CLAIMS

1. Method for cleaning a filtration system under operation, said filtration system comprising:

- a cross-flow filtration membrane having:
  - a feed side fed with a feed stream,
  - a permeate side wherein a permeate stream is recovered and
  - a retentate side wherein a retentate stream is recovered,
- a hydraulic circuit Cp connecting the permeate side of said cross-flow filtration membrane to the feed side of said cross-flow filtration membrane, said hydraulic circuit Cp being provided with a valve allowing the recycling of a proportion of the permeate stream to the feed side of said cross-flow filtration membrane, and/or

said method comprising :

- measuring the difference in pressure between the feed side and the permeate side of the membrane, ΔP membrane, and/or measuring the difference in pressure between the feed side and the retentate side of the membrane, ΔP longitudinal,
- injecting an amount of a chemical product into the filtration system which is under operation in the hydraulic circuit Cp or or upstream of said cross-flow filtration membrane when at least one of ΔP membrane and ΔP longitudinal reaches a predetermine value which is 10% higher than ΔP longitudinal initial or ΔP membrane initial,
- setting the proportion of recycled permeate stream or recycled retentate stream collected in the hydraulic circuit Cp with said valve and/or Cr to enable the recycling of a significant amount of unreacted chemical product having passed through said cross-flow filtration membrane to the feed side of said cross-flow filtration membrane,
- a significant amount of unreacted chemical product meaning that said unreacted chemical product is present in the recycled permeate stream at a concentration of at least 70% of initial concentration of chemical product injected into the filtration system.

2. The method according to claim 1, wherein the cross-flow filtration membrane is a microfiltration membrane, an ultrafiltration membrane, a nanofiltration membrane or a reverse osmosis membrane.

3. The method according to claim 1 or claim 2, wherein the cross-flow filtration membrane is a ceramic membrane or an organic membrane.

4. The method according to any one of claims 1 to 3, wherein the chemical product is a biocide, an acid, a base, a cleaning agent such as surfactant agent, a detergent, a complexation agent or a scale dissolver, or a mixture thereof**.**

5. The method according to any one of claims 1 to 4, wherein the proportion $Q_{C\ permeate}$ of recycled permeate stream collected in the hydraulic circuit Cp is at least 10 %, in particular at least 20 % , in particular at least 30 % , in particular at least 40 % , in particular at least 50 % , in particular at least 60 % , in particular at least 70 % , in particular at least 80 % , in particular at least 90 % .

6. A filtration system comprising:

- a cross-flow filtration membrane having:
  - a feed side fed with a feed stream,
  - a permeate side wherein a permeate stream is recovered and
  - a retentate side wherein a retentate stream is recovered,
- a hydraulic circuit Cp connecting the permeate side of said cross-flow filtration membrane to the feed side of said cross-flow filtration membrane, said hydraulic circuit Cp allowing the recycling of a proportion of the permeate stream to the feed side of said cross-flow filtration membrane,
- a reservoir containing a chemical product and said reservoir being connected to the hydraulic circuit Cp or connected upstream of said cross-flow filtration membrane,
- a valve for setting the proportion of recycled permeate stream collected in the hydraulic circuit Cp,

characterized in that said filtration system further comprises:

- a means for measuring the difference in pressure between the feed side and the permeate side of the membrane, ΔP membrane, and/or measuring the

difference in pressure between the feed side and the retentate side of the membrane, ΔP longitudinal,

a means for triggering the injection of the chemical product when at least one of ΔP membrane and ΔP longitudinal reaches a predetermine value which is 10% higher than ΔP longitudinal initial or ΔP membrane initial.

7. The filtration system according to claim 6, wherein the cross-flow filtration membrane is a microfiltration membrane, an ultrafiltration membrane, a nanofiltration membrane or a reverse osmosis membrane.

8. The filtration system according to claim 6 or claim 7, wherein the cross-flow filtration membrane is a ceramic membrane or an organic membrane.

9. The filtration system according to any one of claims 6 to 8, wherein said filtration system further comprises an injector for injecting the chemical product to the hydraulic circuit Cp or upstream of said cross-flow filtration membrane.

10. The filtration system according to any one of claims 6 to 9, wherein the hydraulic circuit Cp comprises a booster pump or an eductor.