

Selected papers presented at the International Conference on Desalination for the Environment, Clean Water and Energy, European Desalination Society, 23–26 April, 2012, Barcelona, Spain

Volume 51/1–3

Keynote presentation

Seawater desalination: the strategic choice for Saudi Arabia A.M. Al-Ibrahim (Saudi Arabia).....	1
---	---

Regional desalination and resource management experience

Northern Chile and Peru: a hotspot for desalination R.E. Dixon (Quilicura, Chile).....	5
Seawater desalination off the Chilean coast for water supply to the mining industry F. Knops, E. Kahne (Enschede, The Netherlands), M.G. de la Mata (Buenos Aires, Argentina) and C.M. Fajardo (Segunda Región, Chile)	11
Optimum operation of desalination plant to minimize power consumption and water shortage risks in Okinawa, Japan T. Ishida, S. Takizawa, N. Watanabe, M. Murakami, H. Sakai and K. Oguma (Tokyo, Japan).....	19
Quantifying the actual benefits of large-scale seawater desalination in Israel A. Tenne, D. Hoffman and E. Levi (Tel Aviv, Israel)	26
Combined desalination, water reuse, and aquifer storage and recovery to meet water supply demands in the GCC/MENA region N. Ghaffour, T.M. Missimer and G.L. Amy (Thuwal, Saudi Arabia)	38
How sustainable can desalination be? R. Baten and K. Stummeyer (Stuttgart, Germany).....	44
Spanish experience in desalination for agriculture D. Zarzo, E. Campos and P. Terrero (Murcia, Spain)	53
Water security and stability in the Kingdom of Bahrain M.E. Hajjaj and A.H. Hashim (Kingdom of Bahrain).....	67
Qatar water challenges M.A. Darwish and R. Mohtar (Doha, Qatar).....	75
Overview of existing water and energy policies in the MENA region and potential policy approaches to overcome the existing barriers to desalination using renewable energies K.R. Huttner (Germany).....	87
Innovative design of the UF and SWRO Limassol desalination plant in Cyprus N. Nadav (Tel-Aviv, Israel) and E. Koutsakos (Strovolos, Cyprus)	95
Al Dur SWRO plant: a double challenge for pre- and post-treatments S. Le Gallou, S. Bertrand (France) and K.H. Madan (Manama, Bahrain)	101
The role of SWRO Barcelona-Llobregat Plant in the water supply system of Barcelona Area M.A. Sanz (France) and C. Miguel (Spain)	111
Drinking water supply by reverse osmosis plants: three years of experience at El Prat de Llobregat Municipality J. Sanz, A. García, J. Miró and C. Miguel (Spain)	124

Hadera desalination plant two years of operation M. Faigon, Y. Egozy, D. Hefer, M. Ilevicky and Y. Pinhas (Kadima, Israel).....	132
Operational experience of the brackish water reverse osmosis of the water treatment plant in Sant Joan Despí A. Teuler, À. Vega, J. Coma, D. Vidal and J. Aumatell (Barcelona, Spain).....	140
Performance investigation of advanced adsorption desalination cycle with condenser–evaporator heat recovery scheme K. Thu, Y.-D. Kim (Thuwal, Saudi Arabia), A. Myat, A. Chakraborty and K.C. Ng (Singapore)	150
Water defluoridation using nanofiltration vs. reverse osmosis: the first world unit, Thiadiaye (Senegal) M. Pontie, H. Dach (Angers, France), A. Lhassani (Morocco) and C.K. Diawara (Senegal).....	164
Tenorio project: a case of sustainable development in Mexico L. Equihua and A. Rojas (Mexico)	169
Seawater desalination in Mexican Pacific coast by a new technology: use and perspectives V. Perez-Moreno, C.B. Bonilla-Suarez and M.E. Rodriguez-Muñoz (Mexico)	175
Costs	
Independent testing of commercially available, high-permeability SWRO membranes for reduced total water cost J. Mamo (Gzira, Malta), V. Pikalov, S. Arrieta and A.T. Jones (USA).....	184
The impact of sulphuric acid replacement by a phosphonate-based antiscalant on operational costs of seawater desalination L. Diouri (Louvain La Neuve, Belgium), O. Sallangos (Nicosia, Cyprus), W. van der Wal, F. Dutoy, J. Kolpa and O. Henry (Louvain La Neuve, Belgium).....	192
Costs for water supply, treatment, end-use and reclamation A.K. Plappally and J.H. Lienhard V (Cambridge, USA).....	200
Environment	
Marine monitoring surveys for desalination plants—a critical review S. Lattemann and G. Amy (Thuwal, Saudi Arabia).....	233
Minimizing environmental risks on constructing marine pipelines: Aguilas desalination plant B. Arconada, P. Delgado and Á. García (Madrid, Spain)	246
A review of environmental governance and its effects on concentrate discharge from desalination plants in the Kingdom of Saudi Arabia R. van der Merwe, S. Lattemann and G. Amy (Thuwal, Saudi Arabia).....	262
Seawater desalination: an environmental regulator’s perspective G. Hocking (Adelaide, Australia).....	273
Life cycle analysis of urban water cycle in two Spanish areas: Inland city and island area J. Uche, A. Martínez (Zaragoza, Spain), C. Castellano and V. Subiela (Las Palmas, Spain).....	280
Risk assessment of agricultural pollution on groundwater quality in the high valley of Tadjenanet: Chelghoum Laid (Eastern Algeria) A. Khedidja and A. Boudoukha (Batna, Algeria)	292
Produced water characterization in Kuwait and its impact on environment K. AlAnezi, M. Belkharouch, S. Alali and W. Abuhaimed (Shuwaikh, Kuwait).....	302
Reverse osmosis/Ultrafiltration/Microfiltration	
More efficient production line with Desalination plants using reverse osmosis J. Feo, J.J. Sadhwani and L. Alvarez (Spain).....	307
Reverse osmosis membranes oxidation by hypochlorite and chlorine dioxide: spectroscopic techniques vs. Fujiwara test R. Sandín, E. Ferrero, C. Repollés, S. Navea, J. Bacardit (Barcelona, Spain), J.P. Espinós (Sevilla, Spain) and J.J. Malfeito (Barcelona, Spain).....	318

