

INVESTIGATIONS CONCERNING THE USE OF DIOXIN EXPOSED GRASSLAND ALONG RIVERS BY FOOD PRODUCING RUMINANTS WITH SPECIAL REGARD TO FOOD SAFETY

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Introduction:

Since decades it is well known that – due to regular flooding - grassland bordering the riverside can be contaminated by dioxins that are enriched in river's sediments. On the grassland between the river and the dike encroachment has to be avoided and on the dikes grazing sheep are desired to ensure stability and compaction of the dike for improved flood control and flood protection. Thus, cattle and sheep commonly utilize the green fodder grown on these potentially contaminated areas. The aim of different feeding trials, field studies and experiments (including laboratory chemical analyses) performed in the last eight years was to establish a concept that allows pasturing of cattle and sheep on these contaminated grassland and to maintain a production of food (meat, milk) without neglecting aspects of food safety.

Materials and methods:

The grassland along the river Elbe was used as a model for dioxin contaminated areas/soils. To study potential effects of ingesting contaminated grass (or silages) on the dioxin levels in the soil, feces, carcasses and further substrates like rumen content of slaughtered animals, samples of liver, body fat and including milk beef cattle, sheep as well as some dairy cows were used. Furthermore muscle and fat tissues of some newborn animals (lambs, calves) were analysed on dioxin content before the first colostrum ingestion to investigate potential intrauterine transfer. The time of exposure varied between 6 weeks and 6 months (short/long period of suckling) and was followed by the fattening period in which only uncontaminated feed like a finisher diet was offered. Using this procedure the time required for reducing the dioxin level in the carcass (or organs/tissues) was studied.

Results and discussion:

Continuous grazing of ruminants on contaminated grassland resulted in dioxin levels exceeding the upper allowed levels in the liver of slaughtered animals markedly, but also in muscles frequently increased values were measured. If dairy cows were supplied by grass only (without concentrates) the dioxin levels of milk varied around the upper allowed limit. Therefore a new concept was developed: the contaminated grassland should be used by cows and sheep to produce calves and lambs that are fattened only on uncontaminated feeds (at other sides/farms) after a reduced suckling period. If the lambs were weaned at about 6 weeks or calves at about 8 weeks and fed uncontaminated feeds during the following time the dioxin levels of the carcasses varied in an allowed range. But cows and sheep preventing vegetation encroachment by continuous grazing and producing young animals for fattening can not be included in the food chain after being slaughtered without analysing the actual dioxin level. The advantages of this concept are that potentially contaminated grassland can be used (financial basis of farms), the aspects of flood management/protection are considered (riverside grassland without bushes/willows; compaction of dikes) and food safety is guaranteed (fattening of young ruminants on sides without dioxin contamination).

Anyhow, it has to be underlined that special organisation is needed if this concept should work (multi-side-production, identification of animals and areas, sampling for dioxin investigations ...). Finally, recommendations for farmers using contaminated grassland for feed and food production were developed. Those obligatory measures regard the technique of harvesting, the production of hay and silages, watering of animals and so on.

Acknowledgements:

If it is intended to keep dioxin contaminated grassland in production of feed and food many aspects need to be considered, finally costs and profits have to be balanced – with differentiation between the society and private producers.

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