IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 1, April 2022
Impact Factor: 6.252

Use of Electrocoagulation for Waste Water Treatment

Jyoti Sangle[1], Aditya Parmar[2], Yash Thakkar[3], Mannav Shah[4], Sakshi Kokane[5],
Lecturer, Department of Chemical Engineering[1]
Students, Department of Chemical Engineering[2,3,4,5]
Shri Bhagubhai Mafatlal Polytechnic, Mumbai, Maharashtra, India

Abstract: *The electrocoagulation (EC) process is an electrochemical means of introducing coagulants and removing suspended solids, colloidal material, and metals, as well as other dissolved solids from water and wastewaters. The EC process has been successfully employed in removing pollutants, pesticides, and radionuclides. This process also removes harmful microorganisms. More often during EC operation, direct current is applied and electrode plates are sacrificed (dissolved into solution). The dissolution causes an increased metal concentration in the solution that finally precipitates as oxide precipitates. Due to improved process design and material of construction, the EC process is being widely accepted over other physicochemical processes.*

Keywords: Waste Water Treatment, Electrocoagulation, Electrolysis, COD

REFERENCES

[1]. K. Dermentzis, A. Christoforidis, E. Valsamidou, A. Lazaridou, and N. Kokkinos, Removal of Hexavalent Chromium From Electroplating Wastewater By Electrocoagulation With Iron Electrodes,‖ Glob. NEST J., vol. 13, no. 4, pp. 412–418, 2011.
[2]. L. Wei, S. Guo, G. Yan, C. Chen, and X. Jiang, Electrochemical pretreatment of heavy oil refinery wastewater using a three-dimensional electrode reactor,‖ Electrochim. Acta, vol. 55, no. 28, pp. 8615– 8620, 2010.
[3]. S. Zodi, O. Potier, F. Lapicque, and J. P. Leclerc, Treatment of the industrial wastewaters by electrocoagulation: Optimization of coupled electrochemical and sedimentation processes,‖ Desalination, vol. 261, no. 1–2, pp. 186–190, 2010.
[4]. I. Zongo et al., Electrocoagulation for the treatment of textile wastewaters with Al or Fe electrodes: Compared variations of COD levels, turbidity and absorbance,‖ J. Hazard. Mater., vol. 169, no. 1–3, pp. 70–76, 2009.
[5]. J. P. Kushwaha, V. C. Srivastava, and I. D. Mall, Organics removal from dairy wastewater by electrochemical treatment and residue disposal,‖ Sep. Purif. Technol., vol. 76, no. 2, pp. 198–205, 2010.
[6]. B. M. Krishna, U. N. Murthy, B. Manoj Kumar, and K. S. Lokesh, Electrochemical pretreatment of distillery wastewater using aluminum electrode,‖ J. Appl. Electrochem., vol. 40, no. 3, pp. 663–673, 2010.
[7]. R. Farshi, S. Priya, and M. B. Saidutta, Reduction of Color and COD of Anaerobically Treated Distillary Wastewater by Electrochemical Method,‖ no. Ncwse, pp. 168–171, 2013.
[8]. M. J. K. Bashir et al., Landfill leachate treatment by electrochemical oxidation.,‖ Waste Manag., vol. 29, no. 9, pp. 2534–41, 2009.
[9]. P. B. Moraes and R. Bertazzoli, Electrodegradation of landfill leachate in a flow electrochemical reactor,‖ Chemosphere, vol. 58, no. 1, pp. 41–46, 2005.
[10]. S. Koshle, M. Sahana, A. Sulthana, S. Nanjunda Swamy, and S. Mahesh, Groundwater defluoridation by combined electrochemical coagulation and fungal biosorption process-part a groundwater preliminary treatment by batch electrochemical coagulation,‖ Int. J. ChemTech Res., vol. 8, no. 3, pp. 1064–1074, 2015.
[11]. V. Kuokkanen, T. Kuokkanen, J. Rämö, and U. Lassi, Recent Applications of Electrocoagulation in Treatment of Water and Wastewater—A Review,‖ Green Sustain. Chem., vol. 3, no. 2, pp. 89–121, 2013.
[12]. I. Linares-Hernández, C. Barrera-Díaz, G. Roa-Morales, B. Bilyeu, and F. Ureña-Núñez, Influence of the anodic material on electrocoagulation performance,‖ Chem. Eng. J., vol. 148, no. 1, pp. 97–105, 2009.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 1, April 2022
Impact Factor: 6.252

[13]. M. Y. Mollah, R. Schennach, J. R. Parga, and D. L. Cocke, Electrocoagulation (EC) science and applications.,‖ J. Hazard. Mater., vol. 84, no. 1, pp. 29–41, 2001.

[14]. V. Khandegar and A. K. Saroha, Electrocoagulation for the treatment of textile industry effluent - A review,‖ J. Environ. Manage., vol. 128, pp. 949–963, 2013.

[15]. V. Khandegar and A. K. Saroha, ―Electrochemical treatment of distillery spent wash using aluminum and iron electrodes,‖ Chinese J. Chem. Eng., vol. 20, no. 3, pp. 439–443, 2012.

[16]. K. Thella, B. Verma, V. C. Srivastava, and K. K. Srivastava, ―Electrocoagulation study for the removal of arsenic and chromium from aqueous solution.,‖ J. Environ. Sci. Health. A. Tox. Hazard. Subst. Environ. Eng., vol. 43, no. 5, pp. 554–562, 2008.