Using reverse osmosis technology for recycling wastewater from a coal-fired power plant M. Sír, Z. Honzajková, M. Podhola, T. Patočka, P. Kocurek, M. Bystrianský, R. Vurm, M. Kubal and M. Kuraš (Prague, Czech Republic)	328
Long-term benefits of DOW FILMTEC™ RO membranes B. Salgado, E. Gasia-Bruch, V. García-Molina, A. Casañas (Tarragona, Spain) and S. Coker (Lake Jackson, USA)	333
Cleaning of reverse osmosis membranes C. zum Kolk, W. Hater and N. Kempken (Düsseldorf, Germany).....	343
Scheduling of the membrane module rotation in RO desalination plants L.G. Palacin, F. Tadeo, C. de Prada and J. Salazar (Valladolid, Spain).....	352
Evaluation of the recovery of osmotic energy in desalination plants by using pressure retarded osmosis L.G. Palacin, F. Tadeo, C. de Prada and K. Touati (Valladolid, Spain).....	360
Treatment of post-digestion liquors with the application of struvite precipitation and reverse osmosis J. Bohdziewicz (Gliwice, Poland) and M. Kuglarz (Bielsko-Biala, Poland)	366
Oxidation–microfiltration removal of Fe(II) from water L. Setyadhi and J.C. Liu (Taipei, Taiwan).....	374
Optimizing seawater operating protocols for pressurized ultrafiltration based on advanced cleaning research G.G. Oriol, N. Moosa (Tarragona, Spain), R. Garcia-Valls (Catalunya, Spain), M. Busch and V. Garcia-Molina (Tarragona, Spain)	384
Experiences from the Adelaide Desalination project: ultrafiltration cleaning optimisation—from pilot to full-scale operation M. Dixon (Lonsdale, Australia), V. Ayala, G. Hijos (Vizcaya, Spain) and C. Pelekani (Lonsdale, Australia)	397
Ultrafiltration used as pre-treatment for SWRO desalination: dynamic coagulant control under extreme conditions H. Futselaar, B. Blankert, T. Spanjer and F. Spenkeliink (The Netherlands)	407
Seawater pretreatment by dead-end micro and ultrafiltration in pressure-driven inside feed J. Guilbaud, A. Massé, F.-C. Wolff and P. Jaouen (France).....	416
Experience with integrated ultrafiltration/reverse osmosis systems in industrial applications in Spain J. Suárez, J. Villa and B. Salgado (Spain).....	423
Practical experience of backwashing with SWRO permeate for UF fouling control S. Li, S.G.J. Heijman, J.Q.J.C. Verberk, G.L. Amy and J.C. van Dijk (Delft, The Netherlands)	432
Application of membrane and natural coagulants for stillage purification V.M. Vasić, J.M. Prodanović, D.V. Kukić, M.B. Šćiban, M.G. Antov and D.Ž. Ivetić (Novi Sad, Serbia)	437
The fractionation of natural coagulant extracted from common bean by use of ultrafiltration membranes J.M. Prodanović, M.G. Antov, M.B. Šćiban, B.B. Ikonić, D.V. Kukić, V.M. Vasić and D.Ž. Ivetić (Novi Sad, Serbia)	442
Nanofiltration	
Pilot plant comparison study of two commercial nanofiltration membranes in a drinking water treatment plant G. Ribera, L. Llenas, M. Rovira, J. de Pablo and X. Martinez-Llado (Barcelona, Spain)	448
Comparison of nanofiltration membranes' performance in flat sheet and spiral wound configurations: a scale-up study G. Ribera, L. Llenas, X. Martínez, M. Rovira and J. de Pablo (Barcelona, Spain).....	458
NF/RO removal of enrofloxacin and its photodegradation products from water D. Dolar, M. Periša, K. Košutić and S. Babić (Zagreb, Croatia).....	469
Using nanofiltration in a “zero-rejection” process: the removal of Ni ²⁺ and Co ²⁺ from salty wastewater C.F. Esmi, L. Schrive, Y. Barre, J. Palmeri and A. Deratani (France)	476

