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(**收稿**:2013-09-22;**修回**:2013-12-12)

(编辑 栾 嘉)

医学论文中被误用为单位符号的“ppm、ppb、ppt”英文缩写的换算

在医学论文中,“ppm、ppb、ppt”这类英文缩写常常被作者作为单位符号使用,而“ppm、ppb、ppt”不是量纲一的量的单位的专门名称,也不是数学符号,更不是单位符号,只是表示数量份额的英文名词缩写(英文全称分别为 parts per million、parts per billion、parts per trillion)。在实际研究中,仪器测量的数值可能会以“ppm、ppb、ppt”形式给出结果,作者在撰写文章进行数据描述时则需对“ppm、ppb、ppt”进行换算。

对溶液而言,换算前需了解是体积比还是质量比。1 μg/mL 是质量-体积比,如果溶液的密度是 1 g/mL,则 1 μg/mL 相当于 1 ppm;如果溶液密度不是 1 g/mL,则需要进行换算。

对大气中的污染物而言,常用体积浓度和质量-体积浓度来表示其在大气中的含量。体积浓度是用每立方米大气中含有污染物的体积数来表示(如 cm^3/m^3、mL/m^3),换算关系是:1 ppm = 1 cm^3/m^3 = 10^{-6},1 ppb = 10^{-9},1 ppt = 10^{-12};质量-体积浓度是用每立方米大气中污染物的质量数来表示(如 mg/m^3、g/m^3),换算关系是:C = 22.4X/M,式中:X 为污染物以 mg/m^3 表示的浓度值;C 为污染物以 ppm 表示的浓度值;M 为污染物的分子质量。

在土壤、动植物、固体废弃物中“ppm、ppb、ppt”与质量含量的换算关系为:1 ppm = 1 mg/kg = 1 000 μg/kg;1 ppb = 1 μg/kg = 10^{-3} mg/kg;1 ppt = 1 ng/kg = 10^{-6} mg/kg。

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