RICERCHE EFFETTUATE

IGIENE DEGLI ALIMENTI AD USO ZOOTECNICO

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Aflatoxin B1 risk management in Parmigiano Reggiano dairy cow feed

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This study investigated aflatoxin B1 (AFB1) contamination in dairy cow feed and the risk management of AFB1 content in concentrates undertaken by feed industries in the Parmigiano Reggiano area. Data on aflatoxin contamination risk management applied in 29 feed industries were collected and the AFB1 content of 70 feed samples was analysed. Data were collected within the framework of a quality control programme promoted by the Parmigiano Reggiano Consortium in 2013 and 2014. Audit results showed that the control procedures to prevent AFB1 contamination mainly focused on maize and its by-products. AFB1 concentration resulted lower than 5 ppb [legal European Union (EU) limit] in all samples; in one out of 70 samples, AFB1 content was 3.8 ppb and in all the other samples it was lower than 3 ppb. Results showed that AFB1 risk management applied by Italian feed industries effectively monitors AFB1 levels in feed below the EU legal limit.

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Is it possible to grow corn on PCDD/FS and PCBS contaminated land? preliminary results of an up-take study

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Agricultural soils historically contaminated by dioxins (PCDDs), furans (PCDFs) and polychlorinated biphenyls (PCBs) are often abandoned waiting for expensive and hard remediation plans. A regulated reuse of these areas could be an important step for saving these derelict lands and to bring again some profit to the owners. Corn (Zea mays) is a cereal widely used for both feed and food, but also for several industrial products such as ethanol, rubber tires, plasticsi. In different experiments, maize plants showed a lower PCBs contamination than other crop plants2' 3' 4 and maize kernels often resulted contaminated by PCDD/Fs and PCBs at insignificant levels5' 4. The present study was carried out in Brescia (Northern Italy), an agro-industrial city, which was the site of the only Italian PCB-producing plant. The uptake of PCDD/Fs and PCBs by corn grown on a contaminated field was investigated. Plants were seeded and treated ordinarily by the farmer. On the harvesting time (August 2014), soil and plant samples were collected from an area of 25 m2 according to a X scheme. Nine sampling points were chosen, from each point two maize plants and two soil specimens (at 0-30 cm and 30-60 cm depth) were collected. Soil samples of the same depth level were pooled together and thoroughly homogenized obtaining two composite samples. Maize plants were separated into ears (husk leaves, silks, kernels and corncobs), leaves, stalks, and roots. Each part of the corn plant was carefully rinsed with deionized water, incubated in an ultrasonic bath for 10 min and rewashed with deionized water to remove any soil residues or dust particles. Samples were prepared and analyzed by a certified laboratory, according to US EPA Methods 1613/B (1994) and 1668/C (2010). Quantification of the 17 2,3,7,8-substituted PCDD/Fs, the 12 DL-PCBs and the 6 NDL-PCB indicators was carried out. Soil contamination at 0-30 cm depth was found to be: 2,487.00 ng/kg dw for zPCDD/Fs, 14,281.22 ng/lcg dw for EDL-PCBs and 100,415.07

ng/kg dw for zNDL-PCBs. The level of contamination of soil at 30-60 cm depth was: 2,728.60 ng/kg dw for EPCDD/Fs, 12,952.18 ng/kg dw for EDL-PCBs and 67,083.90 ng/kg dw for zNDL-PCBs. Contaminants concentration in the different plant parts followed the order: roots>stalks and leaves>corncobs>whole ears (husk leaves, silks, kernels and corncobs)>kernels. Roots were found to accumulate the highest amount of contaminants (220.87 ng/kg dw zPCDD/Fs, 3,447.69 ng/kg dw EDL-PCBs and 23,231.30 ng/kg dw ENDL-PCBs), as also reported by other authors3; instead com kernels showed the lowest level of contamination (0.91 ng/kg dw zPCDD/Fs, 24.74 ng,/kg dw ADL-PCBs and 145.96 ng/kg dw ENDL-PCBs). Bioaccumulation factors (BAF=[PCB]pia„ p,/[PCB1 ,mean soli) and translocation factors (TF=[PCB1 /I-PCB1 ,00ts — ,other plant part) were determined. Roots BAF was 0.085 for PCDD/Fs, 0.253 for DL-PCBs and 0.277 for NDL-PCBs. The obtained values were higher than those reported by other authors for PCBs in maize roots3. Kernels BAF resulted of 0.0003 for PCDD/Fs, 0.0018 for DL-PCBs and 0.0017 for NDL-PCBs. Strek et al. (1981) observed a BAF of 0.001 for PCBs in maize shoots6. Corn kernels TF was found to be 0.004 for PCDD/Fs, 0.007 for DL-PCBs and 0.006 for NDL-PCBs; instead maize stalks and leaves showed the highest TF (0.018 for PCDD/Fs, 0.107 for DL-PCBs and 0.235 for NDL-PCBs). Despite soil contamination, the preliminary results demonstrated that maize kernels are characterized by negligible pollution, in accordance with previous studiess 4. The low accumulation displayed by corn grains could be exploited in order to try a possible regulated reuse of contaminated field for non-food productions. However, more exhaustive data analysis is necessary to understand the possible effect of both soil particle contamination and uptake from air on the corn contaminants concentration found in this study.