Seawater desalination: nanofiltration—a substitute for reverse osmosis? M. Pontié, J.S. Derauw, S. Plantier, L. Edouard and L. Bailly (France).....	485
Capacitive deionization/Electrodialysis/Ion exchange	
Synergistic effects of chromium(VI) reduction/EDTA oxidization for PCB wastewater by photocatalysis combining ionic exchange membrane processes H.-T. Hsu, S.-S. Chen, W.-S. Chang (Taipei, Taiwan) and C.-W. Li (Taipei, Taiwan).....	495
Ion-selective composite carbon electrode coated with TiO ₂ nanoparticles for the application of electrosorption process J.-H. Lee and J.-H. Choi (Chungnam, Korea).....	503
Bipolar membrane electrodialysis and ion exchange hybridizing for dilute organic acid solutions treatment A. Rehouma, B. Belaissaoui (France), A. Hannachi (Gabes, Tunisia) and L. Muhr (France).....	511
Possibility of improvement of boiler water treatment process—ion exchange vs. reverse osmosis D.V. Kukić, M.B. Šćiban, B.B. Mitrović, J.M. Prodanović, V.M. Vasić, D.Ž. Ivetić and M.G. Antov (Novi Sad, Serbia).....	518
Brine discharge	
Venturi diffusers as enhancing devices for the dilution process in desalination plant brine discharges E. Portillo, G. Louzara, M. Ruiz de la Rosa (Las Palmas, Spain), J. Quesada (Santa Cruz de Tenerife, Spain), J.C. Gonzalez, F. Roque (Las Palmas, Spain), M. Antequera (Madrid, Spain) and H. Mendoza (Las Palmas, Spain).....	525
Numerical modeling of brine discharge: commercial models, MEDVSA online simulation tools and advanced computational fluid dynamics P. Palomar, J.L. Lara, I.J. Losada and L. Tarrade (Santander, Spain).....	543
Reuse and management of brine in sustainable SWRO desalination plants N. Melián-Martel, J.J. Sadhwani Alonso and S.O. Pérez Báez (Las Palmas, Spain).....	560
Echinoderms as indicators of brine discharge impacts Y. Fernández-Torquemada, J.M. González-Correa and J.L. Sánchez-Lizaso (Alicante, Spain).....	567
Membranes	
Review and assessment of the newly developed MD for desalination processes A.S. Hassan and H.E.S. Fath (Abu-Dhabi, UAE).....	574
A study on the relationship between preparation condition and properties/performance of polyamide TFC membrane by IR, DSC, TGA, and SEM techniques D.J. Mohan and L. Kullová (Plzen, Czech Republic).....	586
Chronopotentiometric study of ceramic cation-exchange membranes based on zirconium phosphate in contact with nickel sulfate solutions M.C. Martí-Calatayud, M. García-Gabaldón, V. Pérez-Herranz (València, Spain), S. Sales and S. Mestre (Castellón, Spain).....	597
Gas separation process: analysis of composite membranes based on alumina/PVDF at lower power consumption energy D. da Silva Biron (Caxias do Sul, Brazil), C. Cherubini (Joinville, Brazil), V. dos Santos, L. Gomes (Caxias do Sul, Brazil), A. Schneider (Joinville, Brazil) and M. Zeni (Caxias do Sul, Brazil) ..	606
Cleaning of ultrafiltration membranes after the treatment of surface water: static–dynamic test B. García-Fayos, J.M. Arnal and M. Sancho (València, Spain).....	609
Evaluating the efficiency of different microfiltration and ultrafiltration membranes used as pretreatment for Red Sea water reverse osmosis desalination S.K. Al-Mashharawi, N. Ghaffour, M. Al-Ghamdi and G.L. Amy (Thuwal, Saudi Arabia).....	617
Application of carbon nano-materials in desalination processes Q. Zaib and H. Fath (Abu Dhabi, UAE).....	627
Pervaporation of ethanol/water mixtures by zeolite filled sodium alginate membrane F.U. Nigiz and N.D. Hilmioğlu (Kocaeli, Turkey).....	637

Chelation and permeation of heavy metals using affinity membranes from cellulose acetate–chitosan blends M.M. Naim and H.E.M. Abdel Razek (Alexandria, Egypt).....	644
1-Hexyl-3-methylimidazolium hexafluorophosphate as new component of polymeric membrane of lead ion-selective electrode C. Wardak (Lublin, Poland).....	658

Volume 51/4–6

PV energy

Batch ED fed by a PV unit: a reliable, flexible, and sustainable integration F. Círez, J. Uche, A.A. Bayod and A. Martínez (Zaragoza, Spain).....	673
Evaluation of a solar membrane distillator hybridized with a photovoltaic cell K. Murase, K. Chikamatsu and T. Kyuno (Tokyo, Japan).....	686
Photovoltaic-based combined electricity and clean water production for remote small islands D. Tiligadas, E. Kondili and J.K. Kaldellis (Athens, Greece).....	695
The modular design of photovoltaic reverse osmosis systems: making technology accessible to nonexperts A.M. Bilton and S. Dubowsky (Cambridge, USA).....	702
Assessment of the recovery of photovoltaic cells cutting fluid by chemical pretreatment and ultrafiltration N. Drouiche (Algiers, Algeria), M.W. Naceur, H. Boutoumi, N. Aitmessaoudene, R. Henniche and T. Ouslimane (Blida, Algeria).....	713

Energy saving

Consideration of energy savings in SWRO C.R. Bartels (Oceanside, USA) and K. Andes (Perth, Australia).....	717
Membrane feedpump optimization for efficiency J. Lawler and F. Grondhuis (Vernon, USA).....	726
More than 30% energy saving seawater desalination system by combining with sewage reclamation H. Takabatake, K. Noto, T. Uemura and S. Ueda (Tokyo, Japan).....	733
Unprecedented system efficiency and simplicity yields exceptionally low cost of permeate in 5,000 ton/day SWRO system D. Duncavage and C. Bly (Monroe, USA).....	742
Different designs in energy savings of SWRO Plant of Las Palmas III R. Lemes, R. Falcon, R. Arocha, J. Curbelo, V. Platas and L. De Lorenzo (Las Palmas, Spain).....	749

Energy recovery

Optimized train configuration for mega-scale seawater RO systems with turbocharger energy recovery E. Oklejas and J. Hunt (Monroe, USA).....	759
Reduction of energy consumption in seawater reverse osmosis desalination pilot plant by using energy recovery devices Y. Kim, M.G. Kang, S. Lee, S.G. Jeon and J.-S. Choi (Seoul, Korea).....	766
The availability and security of water production using reliable energy recovery technologies R. Bosleman and R. Clemente (San Leandro, USA).....	772
Online cleaning of tubular heat exchangers in water service systems using projectiles M.R. Jalalirad, M.R. Malayeri and R. Preimesser (Stuttgart, Germany).....	780

Forward osmosis

A novel implementation of water recovery from whey: “forward–reverse osmosis” integrated membrane system C. Aydiner, S. Topcu, C. Tortop, F. Kuvvet, D. Ekinici, N. Dizge and B. Keskinler (Kocaeli, Turkey).....	786
--	-----

