The use of a carbon column in the first step significantly reduces sorbents and solvents consumption, and the total cleanup time is only about two hours if we use the scheme described above. Also the method can be integrated into the FMS EZprep family systems, or you can use traditional multilayer and alumina columns according to US EPA Method 1613.

We can assume that optimizing the method will result in more stable and high recovery, but right now the proposed scheme with Carboxen 1000/1016 carbon column as the first step followed by cleanup on small multilayer column and basic alumina column provides acceptable sample preparation quality for dioxins and WHO-PCBs from a variety of fatty matrix at relatively low time and solvent costs.

**Table 1: Recoveries for PCDD and dioxin-like PCBs from oils and fats**

| | **Fish oil** | **Milk fat** | **Sunflower oil** | **Rapeseed oil** | **Soya lecithin** |
|---|---|---|---|---|---|
| 2,3,7,8-TCDD | 78 | 59 | 50 | 56 | 70 |
| 2,3,7,8-TCDF | 65 | 53 | 43 | 50 | 73 |
| 1,2,3,7,8-PeCDD | 74 | 50 | 35 | 43 | 56 |
| 1,2,3,7,8-PeCDF | 71 | 57 | 42 | 49 | 66 |
| 2,3,4,7,8-PeCDF | 64 | 45 | 27 | 38 | 59 |
| 1,2,3,4,7,8-HxCDD | 62 | 38 | 26 | 33 | 54 |
| 1,2,3,6,7,8-HxCDD | 64 | 39 | 27 | 34 | 54 |
| 1,2,3,4,7,8-HxCDF | 59 | 42 | 28 | 36 | 60 |
| 1,2,3,6,7,8-HxCDF | 57 | 40 | 29 | 35 | 61 |
| 2,3,4,6,7,8-HxCDF | 55 | 40 | 27 | 34 | 59 |
| 1,2,3,7,8,9-HxCDF | 63 | 53 | 51 | 51 | 67 |
| 1,2,3,4,6,7,8-HpCDD | 72 | 34 | 32 | 32 | 42 |
| 1,2,3,4,6,7,8-HpCDF | 59 | 27 | 28 | 31 | 44 |
| 1,2,3,4,7,8,9-HpCDF | 68 | 43 | 37 | 37 | 52 |
| OCDD | 73 | 36 | 45 | 44 | 56 |
| PCB-77 | 81 | 65 | 55 | 49 | 76 |
| PCB-81 | 66 | 47 | 47 | 41 | 71 |
| PCB-126 | 79 | 91 | 44 | 53 | 68 |
| PCB-169 | 55 | 88 | 47 | 49 | 60 |
| PCB-105 | 33 | 49 | 30 | 28 | 81 |
| PCB-114 | 27 | 47 | 25 | 24 | 69 |
| PCB-118 | 34 | 54 | 29 | 28 | 81 |
| PCB-123 | 32 | 50 | 28 | 27 | 77 |
| PCB-156 | 29 | 65 | 33 | 30 | 99 |
| PCB-157 | 30 | 68 | 36 | 29 | 99 |
| PCB-167 | 28 | 66 | 28 | 26 | 99 |
| PCB-189 | 21 | 61 | 23 | 23 | 90 |

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