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**“Precision biochar” in the diet of laying hens**

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**Background/Objective:**

There is a lack of information on the mechanism of biochar's (BC) action on farm animals. Existing research on BC's use in animal nutrition lacks detailed characterization of the biochars, such as specific surface area and pore size. The research carried out so far has shown that BC as a feed additive can potentially improve eggshell resistance to crushing. Thus, the aim and novelty of the proposed research will be to find correlations between novel functionalized biochar, “precision biochar,” and mechanically resistant eggshells and learn about the mechanism that led to that.

**Methods:**

A total of 216 laying hens will be randomly distributed into 72 cages and housed for 60 weeks. Four variants of biochars, obtained from beech and oak wood chips, with specific surface areas ranging between 10 and 400 m2·g-1 will be examined and used as a feed additive (0,5-2,0 % by mass).

**Results:**

We will apply dietary biochar with different surface areas and analyse its effect on eggshell formation efficiency and uterus protein secretion since this parameter has not been studied so far.

**Conclusion:**

Understanding the mechanism of action of biochar correlated with its properties will enable broader use of this material to improve animal health. This study is conducted in cooperation with the leading scientific groups of UPWr, i.e. Animal Science for Future (ASc4Future), Poultry – from Stable to Table (DroPOWER) and Waste and Biomass Valorization Group (WBVG). The work is carried out as part of the research project OPUS-24 entitled "Biochar in the diet of laying hens and the expression of genes and proteins affecting the structure and physicochemical properties of eggs", which was funded by the National Science Centre based on contract UMO-2022/47/B/NZ9/02182 dated August 1, 2023.

**Keywords:** poultry, biochar, feed additive, specific surface area, gene expression, eggshell.