Preliminary studies of water treatment using forward osmosis Y. Xie, R. Ma and S. Xia (Shanghai, China)	800
MED/MSF/Humidification-dehumidification	
An improved model for multiple effect distillation K.H. Mistry (Cambridge, USA), M.A. Antar (Dhahran, Saudi Arabia) and J.H. Lienhard V (Cambridge, USA)	807
Effect of flame spray coating on falling film evaporation for multi effect distillation system R. Abraham and A. Mani (Chennai, India)	822
Heat transfer performance and bundle-depth effect in horizontal-tube falling film evaporators S. Shen, G. Liang, Y. Guo, R. Liu and X. Mu (Dalian, China)	830
Experimental investigations on the performance of an air heated humidification–dehumidification desalination system M.A. Antar and M.H. Sharqawy (Dhahran, Saudi Arabia)	837
Techno-economic analysis of hybrid high performance MSF desalination plant with NF membrane A.N.A. Mabrouk and H.E.S. Fath (Egypt)	844
Analysis of adjusting method for load performance of TVC-MED desalination plant B. Zhang, L. Yang, S. Shen, X. Liu and K. Zhang (Dalian, China)	857
Effect of fixed bed characteristics on the performance of pulsed water flow humidification- dehumidification solar desalination unit A.H. El-Shazly, A.A. Al-Zahrani, Y.A. Al-Hamed and S.A. Nosier (Jeddah, Saudi Arabia)	863
Numerical analysis of thermodynamic behaviour of falling film outside a horizontal tube L. Yang, C. Xue, B. Zhang, K. Zhang and S. Tao (Dalian, China)	872
Scaling	
Remineralization of desalinated water by limestone dissolution with carbon dioxide H. Shemer, D. Hasson, R. Semiat (Haifa, Israel), M. Priel, N. Nadav, A. Shulman and E. Gelman (Tel-Aviv, Israel)	877
New insight into the relation between bulk precipitation and surface deposition of calcium carbonate mineral scale V. Eroini, A. Neville, N. Kapur and M. Euvrard (Besançon, France)	882
Scaling tendency assessment in reverse osmosis modules H. Hchaichi (Gabes, Tunisia), H. Elfil (Soliman, Tunisia), P. Guichardon (Marseille, France) and A. Hannachi (Gabes, Tunisia)	892
New insights into silica scaling on RO-membranes A. Kempter (Ludwigshafen, Germany), T. Gaedt (Trostberg, Germany), V. Boyko, S. Nied (Ludwigshafen, Germany) and K. Hirsch (Wyandotte, USA)	899
The performance of anti-scalants on silica-scaling in reverse osmosis plants W. Hater, C. zum Kolk (Düsseldorf, Germany), G. Braun and J. Jaworski (Cologne, Germany)	908
New anti-scalant performance evaluation for MSF technology A. Mohamed, J. Robert, A.N. Mabrouk, I. Ahmad, A. Nafey, J.S. Choi, J.K. Park (Dubai, UAE), S. Nied and J. Detering (Ludwigshafen, Germany)	915
A sustainable antiscalant for RO processes G. van Engelen and R. Nolles (Breda, The Netherlands)	921
Simple process for hardening desalinated water with Mg ²⁺ ions D. Hasson, R. Semiat, H. Shemer, M. Priel and N. Nadav (Israel)	924
Selection of nanofiltration membranes as pretreatment for scaling prevention in SWRO using real seawater L. Llenas, G. Ribera, X. Martínez-Lladó, M. Rovira and J. de Pablo (Manresa, Spain)	930
Amorphous aluminosilicate scaling characterization in a reverse osmosis membrane S. Salvador Cob, C. Beupin, B. Hofs, M.M. Nederlof, D.J.H. Harmsen, E.R. Cornelissen (Nieuwegein, The Netherlands), A. Zwijnenburg (Leeuwarden, The Netherlands), F.E. Genceli Güner and G.J. Witkamp (Delft, The Netherlands)	936

Fouling/RO

The use of microbial and chemical analyses to characterize the variations in fouling profile of seawater reverse osmosis (SWRO) membrane C.-L. de O. Manes, M.T. Khan (Thuwal, Saudi Arabia), V.G. Molina (Tarragona, Spain) and J.-P. Croue (Thuwal, Saudi Arabia).....	944
Membrane fouling in seawater desalination processes caused by harmful dinoflagellate <i>Cochlodinium polykrikoides</i> M. Kuroiwa, T. Masuda, T. Omura, A. Wongrueng, K. Oguma, H. Sakai, M. Murakami and S. Takizawa (Tokyo, Japan)	950
Evaluating impact of fouling on reverse osmosis membranes performance N. Peña, S. Gallego, F. del Vigo (Madrid, Spain) and S.P. Chesters (Middlewich, UK).....	958
Fouling of reverse osmosis membranes by cane molasses fermentation wastewater: detection by electrical impedance spectroscopy techniques J. Cen, J. Kavanagh, H. Coster and G. Barton (Sydney, Australia).....	969

Fouling/MSF

Restoration of “dead” clay fouled membranes U. Farooq and S. Sheikh (Pakistan).....	976
An application of dynamic simulation for 16.2 MIGD MSF desalination plant H.S. Choi, B.G. Bak, G.M. Lee, S.M. Kim and J.K. Park (Changwon, Korea).....	983

Biofouling

Antibacterial efficiency of composite nano-ZnO in biofilm development in flow-through systems A. Ronen, R. Semiat and C.G. Dosoretz (Haifa, Israel).....	988
Impact of biofouling in intake pipes on the hydraulics and efficiency of pumping capacity H. Polman (Arnhem, The Netherlands), F. Verhaart (Delft, The Netherlands) and M. Bruijs (Arnhem, The Netherlands)	997
Surface analysis for the identification of effective strategies to fight marine biofouling C. Hippus, S. Nied, G. Schürmann and A. Feßenbecker (Ludwigshafen, Germany).....	1004

TEP

Transparent exopolymer particles as critical agents in aquatic biofilm formation: implications for desalination and water treatment T. Berman (Migdal, Israel).....	1014
Characterisation of transparent exopolymer particles (TEP) produced during algal bloom: a membrane treatment perspective L.O. Villacorte, Y. Ekowati (Delft, The Netherlands), H. Winters (Thuwal, Saudi Arabia), G.L. Amy, J.C. Schippers and M.D. Kennedy (Delft, The Netherlands).....	1021
Three years operational experience with ultrafiltration as SWRO pre-treatment during algal bloom R. Schurer (Rotterdam, The Netherlands), A. Tabatabai, L. Villacorte, J.C. Schippers and M.D. Kennedy (Delft, The Netherlands).....	1034
Microfiber filtration of lake water: impacts on TEP removal and biofouling development G. Eshel (Galil Elyon, Israel), H. Elifantz (Jerusalem, Israel), S. Nuriel, M. Holenberg (Galil Elyon, Israel) and T. Berman (Migdal, Israel).....	1043
Removal of polysaccharide foulants from reverse osmosis feedwater using electroadsorptive cartridge filters R. Komlenic (USA), T. Berman (Migdal, Israel), J.A. Brant, B. Dorr (Laramie, USA), I. El-Azizi (Tripoli, Libya) and H. Mowers (USA)	1050

