

Recovery of lactic acid from fermentation broth by two-stage process of nanofiltration and water-splitting electro dialysis

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A two-stage process of nanofiltration and water-splitting electro dialysis was investigated for lactic acid recovery from fermentation broth. In this process, sodium lactate is isolated from fermentation broth in the first stage of nanofiltration, and then it is converted to lactic acid in the second stage of water-splitting electro dialysis. To determine optimum operating conditions for nanofiltration, the effects of pressure, lactate concentration, pH, and impurities were studied. In the case of NTR-729 membrane, lactate rejection was lower than 5 %. Magnesium rejection was about 45 % and calcium rejection was 40 %. In the case of NF45 membrane, lactate rejection was lower than 20 %. Magnesium rejection was about 83 % and calcium rejection was 65 %. Such a high rejection of divalent metal ions in nanofiltration is expected to eliminate or at least minimize the necessity of additional ion exchange step to remove the divalent ions which would otherwise cause a serious membrane fouling in the second stage of water-splitting electro dialysis. In the subsequent water-splitting electro dialysis, both of sodium lactate conversion to lactic acid and sodium hydroxide recovery was about 96 %.