

## Answer on Question #60252, Chemistry / General Chemistry

1. A container found in the victim home that contained 120g of ethylene glycol in 450g of liquid. How many drinks each containing 100g of this liquid would 65kg victim need to consume to reach a toxic level of ethylene glycol

### Conditions:

$m(\text{C}_2\text{H}_6\text{O}_2)=120\text{g}$ ;  $m(\text{sol})=450\text{g}$ ;  $m(\text{part of sol})=100\text{g}$ ;  $m(\text{Victim})=65\text{kg}$ ;

$\text{Dens}(\text{C}_2\text{H}_6\text{O}_2)=1.113\text{g}/\text{cm}^3$

$N(\text{Drinks})=?$

### Solution:

1. Ethylene glycol has been shown to be toxic to humans[1] and is also toxic to domestic pets such as cats and dogs. A toxic dose requiring medical treatment varies but is considered more than 0.1 mL per kg body weight (mL/kg) of pure substance.
2. The orally lethal dose in humans has been reported as approximately 1.4 mL/kg of pure ethylene glycol..  
Actually we are interested in the orally lethal dose!
3. The orally lethal dose in [g] =  $1.4/1.113=1.258(\text{g})$   
And the dose for 65kg victim is  $1.258*65=81.746(\text{g})$
4. In the 100g of have: 120g(C<sub>2</sub>H<sub>6</sub>O<sub>2</sub>) it is 450g of sol  
Xg(C<sub>2</sub>H<sub>6</sub>O<sub>2</sub>) it is 100g of sol  
Hereof  $X=120*100/450 = 26.666(\text{g})(\text{C}_2\text{H}_6\text{O}_2)$  in 100g of solution
5. For 65kg victim need to drink  $81.746/26.666=3.065(\text{drinks})$

**Answer: A toxic level of ethylene glycol(the orally lethal dose) will be obtained after 3 drinks each contain 100g of 450g solutions!**

### Literature

1. Friedman EA, Greenberg JB, Merrill JP, Dammin GJ (June 1962). "Consequences of ethylene glycol poisoning. Report of four cases and review of the literature". The American Journal of Medicine 32 (6): 891–902. doi:10.1016/0002-9343(62)90035-9. ISSN 0002-9343.
2. Brent J (2001). "Current management of ethylene glycol poisoning". Drugs 61 (7): 979–88. doi:10.2165/00003495-200161070-00006.