MBR

The effects of operation conditions of carbon/nitrogen ratio and pH on nitrogen removal in intermittently aerated membrane bioreactor (IAMBR) H. Benaliouche, D. Abdessemed and G. Nezzal (Algiers, Algeria).....	1057
--	------

The IFAS-MBR process: a compact combination of biofilm and MBR technology as RO pretreatment T. De la Torre, C. Rodríguez (Barcelona, Spain), M.A. Gómez (Granada, Spain), E. Alonso (Seville, Spain) and J.J. Malfeito (Barcelona, Spain).....	1063
The anaerobic MBR for sustainable industrial wastewater management H. Futselaar, R. Rosink, G. Smith and L. Koens (Enschede, The Netherlands).....	1070
Treatment of dyeing wastewater using submerged membrane bioreactor A.H. Konsowa, M.G. Eloffy and Y.A. El-Taweel (Alexandria, Egypt).....	1079
SDI/MFT	
Assessment of silt density index (SDI) as fouling propensity parameter in reverse osmosis (RO) desalination systems R.M. Rachman, N. Ghaffour, F. Wali and G.L. Amy (Thuwal, Saudi Arabia).....	1091
Limitations, improvements and alternatives of the silt density index A. Alhadidi, B. Blankert, A.J.B. Kemperman (Enschede, The Netherlands), R. Schurer (Spijke- nisse, The Netherlands), J.C. Schippers (Delft, The Netherlands), M. Wessling and W.G.J. van der Meer (Enschede, The Netherlands).....	1104
SDI and MFI workshop: conclusions and recommendations J.C. Schippers, L. Broens and M. Balaban.....	1114
Brackish water desalination	
Integrated Membrane System (IMS) to treat brackish water with high salinity: a new treatment concept J.F. Ruana (Tarragona, Spain), F.J. Bernaola, A.R. Frutos (Sevilla, Spain) and X. Pujol (Tarragona, Spain).....	1116
Industrial and brackish water treatment with closed circuit reverse osmosis R.L. Stover (Newton, USA).....	1124
Desalination of brackish groundwater and concentrate disposal by deep well injection N. Wolthek (Lelystad, The Netherlands), K. Raat (Nieuwegein, The Netherlands), J.A. de Ruijter (Schiedam, The Netherlands), A. Kemperman (Leeuwarden, The Netherlands) and A. Oosterhof (Lelystad, The Netherlands).....	1131
Barcelona, three years of experience in brackish water desalination using EDR to improve quality. New O&M procedures to reduce low-value work and increase productivity F. Valero, A. Barceló, M.E. Medina and R. Arbós (Sant Joan Despí, Spain).....	1137
Estimation of the maximum conversion level in reverse osmosis brackish water desalination plants E.R. Saavedra, A.G. Gotor, S.O. Pérez Báez and A.R. Martín (Las Palmas, Spain).....	1143
Pioneering demineralized and desalinated water cost reduction with innovative brackish water RO membrane technology K. Majamaa (Tarragona, Spain), A. Roy, J. Johnson and M. Peery (Edina, USA).....	1151
Renewable energy/Freezing	
Sustainable renewable energy seawater desalination using combined-cycle solar and geothermal heat sources T.M. Missimer, Y.-D. Kim, R. Rachman and K.C. Ng (Thuwal, Saudi Arabia).....	1161
Renewable desalination: a methodology for cost comparison M. Moser, F. Trieb, T. Fichter and J. Kern (Stuttgart, Germany).....	1171
Seawater reverse osmosis (SWRO) as deferrable load in micro grids K. Bognar (Fasanenstraße, Germany), R. Pohl (Berlin, Germany) and F. Behrendt (Fasanenstraße, Germany).....	1190
Freeze concentration for membrane concentrate treatment and volume reduction W. Gao (Canada).....	1200
A multicriteria analysis for the optimal desalination-RES system. Special focus: the small Greek islands E. Kondili, J.K. Kaldellis and M. Paidousi (Athens, Greece).....	1205

- Wind desalination for the Island of Mykonos in Greece: a case study
G. Xenarios (Athens, Greece), P. Papadopoulos and E. Tzen (Pikermi, Greece) 1219

Solar desalination

- Parametric equations for the variables of a steady-state model of a multi-effect desalination plant
P. Palenzuela, D. Alarcón, G. Zaragoza, J. Blanco and M. Ibarra
(Almería, Spain) 1229
- Numerical simulation of solar-assisted multi-effect distillation (SMED) desalination systems
Y.-D. Kim, K. Thu (Thuwal, Saudi Arabia), A. Myat and K.C. Ng (Singapore) 1242
- Design and testing of an isolated commercial EDR plant driven by solar photovoltaic energy
B. Peñate (Santa Lucía, Spain), F. Círez (Zaragoza, Spain), F.J. Domínguez, V.J. Subiela and
L. Vera (Santa Lucía, Spain) 1254
- Distilled and drinkable water quality produced by solar membrane distillation technology
J.R.B. Rodríguez, V.M. Gabet, G.M. Monroy (Santa Lucía, Spain), A.B. Puerta (Santa Cruz de
Tenerife, Spain) and I.F. Barrio (Barcelona, Spain) 1265
- Exergy analysis of a solar-assisted MED desalination experimental unit
L. Yang, T. Shen, B. Zhang, S. Shen and K. Zhang (Dalian, China) 1272
- DesaLink: solar powered desalination of brackish groundwater giving high output and high
recovery
T.Y. Qiu, O.N. Igobo and P.A. Davies (Birmingham, UK) 1279
- Study of thermophysical properties of a solar desalination system using solar energy
M. Boukhriss, K. Zhani and R. Ghribi (Sfax, Tunisia) 1290

