinted' on feed as a pecking substrate if dilution level increased. This may decrease feather pecking and could explain the improved feather condition at 49 weeks of age when 15% diluted rearing diet was fed.

**Keywords:** feather damage, pullet, laying hen, dietary dilution, NSP