[17]. M. A. Zazouli and M. Taghavi, ―Phenol Removal from Aqueous Solutions by Electrocoagulation Technology Using Iron Electrodes:Effect of Some Variables,‖ J. Water Resour. Prot., vol. 4, no. 11, pp. 980–983, 2012.

[18]. G. Chen, Electrochemical technologies in wastewater treatment,‖ Sep. Purif. Technol., vol. .38, no. 1, pp. 11–41, 2004.

[19]. S. Vasudevan, S. M. Sheela, J. Lakshmi, and G. Sozhan, Optimization of the process parameters for the removal of boron from drinking water by electrocoagulation - A clean technology,‖ J. Chem. Technol. Biotechnol., vol. 85, no. 7, pp. 926–933, 2010.

[20]. N. Tyagi, S. Mathur, and D. Kumar, Electrocoagulation process for textile wastewater treatment in continuous upflow reactor, vol. 73, no. 3. 2014.

[21]. F. Akbal and S. Camcidotless, Copper, chromium and nickel removal from metal plating wastewater by electrocoagulation,‖ Desalination, vol. 269, no. 1–3, pp. 214–222, 2011. Bharath M et al /International Journal of ChemTech Research, 2018,11(03): 289-302. 301

[22]. R. Katal and H. Pahlavanzadeh, ―Influence of different combinations of aluminum and iron electrode on electrocoagulation efficiency: Application to the treatment of paper mill wastewater,‖ Desalination, vol. 265, no. 1–3, pp. 199–205, 2011.

[23]. M. Kobya, F. Ulu, U. Gebologlu, E. Demirbas, and M. S. Oncel, Treatment of potable water containing low concentration of arsenic with electrocoagulation: Different connection modes and Fe-Al electrodes,‖ Sep. Purif. Technol., vol. 77, no. 3, pp. 283–293, 2011.

[24]. M. Kobya, U. Gebologlu, F. Ulu, S. Oncel, and E. Demirbas, Removal of arsenic from drinking water by the electrocoagulation using Fe and Al electrodes,‖ Electrochim. Acta, vol. 56, no. 14, pp. 5060– 5070, 2011.

[25]. M. Kobya, E. Demirbas, N. U. Parlak, and S. Yigit, Treatment of cadmium and nickel electroplating rinse water by electrocoagulation.,‖ Environ. Technol., vol. 31, no. 13, pp. 1471–81, 2010.

[26]. L. E. and J. L. Justin K. Maghanga, Fred K. Segor, ―Electrocoagulation Method for Colour Removal in Tea,‖ Bull. Chem. Soc. Ethiop., vol. 23, no. 3, pp. 371–381, 2009.

[27]. K. S. P. Kalyani, N. Balasubramanian, and C. Srinivasakannan, ―Decolorization and COD reduction of paper industrial effluent using electro-coagulation,‖ Chem. Eng. J., vol. 151, no. 1–3, pp. 97–104, 2009.

[28]. M. Kobya and S. Delipinar, ―Treatment of the baker‘s yeast wastewater by electrocoagulation,‖ J. Hazard. Mater., vol. 154, no. 1–3, pp. 1133–1140, 2008.

[29]. M. Tir and N. Moulai-Mostefa, ―Optimization of oil removal from oily wastewater by electrocoagulation using response surface method,‖ J. Hazard. Mater., vol. 158, no. 1, pp. 107–115, 2008.

[30]. S. Kongjao, S. Damronglerd, and M. Hunsom, ―Simultaneous removal of organic and inorganic pollutants in tannery wastewater using electrocoagulation technique,‖ Korean J. Chem. Eng., vol. 25, no. 4, pp. 703–709, 2008.

[31]. F. Ilhan, U. Kurt, O. Apaydin, and M. T. Gonullu, ―Treatment of leachate by electrocoagulation using aluminum and iron electrodes,‖ J. Hazard. Mater., 2008.

[32]. S. Veli, T. Öztürk, and A. Dimoglo, ―Treatment of municipal solid wastes leachate by means of chemical- and electro-coagulation,‖ Sep. Purif. Technol., vol. 61, no. 1, pp. 82–88, 2008.

[33]. G. Roa-Morales, E. Campos-Medina, J. Aguilera-Cotero, B. Bilyeu, and C. Barrera-Díaz, Aluminum electrocoagulation with peroxide applied to wastewater from pasta and cookie processing,‖ Sep. Purif. Technol., vol. 54, no. 1, pp. 124–129, 2007.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 1, April 2022
Impact Factor: 6.252

[34]. A. A. Bukhari, ―Investigation of the electro-coagulation treatment process for the removal of total suspended solids and turbidity from municipal wastewater,‖ Bioresour. Technol., vol. 99, no. 5, pp. 914–921, 2008.

[35]. M. Kobya, H. Hiz, E. Senturk, C. Aydiner, and E. Demirbas, ―Treatment of potato chips manufacturing wastewater by electrocoagulation,‖ Desalination, vol. 190, no. 1–3, pp. 201– 211, 2006.

[36]. N. N. Rao, K. M. Somasekhar, S. N. Kaul, and L. Szpyrkowicz, ―Electrochemical oxidation of tannery wastewater,‖ J. Chem. Technol. Biotechnol., vol. 76, no. 11, pp. 1124– 1131, 2001.