

distribution ratio, D

in liquid-liquid distribution

The ratio of the total analytical concentration of a solute in the extract (regardless of its chemical form) to its total analytical concentration in the other phase.

Notes:

1. If there is possible confusion with the extraction factor or (mass) distribution ratio the term concentration distribution ratio (symbol D_c) should be used, but this is not common usage. This is reasonably compatible with chromatographic nomenclature.
2. The terms distribution coefficient, extraction coefficient and, where appropriate, scrubbing coefficient, stripping coefficient are widely used alternatives but are not recommended. If they must be used in a given situation the term ratio is preferable to coefficient.
3. In equations relating to aqueous/organic systems the organic phase concentration is, by convention, the numerator and the aqueous phase concentration the denominator. In the case of stripping ratio the opposite convention is sometimes used but should then be clearly specified.
4. In the past there has been much confusion between the distribution ratio as defined above, the value of which varies with experimental conditions, e.g. pH, presence of complexing agents, extent of achievement of equilibrium etc. and the true partition coefficient which is by definition invariable or the partition coefficient or distribution constant which apply to a particular chemical species under specified conditions. For this reason the terms distribution constant, partition constant, partition coefficient, partition ratio and extraction constant should not be used in this context.
5. The use of the ratio: light phase concentration to heavy phase concentration is ambiguous and is not recommended.
6. The distribution ratio is an experimental parameter and its value does not necessarily imply that distribution equilibrium between the phases has been achieved.

Source:

PAC, 1993, 65, 2373 (*Nomenclature for liquid-liquid distribution (solvent extraction) (IUPAC Recommendations 1993)*) on page 2382

PAC, 1996, 68, 957 (*Glossary of terms in quantities and units in Clinical Chemistry (IUPAC-IFCC Recommendations 1996)*) on page 970

Orange Book, p. 89