Solar stills

- Desalination and hot water production using solar still enhanced by external solar collector
H. Mousa and M. Abu Arabi (Irbid, Jordan) 1296
- Design and experimental analysis of low-cost heat water solar collectors
E. Cardoso, S. Silva-Martinez, A. Alvarez and J.A. Hernández (Morelos, Mexico) 1302
- Contributing to the improvement of the production of solar still
H.B. Bacha (Alkharj, Saudi Arabia) and K. Zhani (Sfax, Tunisia) 1310
- Novel multiple effect direct solar distillation system of integrated solar still and HDH system
H. Fath, N. Jayswal and A. Qadir (Abu Dhabi, UAE) 1319

Volume 51/7–9

Membrane distillation

- Fabrication of electrospun nanofibrous membranes for membrane distillation application
L. Francis, H. Maab, A. AlSaadi, S. Nunes, N. Ghaffour and G.L. Amy (Thuwal, Saudi Arabia) 1337
- A novel solar-driven air gap membrane distillation system
E.K. Summers and J.H. Lienhard V (Cambridge, USA) 1344
- Membrane distillation properties of TiO₂ ceramic membranes modified by perfluoroalkylsilanes
J. Kujawa, W. Kujawski, S. Koter, K. Jarzynka, A. Rozicka, K. Bajda (Torun, Poland),
S. Cerneaux, M. Persin and A. Larbot (France) 1352
- Effect of temperature difference on performance of membrane crystallization-based membrane
distillation system
Y.-S. Park (Deajeon, Korea), C.-K. Lee, S.-K. Kim, H.-J. Oh (Goyang-Si, Korea), S.-H. Lee
(Seoul, Korea) and J.-S. Choi (Goyang-Si, Korea) 1362
- An assessment of the cleaning solutions' purification by membrane filtration
I. Kowalska (Wroclaw, Poland) 1366

Modeling/Simulation

Multi-dimensional simulation tool development for the performance evaluation of a CDI electrode and its geometry parameter optimization B.G. Jeon and H.C. NO (Daejeon, Korea).....	1377
Flow transport modelling of feed species (water and salt) through a seawater RO membrane A.H. Hashim (Manama, Bahrain).....	1385
Modeling in TRNSYS of a single effect evaporation system powered by a Rankine cycle S. Casimiro (Lisbon, Portugal), C. Ioakimidis (Bilbao, Spain), J. Mendes and M. Giestas (Lisbon, Portugal)	1405
Optimization coupling RO desalination unit to renewable energy by genetic algorithms T. Ben M'Barek, K. Bourouni and K.B. Ben Mohamed (Tunis, Tunisia).....	1416
Numerical simulation of the adsorption process of copper for phosphoric acid purification S. Zermane and A.-H. Meniai (Constantine, Algeria).....	1429
Modeling and simulation of wind energy chain conversion S. Bellarbi, N. Kasbadji merzouk, A. Malek and C. Larbes (Algeria)	1434
Uncertainty analysis of COP prediction in a water purification system integrated into a heat transformer using several artificial neural networks J.A. Hernández (Cuernavaca, México) and D. Colorado (Coatzacoalcos, Mexico)	1443
Modeling of phosphoric acid purification contaminated by magnesium and cadmium N. Boulkroune, A.H. Meniai, W. Louaer and K. Bitchikh (Constantine, Algeria)	1457
Geochemical modeling of groundwater in the El Eulma area, Algeria L. Belkhiri (Batna, Algeria) and L. Mouni (Bouira, Algeria)	1468
Modeling, simulation and experimental validation of a pad humidifier used in solar desalination process K. Zhani (Sfax, Tunisia) and H. Ben Bacha (Alkharj, Saudi Arabia)	1477
A CO ₂ -PENS model of methods and costs for treatment of water extracted during geologic carbon sequestration E.J. Sullivan, S. Chu, P.H. Stauffer and R.J. Pawar (Los Alamos, USA)	1487
Simplified residence time prediction models for constructed wetland water recycling systems X. Wei (Columbus, USA), X. Wang, B. Dong (Wuhan, China), X. Li (Guilin, China), A.K. Plappally (Cambridge, USA), Z. Mao (Wuhan, China) and L.C. Brown (Columbus, USA).....	1494
Numerical simulation of forced convective evaporation in thermal desalination units with vertical tubes R. Kouhikamali, B. Hassanpour and K. Javaherdeh (Rasht, Iran)	1503
Simulation of a giant MSF recirculation plants A.K. El-Feky (Inshas, Egypt).....	1511

Water treatment and reuse

Design and start-up experiences of 19,000 m ³ /d Camp de Tarragona-Vilaseca Water Reclamation Plant B. Salgado, K. Majamaa, J. Sanz and J. Molist (Spain)	1519
Electrochemical decolourisation of cotton dye baths for reuse purposes: a way to reduce salinity of the textile wastewater V. López-Grimau, C. Gutiérrez, M. Sala and M. Crespi (Terrassa, Spain)	1527
Pollution loads and surface water quality in the Kızılırmak Basin, Turkey S.Ç. Ayaz, Ö. Aktaş, S. Dağlı, C. Aydoğan, E. Atasoy Aytış (Kocaeli, Turkey) and L. Akça (Ankara, Turkey).....	1533
The performance of a fixed-bed treatment system packed with layered textiles for their filtration/adsorption potential for salt and organic pollutant A. Ojstršek and D. Fakin (Maribor, Slovenia).....	1543
Optimization of system for thermal treatment of chlorine water V. Nikulshin (Odessa, Ukraine)	1549

