Hay for livestock feeding – Method validation

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Background:
Hay and grass may account for up to 100% of the feed for dairy and beef cattle. Thus hay may be of high importance for the pesticide residue exposure of livestock. Hay was therefore chosen as test material for EUPT-CF12 carried out in January/February 2018. Method performance using QuEChERS according to EN 15662 and dSPE employing three different kits (Table 1) were studied for a selection of analytes (Figure 1). Using 1 gram of sample QuEChERS (EN 15662) performed equally well or better than when modifying the method by using one of the three other dSPE kits. 402 pesticides and metabolites of pesticides were therefore validated on hay using QuEChERS extraction according to EN 15662 and analysis by LC-MSMS and GC-MSMS. The pesticides and metabolites validated are listed in Table 3. The validation was performed in accordance with the requirements outlined in SANTE/11813/2017³.

Analytical procedure:

Table 1: Pesticides and metabolites validated on hay using QuEChERS method

Table 2: Overall results for validation performed on hay using QuEChERS (EN 15662) with sample size reduced to 1 gram. *: recoveries for chlorothalonil (47%)

Table 3: Test of dSPE procedure for clean-up of QuEChERS hay extracts

Table 4: Recoveries of selected pesticides spiked into blank hay samples (0.5 mg/kg) using QuEChERS extraction with dSPE according to proc. 1-4.

Results:

Conclusion: QuEChERS (EN 15662) gave satisfactory extraction of analytes from hay (Figure 1, Table 2). In total 402 pesticides and metabolites of pesticides were validated. 296 were GC-MSMS amenable compounds and 297 were LC-MSMS amenable. An LOQ of 0.025 mg/kg were obtained for majority of the pesticides and metabolites (see Table 2). From inspection of GC-MS full scan chromatogram the hay extract obtained with QuEChERS (EN 15662) was found to be relatively low compared to the amount of co-extract observed for oat (Figure 2).