Eco-floor for youngstock and heifers

Summary

- Reducing ammonia emission from dairy stables could be an item in the Flemish legislation in the future
- A floor with ammonia reduction characteristics is installed in the new youngstock barn of Hooibeekhoeve to investigate the practicability
- The influence of this type of floor on claw health and animal behaviour is examined
- Results will be reported later

Background

Deposition of ammonia increases the nitrogen availability and acidity of the soil which could reduce the ecological quality of ecosystems. Preventing ammonia emission is therefore important e.g. for nature conservation and achieving water quality standards.

Animal farms account for over 90% of the ammonia emission in Flanders. Ammonia is formed by the decomposition of urea in the urine and organically bound nitrogen in faeces. Dairy farmers in Flanders typically store slurry in under floor pits where manure is deposited directly through slatted floors. Urine and manure make contact on the stable floor and in the manure pit. Ammonia thus escapes from both the floor surface and manure pit. To achieve a substantial reduction in emissions, low emission floors therefore have to reduce both emissions from the floor the manure pit.

In the Flemish legislation it is obligated to build pig and poultry stables with an ammonia reduction system. For dairy barns however there is no obligation to integrate an ammonia reduction system up till now.

Principles of the eco-floor

The design of the Van Der Velden eco-floor, used in the youngstock barn of Hooibeekhoeve, has the characteristics of a normal grid floor. However, where in the normal floor there is a free exchange of gasses between the manure pit and stable, the eco-floor has replaceable cartridges which fit into the recesses of the concrete grid floor. These plastic cartridges are provided with ‘flaps’ that automatically open and close under the weight of manure and urine. If manure and urine drop onto the flaps, they open up and close again as the manure and urine falls through. This system minimizes the gasses exchange between the manure storage and stable, as such preventing the ammonia to leave the manure pit. Furthermore, the urine is quickly drained from the floor surface reducing the emission from the floor.

Besides the reduction of the ammonia emission the rubber element of the eco-floor in combination with the concrete have the potential to improve the claw health of the cows.

Research

With our research we want to test the difference in ammonia emission with the eco-floor versus normal slatted floor. Additionally, we want to know if the animals behave different on the eco-floor and what the effect of the floor is on claw health and locomotion. The normal and eco-floor are currently installed in different parts of the young cattle stable. Behaviour observations and scoring of the claw heath are done. Current observations show that the manure tends to get stuck in the flaps of the eco-floor. It should be noted that the current occupation of the stable is rather low, increasing the time the manure stays on top of the floor and decreasing the ease with which the manure moves through the eco-floor. In comparison with the producing dairy cows young cattle faeces is generally more solid. Furthermore, the current ration of the young cattle results in even more solid faeces. In order to solve the problem of manure getting stuck in the flaps, the cleaning interval of the dung robot on the eco-floor was increased but this wasn't enough. Therefore the plastic cartridges are currently removed.

Recommendations

This innovation may be interesting for the dairy sector allowing to decrease ammonia emission and improving claw health. However, implementation of this specific type of floor with the plastic element could give a problem with manure getting stuck in the plastic cartridges when the manure is solid (young cattle faeces are more solid) or the occupancy rate is too low.