APPLIANCE OF REVERSE OSMOSIS FOR PHARMACOLOGY WATER TREATMENT

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Reverse osmosis (RO) is an effective method for the municipal wastewater reclamation since it helps to remove a wide range of organic pollutants, bacteria and viruses, dissolved organic matter, and inorganic salts.

Reverse osmosis membranes restrain majority of dissolved salts, organic materials, viruses and bacteria and admit water.

There are number of theories on membrane transporting processes.

Diffusion theory: In theory, water molecules and salt ions spread through membrane but ions have significantly lower diffusion coefficient.

Capillary theory: water passes through a membrane as a capillary system. In addition, there is water inside the capillary in bound state. This state creates hydrogen bonds with atoms on surface. Movement connected with old bonds destruction and creation of new once. Since ions cannot create hydrogen bonds, they can't move through capillary that way.

There are water lay on surface of hydrophilic membranes (the surface of membrane becomes easy wet) due to adsorption. If the pore diameter is not more than double thickness of such a layer, ions of dissolved materials cannot pass through it.

On the whole, all these ideas are true and help to understand deeper observing mechanisms.

Usually, ultraviolet light (UV) uses as a bactericide. The UV sources in pharmaceutical water purification systems are low or medium pressure mercury vapour lamps.

Radiation with a wavelength of 240-260 nm has the greatest bactericidal action with a peak at 265nm. It damages DNA and RNA polymerase at low doses preventing replication. For most Pharmacological applications, UV chambers and lamps need to be designed to provide a sufficient dosage of UV to achieve a 6log10 reduction of typical pathogenic contaminants.

Radiation at shorter wavelengths (185 nm) is effective for the oxidation of organics. The UV breaks large organic molecules into smaller ionised components, which can then be removed by a downstream continuous electrodeionisation. 185 nm UV is also used to destroy excess chlorine or ozone.

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