Wastewater

Direct sludge filtration: sustainable municipal wastewater treatment H. Futselaar, P. van Lierop and R. Borgerink (AS Enschede, The Netherlands).....	1554
Characterisation of foulants in membrane filtration of biorefinery effluents T. Handelsman (Sydney, Australia), T. Nguyen (Melbourne, Australia), M. Vukas, G. Barton, H. Coster (Sydney, Australia), F. Roddick (Melbourne, Australia) and J. Kavanagh (Sydney, Australia).....	1563
A simple model for secondary clarifier: application to wastewater treatment plant Z. Bakiri and S. Nacef (Setif, Algeria).....	1571
Removal of aromatic hydrocarbons (BTX) in anoxic and anaerobic wastewater treatment processes B. Mrowiec, M. Kuglarz and L. Przywara (Bielsko-Biala, Poland).....	1577
Optimization of removal of colour and organic pollutants from textile wastewater treated with UV/H ₂ O ₂ adopting the Plackett–Burman factorial design D. Fakin and A. Ojstršek (Maribor, Slovenia).....	1584
Coagulation enhancement of nonylphenol ethoxylate by partial oxidation using zero-valent iron/hydrogen peroxide S.-S. Chen, N.C. Nguyen, Y.-M. Chen (Taipei, Taiwan) and C.-W. Li (Taipei, Taiwan).....	1590
HF wastewater remediation by electrocoagulation process S. Aoudj (Merveilles, Algeria), A. Khelifa (Blida, Algeria), N. Drouiche and M. Hecini (Merveilles, Algeria).....	1596
Evaluation of possibility of textile dye removal from wastewater by aqueous two-phase extraction D.Z. Ivetic, M.B. Sciban, V.M. Vasic, D.V. Kukic, J.M. Prodanovic and M.G. Antov (Novi Sad, Serbia).....	1603
Modeling of cavitation as an advanced wastewater treatment M. Capocelli, M. Prisciandaro (L'Aquila, Italy), A. Lancia (Napoli, Italy) and D. Musmarra (Italy).....	1609
Wastewater reuse by means of UF membrane process: a comparison with Italian provisions G. Mazziotti di Celso (Italy) and M. Prisciandaro (L'Aquila, Italy).....	1615
Analysis and design of a pilot system for the treatment of industrial wastewaters using membrane processes C.A. Espinoza, A.G. Gotor and S.O.P. Báez (Las Palmas, Spain).....	1623
Removal of phosphate from Eshidiya industrial wastewater by sedimentation and enhanced sedimentation S. Emeish (Assalt, Jordan), M.K. Abu-Arabi and B.I. Hudaib (Irbid, Jordan).....	1629
Chloride removal from Eshidiya phosphate mining wastewater M.K. Abu-Arabi (Irbid, Jordan), S. Emeish (Assalt, Jordan) and B.I. Hudaib (Irbid, Jordan).....	1634

Contaminant removal

Turbidity and pH dissipations in a dosage of high concentration NaOH solution to seawater V. Kesler, D. Hasson, H. Shemer, R. Semiat (Haifa, Israel), C. Bartels (Oceanside, USA) and M. Wilf (San Diego, USA).....	1641
A new, energy-efficient approach for boron removal from SWRO plants O. Nir (Haifa, Israel), M. Herzberg and O. Lahav (Haifa, Israel).....	1651
Concentrations of PCBs and heavy metals in water of the dam reservoir and use of pre-hydrolyzed coagulants to micropollutants removal from surface water A. Rosińska and L. Dąbrowska (Czstochowa, Poland).....	1657
Association of dissolved air flotation (DAF) with microfiltration for cyanobacterial removal in water supply P.A.P.d. Amaral, L.A. Coral, M.E. Nagel-Hassemer, T.J. Belli and F.R. Lapolli (Florianópolis, Brazil).....	1664
Cesium (Cs) and strontium (Sr) removal as model materials in radioactive water by advanced reverse osmosis membrane T. Sasaki, J. Okabe, M. Henmi, H. Hayashi and Y. Iida (Shiga, Japan).....	1672

Removal of nonionic surfactant from electroplating wastewater by fluidized zerovalent iron with two oxidants ($H_2O_2/Na_2S_2O_8$) S.-S. Chen, H.-T. Hsu, H.-J. Tsui and Y.-M. Chang (Taipei, Taiwan).....	1678
Removal of copper II present in phosphoric acid using Algerian dates' stones as solid support S. Zermane and A.-H. Meniai (Constantine, Algeria).....	1685
Biosorption of lead from aqueous solution by biologically activated date pedicels: batch and column study H. Yazid, L. Amour, A. Terkmani and R. Maachi (Bab Ezzouar, Algeria).....	1690
Application of the catalytic properties of methionine to the determination of Bi(III) as well in the presence of Cu(II) ions at low levels by square wave voltammetry A. Nosal-Wiercińska, M. Grochowski (Lublin, Poland), S. Skrzypek and D. Guziejewski (Łódź, Poland).....	1700
Removal of bromide ions from an aqueous solution by Donnan dialysis with anion-exchange membranes S. Łakomska and J. Wiśniewski (Wrocław, Poland).....	1705
Factorial experimental design for optimizing the removal of lead ions from aqueous solutions by cation exchange resin D. Kavak, M. Demir, B. Başsayel and A.S. Anagün (Meselik, Turkey).....	1712
Removal of lead from aqueous solutions by precipitation: statistical analysis and modeling D. Kavak (Meselik, Turkey).....	1720
Removal of nitrate from JUST wastewater effluent: a case study S. Al-Asheh, A. Al-Zoubi and H. Malas (Irbid, Jordan).....	1727
Study of the removal of residual aluminum through the biopolymers carboxymethylcellulose, chitin, and chitosan M.Á. Lobo-Recio (Araranguá, Brazil), F.R. Lapolli, T.J. Belli, C.T. Folzke and R.R.Z. Tarpani (Florianópolis, Brazil).....	1735
Corrosion/Water, oil and gas	
Corrosion and corrosion management investigations in seawater reverse osmosis desalination plants N. Larché (Brest, France), P. Dézerville (Saint-Maurice, France) and D. Le Flour (Brest, France).....	1744
Dynamic cross-flow filtration of oilfield produced water by rotating ceramic filter discs M. Ebrahimi, O. Schmitz, S. Kerker (Giessen, Germany), F. Liebermann (Rain/Lech, Germany) and P. Czermak (Giessen, Germany).....	1762
Industrial case studies in the petrochemical and gas industry in Qatar for the utilization of industrial waste heat for the production of fresh water by membrane desalination M. Khraisheh, F. Benyahia and S. Adham (Doha, Qatar).....	1769
Pretreatment/Post-treatment	
NOM characterization by LC-OCD in a SWRO desalination line F.X. Simon, Y. Penru, A.R. Guastalli, S. Esplugas, J. Llorens (Barcelona, Spain) and S. Baig (France).....	1776
Ceramic membrane as a pretreatment for reverse osmosis: interaction between marine organic matter and metal oxides L. Dramas and J.-P. Croué (Thuwal, Saudi Arabia).....	1781
Post-treatment of desalinated water and water quality characteristics in Yanbu Industrial City A.S. Bajahlan and J.-M. Wie (Yanbu Al-Sinaiyah, Saudi Arabia).....	1790
SWRO pre-treatment design using high-rate dissolved air flotation including preliminary pilot-scale results T. Amato (Birmingham, UK), K.-S. Park, W. Yim and T. Kim (Seoul, Korea).....	1804
Advantages obtained through the elimination of chemical products in the pre-treatment process of large desalination plants for the control of fouling, biofouling and scaling in reverse osmosis membranes A.M. Elguera, S.O. Pérez-Báez and A. Gómez-Gotor (Las Palmas, Spain).....	1817

