Buffer and Media Preparation – How to Prepare a Solution

Your Objectives:

At the end of the lesson, you should be able to make a solution.

What is a solution?

A [ ] is a [ ] (oftentimes a water-based one) into which one or more [ ] /components are added (solutes) that are completely soluble.

If something is added to a solvent making it [ ], it creates a [ ], a 2-phase system or an emulsion. If not, and they are the same, then: "creates a **suspension**, or what is called a 2-phase system, or [ ]."

At all stages of a biopharmaceutical manufacturing process, the [ ] must remain [ ] in the media and [ ] employed.

And the only insoluble components are the cells themselves, along with certain components of the cells released in the event that cells break apart.

Some terminology

- [ ]

  This is the maximum amount of a solute which can be dissolved in a solvent (saturation) before the solute separates, [ ], (etc.)

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  This describes any which ‘likes’ water; namely, something that readily in water.

- **(lipophilic)**

  This is a substance which is ‘phobic’ of water; in this case, it is something which either does not dissolve in water, or then, it is something that ‘favours’ lipids; hence, it readily dissolves in hydrophobic solvents.

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  This means a substance (e.g. a protein) which, by its having both hydrophilic and hydrophobic parts, is both soluble in water but also hydrophobic (e.g. a detergent).

- **Density (specific)**

  The specific gravity, or density, of a solution is the mass of a solution per unit volume; i.e. water has a density of 1.00 g/cm3 , or 1.00 kg/L, or 1000 g/L.

  NB: The changes according to the temperature. e.g. water!

  If compounds are added to the water, the density increases; thus, if we added 20 g glucose to 1 litre of pure water, the density becomes 1020 g/L.

- **Making a solution**

  You prepare a by dissolving a known mass of (oftentimes a solid) into a specific amount of a solvent. One

of the most common ways of expressing the [ ] of the solution is as M ([ ]), which is moles of solute per litre of solution.

Example of How to Prepare a Solution

Prepare 1 litre of 1.00 M NaCl solution.

Firstly, calculate the molar [ ] of NaCl, which is the mass of a mole of Na plus the mass of a mole of Cl, or 22.99 + 35.45 = 58.44 g/mol

1. Weigh out 58.44 g of NaCl;
2. Place the NaCl in a 1-litre volumetric [ ]
3. Add a small volume of [ ], deionized water so as to dissolve the salt;
4. Fill the flask up to the 1-L line.

If a different [ ] is required, then multiply that number times the molar mass of NaCl. So, for example, if you wanted a 0.5 M solution, you would use 0.5 x 58.44 g/mol of NaCl in 1-L solution, or 29.22 g of NaCl.

Molarity is expressed in terms of litre of solution, and *not* litres of solvent. To prepare a solution, the flask is filled to the mark. In other words, it is incorrect to add 1 litre of water to a mass of sample if you wanted to prepare a molar solution.

Helpful link: https://www.youtube.com/watch?v=0_CsM6br4PI

Aufgabe Lückentext:

Folgende Wörter bitte in den Lückentext einfüllen.
Jedes Wort kommt einmal vor.
Bitte Gross- und Kleinbuchstaben beachten.

Amphipathic, buffers, compounds, concentration, components, density, dissolves, distilled, emulsion, flask, gravity, Hydrophilic, Hydrophobic, insoluble, mass, molarity, molarity, precipitates, Solubility, soluble, solution, solution, solvent, solute, suspension, substance