

Comparison of Parameters: Mediterranean Seawater, Brine and Purified Drinking Water

Based on the analyses carried out by the Food Safety Technology Centre (CTS), a detailed comparison is made between the three samples analysed (original Mediterranean seawater, brine generated after the reverse osmosis process and purified drinking water). The results are presented below:

1. Physical-Chemical Analysis

Parameter	Mediterranean Sea Water	Brine	SEW Purified Drinking Water	Legal Limit (Drinking Water)
pH	7.89 units	8.10 units	6.78 units	6,5 - 9,5
Conductivity	Not specified	High (due to salt concentration)	1867 μ s/cm	2500 μ s/cm
Turbidity	Not specified	Not specified	0.07 UNF	4 UNF
Ammonium	5.0 mg/l	5.0 mg/l	0.012 mg/l	.5 mg/l
Free chlorine	Not specified	Not specified	0.0127 mg/l	1 mg/l
Combined chlorine	Not specified	Not specified	0.0006 mg/l	2 mg/l

Observations:

1. pH: Drinking water has a slightly lower pH (6.78), which makes it suitable for human consumption according to the established legal limits.
2. Conductivity: The conductivity of drinking water is within legal limits, indicating that salts have been significantly reduced in the reverse osmosis process.
3. Turbidity: The turbidity of drinking water is extremely low (0.07 UNF), reflecting excellent visual and physical quality.
4. Ammonium and chlorine: Ammonium and chlorine levels in drinking water are well below legal limits, indicating efficient purification.

2. Microbiological analysis

Parameter	Mediterranean Sea Water	Brine	Purified drinking water	Legal Limit (Drinking Water)
Mesophilic aerobes	Unspecified	Unspecified	1×10^3 cfu/ml	< 1×10^3 cfu/ml
Total coliforms	10 cfu/100ml	Not detected	Not detected	0 cfu/100 ml
Escherichia coli	10 cfu/100ml	Not detected	Not detected	0 cfu/100 ml
Clostridium perfringens	Unspecified	Not detected	Not detected	0 cfu/100 ml
Fecal Enterococcus	7 CFU/100ml	Not detected	Not detected	0 cfu/100 ml

Observations:

1. Microbiological elimination: Drinking water is completely free of pathogenic microorganisms (Escherichia coli, fecal Enterococcus, total coliforms), complying with the legal limits for human consumption.
2. Mesophilic aerobes: The presence of mesophilic aerobes in drinking water is within the permitted limit (< 1×10^3 cfu/ml), which ensures their microbiological safety.

3. Overall Comparison

Aspect	Mediterranean Sea Water	Brine	Purified drinking water
Salinity	33.2 g/l	70 g/l	Very low (< 0.5 g/l)
Organic matter	1.17 mg/l	<1.0 mg/l	Completely eliminated
Pathogenic microorganisms	Present	Completely eliminated	Completely eliminated
Turbidity	Not specified	Not specified	Very low
pH	7.89 units	8.10 units	6.78 units



Observations:

1. Salinity: The salinity of drinking water is extremely low, making it suitable for human consumption. This contrasts with the high salinity of the brine and the original water.
2. Organic matter: Organic matter has been completely removed from drinking water, ensuring its purity.
3. Microorganisms: Both seawater and brine contained pathogenic microorganisms that were eliminated during the purification process.

4. Conclusion

The comparative analysis shows that Smart Eco Water's reverse osmosis module is highly efficient in purifying Mediterranean seawater, transforming it into drinking water of excellent quality.

The parameters of purified water comply with all the legal requirements established for human consumption, standing out for its:

- Low salinity: Significant reduction of salts, guaranteeing conductivity within legal limits.
- Absence of pathogenic microorganisms: Complete elimination of bacteria and other microbiological contaminants.
- Physical and chemical purity: Extremely low levels of turbidity, ammonium and chlorine, reflecting optimal quality.

The purification process not only meets safety and quality standards, but also ensures environmental sustainability by returning a controlled brine compatible with the marine ecosystem to the sea. This makes Smart Eco Water's reverse osmosis modules an ideal solution for the production of drinking water from seawater, without compromising human health or the environment.

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