CLAIMS

What is claimed is:

1. A process for filtering a liquid sample, comprising:

   routing a first batch of a liquid sample from a sample container to a first cycling tank;

   upon filling the first cycling tank, routing the first batch of the liquid sample from the first cycling tank to a diafiltration assembly by a continuous diafiltration process that includes routing retentate produced by diafiltration of the first batch of the liquid sample back to the first cycling tank or to a concentration filtration assembly;

   during diafiltration of the first batch of the liquid sample, routing a second batch of the liquid sample from the sample container to a second cycling tank;

   upon filling the second cycling tank, routing the second batch of the liquid sample from the second cycling tank to the diafiltration assembly by the continuous diafiltration process that includes routing retentate produced by diafiltration of the second batch of the liquid sample back to the second cycling tank or to the concentration filtration assembly; and

   continuing to alternate the filling and continuous diafiltration of batches and emptying of the liquid sample between the first and second cycling tanks until a total product volume is processed.
2. The process of Claim 1, wherein the continuous diafiltration process includes a tangential flow filtration (TFF) step.
3. The process of Claim 1, wherein the liquid sample is concentrated prior to being delivered to the first or second cycling tanks.
4. The process of Claim 3, wherein the liquid sample is concentrated using a single-pass tangential flow filtration (SPTFF) process.
5. The process of Claim 1, further comprising alternately routing the retentate from the first and second batches of liquid sample to a holding tank prior to delivering the retentate to the concentration filtration assembly.
6. The process of Claim 1, further comprising alternately filtering the retentate produced by continuous diafiltration of the first batch of the liquid sample and the retentate produced by continuous diafiltration of the second batch of the liquid sample through the concentration filter assembly until a total product volume is recovered.

7. The process of Claim 6, wherein filtering retentate in the concentration filtration assembly includes a single-pass tangential flow filtration (SPTFF) step.
8. The process of Claim 1, further comprising cleaning one of the first and second diafiltration tanks during a continuous diafiltration process at the other of the first and second diafiltration tanks.
9. The process of Claim 1, further comprising flushing the diafiltration assembly during the filling of the first or second diafiltration tank.
10. The process of Claim 1, wherein the continuous diafiltration process is a constant volume diafiltration process.
11. The process of Claim 1, wherein the continuous diafiltration process is an optimum diafiltration process.
12. The process of Claim 1, further comprising routing a third batch of the liquid sample from the sample container to a third cycling tank and alternating the filling and continuous diafiltration of batches of the liquid sample among the first, second, and third cycling tanks until a total product volume is recovered.
13. The process of Claim 12, further comprising routing the third batch of the liquid sample from the third cycling tank to a second diafiltration assembly by a continuous diafiltration process that includes routing retentate produced by continuous diafiltration of the third batch to the liquid sample back to the third cycling tank or to the concentration filtration assembly for product recovery, wherein the diafiltration assemblies are configured to operate in parallel.
14. A system for filtering a liquid sample, comprising:

first and second cycling tanks;

a first valve configured to direct a flow of a liquid sample to the first or second cycling tank;

a continuous diafiltration (CDF) assembly;

a second valve configured to direct a flow of the liquid sample to the CDF assembly from the first or second cycling tank;

a diafiltration pump;

a third valve configured to direct a flow of buffer solution to retentate of the CDF assembly returning to the first or second cycling tank; and

a controller configured to toggle the first valve to alternately direct the liquid sample to one of the first and second cycling tanks while toggling

the second and third valves to direct liquid sample to the CDF assembly from, and buffer solution to the retentate returning to, the other of the first and second cycling tanks through a continuous diafiltration process.

15. The system of Claim 14, wherein the CDF assembly comprises a tangential flow filtration (TFF) assembly.
16. The system of Claim 14, further comprising a single-pass tangential flow filtration (SPTFF) assembly upstream of the first and second diafiltration tanks.
17. The system of Claim 14, further comprising a holding tank downstream of the first and second diafiltration tanks.
18. The system of Claim 14, further comprising a single-pass tangential flow filtration (SPTFF) assembly downstream of the first and second diafiltration tanks.
19. The system of Claim 14, further comprising a third cycling tank, wherein the controller is further configured to cycle batches of the liquid sample among the first, second, and third cycling tanks in the continuous diafiltration process at the CDF assembly.
20. The system of Claim 19, further comprising a second CDF assembly configured to operate in parallel with the first CDF assembly, wherein the controller is further configured to cycle batches of the liquid sample among a first, second, and third cycling tanks in a continuous diafiltration process at both of the CDF assemblies.
21. The system of Claim 14, further comprising a diafiltration buffer tank, the diafiltration pump in fluid communication with the diafiltration tank and the first and second cycling tanks, or a fluid conduit configured to direct retentate to the first and second cycling tanks, wherein the controller is further configured to control a flow rate of the buffer solution at the diafiltration pump.
22. The system of Claim 14, further comprising a feed pump in fluid communication with the first and second cycling tanks and the CDF assembly, wherein the controller is further configured to control a flow rate of the liquid sample at the feed pump.
23. A process for filtering a liquid sample, comprising:

routing a first batch of a liquid sample from a sample container to a first cycling tank;

upon filling the first cycling tank, routing the first batch of the liquid sample from the first cycling tank to a diafiltration assembly by a continuous diafiltration process that includes routing retentate produced by diafiltration of the first batch of the liquid sample back to the first cycling tank or to a product recovery vessel;

during diafiltration of the first batch of the liquid sample, routing a second batch of the liquid sample from the sample container to a second cycling tank;

upon filling the second cycling tank, routing the second batch of the liquid sample from the second cycling tank to the diafiltration assembly by the continuous diafiltration process that includes routing retentate produced by diafiltration of the second batch of the liquid sample back to the second cycling tank or to the product recovery vessel; and

continuing to alternate the filling and continuous diafiltration of batches and emptying of the liquid sample between the first and second cycling tanks until a total product volume is processed.

24. The process of claim 23, wherein the product recovery vessel is a final product container for use by an end user.
25. The system of claim 19, wherein the third cycling tank is a new unit operation.
26. The system of Claim 14, further comprising a diafiltration buffer tank, the diafiltration pump in fluid communication with the diafiltration tank and the first and second cycling tanks, or a fluid conduit configured to direct retentate to the first and second cycling tanks, wherein the controller is further configured to control buffer delivery based on flow rate of the buffer solution at the diafiltration pump, permeate life, optimum diafiltration concentration, or the level of at least one of the cycling tanks.