Osmolality

Osmolality is the amount of osmotically active substances dissolved in a unit mass of solvent. It is usually expressed in Osm/kg or in fractions of this unit.

> Osmolality expresses the number of dissolved particles in a kilogram of pure solvent. In contrast, osmotic concentration (formerly osmolarity) indicates the number of dissolved particles in a liter of the resulting solution.

Osmolality is equal to the product of molality and the number of particles formed by the dissociation of one molecule.

> If we compare aqueous solutions of glucose, NaCl and Na_2SO_4 , all with the same molality of 1 mol/kg, their osmolality will be different. The glucose molecule does not dissociate, therefore the osmolality of this solution is equal to 1 Osm/kg. The NaCl solution dissociates so that one NaCl molecule produces two ions (Na^+, Cl^-), therefore the osmolality of this solution is 2 Osm/kg. The Na_2SO_4 solution dissociates into three active ions – Na^+, Na^+ and SO_4^{2-}, therefore the osmolality of this solution is 3 Osm/kg. This calculation only applies to ideal, i.e. extremely dilute solutions.

However, most body fluids are real, i.e. non-ideal solutions where the real osmolality is less than the ideal osmolality. To obtain the value of the real osmolality, you need to know the osmotic coefficient of the solution, by which the value of the ideal osmolality of the solution is multiplied.

The physiological value of plasma osmolality is about 300 mOsm/kg of water [1].

> The used unit Osm (osmol) does not belong to the units of the SI system. An expression corresponding to the SI system would be the molality of osmotically active particles in mol/kg .

Links

related articles

- Serum osmolality
- Urine osmolality
- Osmolarity
- Osmotic pressure

Reference

1. . ŠVÍGLEROVÁ, Jitka. *Osmolalita* [online]. The last revision 2009-02-18, [cit. 2010-11-12]. <https://web.archive.org/web/20160416224559/http://wiki.lfp-studium.cz/index.php/Osmolalita>.