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Study on Residues and Cleaning of Organochlorine Pesticides and Polychlorinated Biphenyls in Microsyringes

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英文关键词:[microsyringe](#) [cross contamination](#) [organochlorine pesticides](#) [polychlorinated biphenyls](#) [semivolatile organic pollutants](#)

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中文摘要:

微量注射器越来越多地用于转移微量液体,但是微量注射器中有机化合物的残留可能造成的交叉污染易被忽视。本文系统地研究了微量注射器中有机氯农药类和多氯联苯类化合物的残留和清洗效果。结果表明,三个品牌的微量注射器清洗的难易不同,在选择微量注射器时应根据实验结果选择满足实验要求的类型;正己烷清洗液的体积与稀释倍数成正比,原因在于0.1 mL、0.2 mL、0.5 mL和1 mL第一针清洗液洗出的化合物质量接近,清洗液体积甚至与洗出化合物的量相关,因此选用体积最小的0.1 mL效果和成本优势最大;相同浓度的有机氯农药类和多氯联苯类化合物清洗效果接近,原因可能是这两类化合物的理化性质相近;不同浓度的标准溶液需要清洗的次数不同,浓度越高的标准溶液需要清洗的次数越多。本文总结出三条清洗规律:①1 mL微量注射器中的残留量约为吸取量的1%左右;②第一针洗出化合物的量超过残留量的90%;③随着清洗次数的增加,呈现清洗效果越来越差、稀释倍数越来越小的趋势。根据这些规律,可以针对不同浓度的不同化合物采取相应的清洗措施,在标准溶液配制和定相色谱仪方法设置过程中更有效地预防污染和节约成本。

英文摘要:

Microsyringes are being increasingly used to transfer trace liquid, but the concern of cross contamination caused by residues of organic contaminant in microsyringes is routinely overlooked. The residues and cleaning effects of organochlorine pesticides (OCPs) and polychlorinated biphenyls (PCBs) in microsyringes were systematically researched and the findings are presented in this paper. Results show that the cleaning effects are different for three brands of microsyringe. Microsyringes should be chosen according to the suitability to the intended experiment. The volume of cleaning solvent was proportional to the dilution ratio of organic contaminant, which was due to the approximate amount of contaminant in the first cleaning fluid by 4 volumes (0.1 mL, 0.2 mL, 0.5 mL and 1 mL). Moreover,

the volume of cleaning solvent had a negative correlation with the amount of washout compounds. The best effect and lowest cost came from using 0.1 mL cleaning solvent. There is no difference in cleaning effects of OCPs and PCBs standard solution at the same concentration probably due to the similar physical and chemical properties of the two. Three cleaning observations were made: the residue amount of OCPs or PCBs in a 1 mL microsyringe was about 1% of the loaded amount, the amount in the first cleaning solvent was over 90% of the residues, and with the increase in cleaning times, the cleaning effect was less effective, and dilution ratio smaller. According to the above, corresponding cleaning methods can be used, according to varying concentrations of different pollutants, as far as possible to reduce organic contaminant in microsyringes and therefore reduce the cost.

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