Pre-treatment of Llobregat River raw water through pressurised inside/out hollow fibre ultrafiltration membranes O. Ferrer, X. Serrallach (Spain), F. Horváth (Enschede, The Netherlands), J. Mesa (Barcelona, Spain), O. Gibert and X. Bernat (Spain).....	1831
Performance of a sand filter in removal of algal bloom for SWRO pre-treatment S. Plantier, J.-B. Castaing, N.-E. Sabiri, A. Massé, P. Jaouen and M. Pontié (France).....	1838
New range of natural products for pre-treatment of water desalination plants N. Adroer, E. Cortada and J. Ruiz (Barcelona, Spain).....	1847
Characterization of biofilm bacteria isolated from two distinct seawater reverse osmosis systems in Saudi Arabia M.O. Saeed (Al-Jubail, Saudi Arabia), W.L. Teng (Singapore), I.A. Al-Tisan and M.A. Namazi (Al-Jubail, Saudi Arabia).....	1855
Long term experience in the operation of nanofiltration pretreatment unit for seawater desalination at SWCC SWRO plant A.A. Al-Hajouri (Ummlujj, Saudi Arabia), A.S. Al-Amoudi and A.M. Farooque (Jubail, Saudi Arabia).....	1861
The study of environmentally friendly pretreatment system K. Takeuchi (Yokohama, Japan), Y. Ito, K. Tokunaga, M. Nagai (Nagasaki, Japan) and H. Iwahashi (Yokohama, Japan).....	1874
Evaluation of a novel double-layer biological aerated filter (BAF) for drinking water bio-pretreatment: comparison with a single-layer BAF M. Han, Z.-w. Zhao, W. Gao, J. Liu and F.-y. Cui (Harbin, China).....	1881
Cogeneration/hybrid	
Preliminary thermoeconomic analysis of combined parabolic trough solar power and desalination plant in port Safaga (Egypt) J. Blanco, P. Palenzuela, D. Alarcón-Padilla, G. Zaragoza and M. Ibarra (Almeria, Spain).....	1887
The performance investigation of a temperature cascaded cogeneration system equipped with adsorption desalination unit A. Myat (Singapore), K. Thu, Y.D. Kim (Thuwal, Saudi Arabia) and N.K. Choon (Singapore).....	1900
Thermodynamic analysis of a cogeneration gas turbine and desalination plant A. Al Zahrani, J. Orfi, H. Al Ansary, B. Salim and Z. Al Suhaibani (Riyadh, Saudi Arabia).....	1908
The performance of a temperature cascaded cogeneration system producing steam, cooling and dehumidification A. Myat (Singapore), K. Thu, Y.-D. Kim (Thuwal, Saudi Arabia) and N.K. Choon (Singapore).....	1915
More	
Recovery of solved salts of the liquid effluents from the manufacture of cured hams: preliminary study J.M. Arnal, B. García-Fayos, M. Sancho and M.C. Leon-Hidalgo (Valencia, Spain).....	1922
Desalination of saline water with single and combined adsorbents A. Aghakhani, S.-F. Mousavi and B. Mostafazadeh-Fard (Isfahan, Iran).....	1928
Chemical analysis of distilled water: a case study N.S. Al-Deffeeri (Ardia, Kuwait).....	1936
Coagulation activity of spray dried salt extracted <i>Moringa oleifera</i> T.A. Mohammad, E.H. Mohamed (Serdang, Malaysia), M.J.M.M Noor (Malaysia) and A.H. Ghazali (Serdang, Malaysia).....	1941
Effect of the packaging and storage conditions on the coagulation activity of spray-dried salt-extracted <i>Moringa oleifera</i> M.J.M.M. Noor (Kuala Lumpur, Malaysia), E.H. Mohamed, T.A. Mohammad and A.H. Ghazali (Serdang, Malaysia).....	1947
Biosorption of Cu ²⁺ in a packed bed column by almond shell: optimization of process variables M.C. de Hoces, G.B. García, A.R. Gálvez, A.E. Álvarez and M.Á. Martín-Lara (Granada, Spain).....	1954

Evaporation of water/ammonia binary liquid film by mixed convection inside isothermal vertical plates A.B. Mohamed (Monastir, Tunisia) and J. Orfi (Riyadh, Saudi Arabia)	1966
Slip flow effect on laminar convection inside micro-tubes with permeable walls N. Loussif (Monastir, Tunisia), J. Orfi (Riyadh, Saudi Arabia) and A. Omri (Gafsa, Tunisia)	1973
Optimization of AC impedance test cell for accelerated evaluation of marine industrial coating in Kuwait A. Husain and M. Al Madaj (Safat, Kuwait)	1980
Biosorption of nickel using unmodified and modified lignin extracted from agricultural waste A.E. Okoronkwo and S.J. Olusegun (Akure, Nigeria)	1989