

Supporting information

Recent advances in the remediation of Textile dye-containing wastewater: Prioritizing Human Health and Sustainable Wastewater Treatment

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Table S1. Advantages and disadvantages of biological methods for dye removal.

Process	Advantages	Disadvantages
Biological methods Bioreactors Biological activated sludge Microbiological treatments Enzymatic decomposition	<ul style="list-style-type: none">- Inexpensive process.- Variety of species can be used.- Good removal of BOD and SS- Better elimination of growing pollutants from water	<ul style="list-style-type: none">- Needs organization and maintenance of the microbes.- Longer time of operations.- Low efficiency of dye degradation.- Sludge generation- Synergy between species and their impact on treatment- Complex nature of microorganism- Not suitable for all class of dyes.-

Table S2. Dye degradation by various bacterial biomass.

Bacteria Culture	Dyes	Mechanism	% Removal	Ref.
Citrobacter sp	Malachite Green	Biodegradation	86 %	[1]
Pseudomonas sp.	P-Nitrophenol	Bioremediation	97%	[2]
Pseudomonas luteola	Acid Red-G	Azo-reductases	36 %	[3]
Pseudomonas stutzeri	Acid anthraquinone dye	Bio-sorption	50-60 %	[3]
Streptomyces viridosporus	Azo Red-171	Ion-exchange	75 %	[4]
Micrococcus glutamicus	Reactive Black-5	Bio-sorption	93 %	[5]

Table S3. Advantages of combination-based (hybrid) processes.

Categories	Hybrid process	Advantages	Ref
Chemical/physical	Photocatalytic membrane reactors	<ul style="list-style-type: none">- Able to destroy all type of organic pollutants.- Limits penetration- Energy efficient and required small reactor	[6,7]
	Electro-Oxidation	<ul style="list-style-type: none">- No formation by products and no more requirement of toxic chemicals.- Possibility of process control	[8,9]

Categories	Hybrid process	Advantages	Ref
Chemical/biological	MEC	- Simple design and it enhance for the removal of azo dyes.	[10]
	MBR	- Efficient even if wastewater containing higher COD (above 3 g/L), no microbes and solid presence in the waste.	[11,12]
Chemical/chemical	Coagulation-Fenton	- Efficient degrading azo dyes and other synthetic dyes	[13]
	Sono-photocatalysis	- Efficient elimination of toxicity, cheaper process.	[14,15]
	AOPs-Photocatalysis (Hybrid Z-scheme)	- Efficient reduction of pollutants, significant removal of all type of dyes. - Faster reactions.	[16]

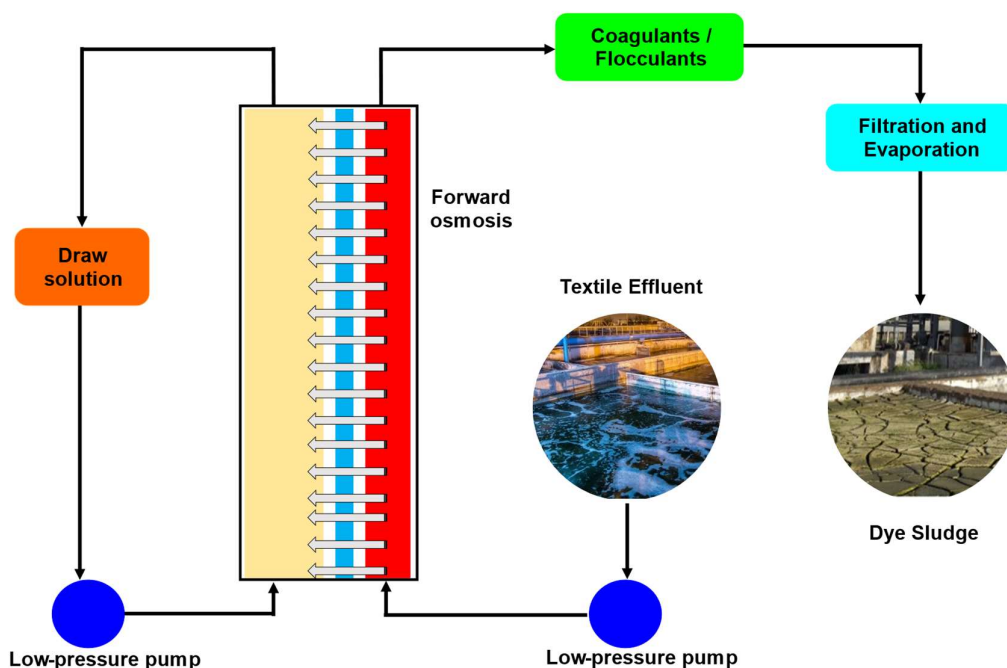


Figure S1. Schematic representation of forward osmosis process.

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