the feed stream. The conditioner comprises a component that has a weight average molecular weight of from about 1,000 Daltons to about 10,000,000 Daltons and comprises a water soluble polymer, a polymer of biological origin, or a combination thereof. The conditioner is introduced in the feed stream to increase the detected removal efficiency of the fluorescing substance by the membrane.

[0005a] In one aspect, there is provided a method of conditioning a membrane utilized for water purification, the method comprising: monitoring membrane performance during water purification via fluorometric measurement of a fluorescing substance present in a feed stream and at least one of a permeate stream and a reject stream to detect removal efficiency of the fluorescing substance; and introducing a conditioner comprising a component having a weight average molecular weight of from about 1,000 Daltons to about 10,000,000 Daltons into the feed stream, the component comprising a water soluble polymer, a polymer of biological origin, or a combination thereof, to increase the detected removal efficiency of the fluorescing substance by the membrane, wherein the component comprises a polymer of biological origin, wherein the polymer of biological origin comprises cellulose, methyl cellulose, polymethylcellulose, cellulose ether, or a combination thereof.

[0006] In another embodiment, the method comprises monitoring membrane performance during water purification via fluorometric measurement of a fluorescing substance present in a feed stream and at least one of a permeate stream and a reject stream. The monitoring allows for the detection of removal efficiency of the fluorescing substance. A conditioner is introduced into the feed stream. The conditioner comprises a precursor that is reacted to form a water soluble polymer that has a weight average molecular weight of from about 1,000 Daltons to about 10,000,000 Daltons. The conditioner is introduced in the feed stream and reacted to increase the detected removal efficiency of the fluorescing substance by the membrane.

[0007] In yet another embodiment, the method comprises monitoring membrane performance during water purification via fluorometric measurement of a fluorescing substance present in a feed stream and at least one of a permeate stream and a reject stream. The monitoring allows for the detection of removal efficiency of the fluorescing substance. The detected removal efficiency is compared to a control criterion to determine whether the control criterion is met. If the detected removal efficiency does not meet the control criterion, a conditioner is introduced into the feed stream. The conditioner comprises a component that has a weight average molecular weight of from about 1,000 Daltons to about

10,000,000 Daltons and comprises a water soluble polymer, a polymer of biological origin, or a combination thereof. The conditioner is introduced in the feed stream to increase the detected removal efficiency of the fluorescing substance by the membrane.

[0007a] In another aspect, there is provided a method of conditioning a membrane utilized for water purification, the method comprising: monitoring membrane performance during water purification via fluorometric measurement of a fluorescing substance present in a feed stream and at least one of a permeate stream and a reject stream to detect removal efficiency of the fluorescing substance; determining whether the detected removal efficiency meets a control criterion; and if the detected removal efficiency does not meet the control criterion, introducing a conditioner comprising a component having a weight average molecular weight of from about 1,000 Daltons to about 10,000,000 Daltons into the feed stream, the component comprising a polymer of biological origin, wherein the polymer of biological origin comprises cellulose, methyl cellulose, polymethylcellulose, cellulose ether, or a combination thereof, to return the detected removal efficiency to meet the control criterion.

[0008] In a further embodiment, the method comprises circulating a blend comprising water, a component having a weight average molecular weight of from about 1,000 Daltons to about 10,000,000 Daltons and a fluorescing substance through the membrane, which is done to improve removal efficiency of the fluorescing substance by the membrane. The component comprises a water soluble polymer, a precursor of a water soluble polymer, a polymer of biological origin, or a combination thereof. Membrane performance is monitored via fluorometric measurement during the circulation of the blend by detecting removal efficiency of the fluorescing substance by the membrane. The blend is circulated through the

membrane until a control criterion of membrane performance is met. The method may further comprise purifying water using the membrane after the circulation of the blend has been stopped.

[0008a] In a further aspect, there is provided a method of conditioning a membrane utilized for water purification, the method comprising: circulating a blend comprising water, a component having a weight average molecular weight of from about 1,000 Daltons to about 10,000,000 Daltons and a fluorescing substance through the membrane to improve removal efficiency of the fluorescing substance by the membrane, the component comprising a water soluble polymer, a polymer of biological origin, or a combination thereof; monitoring membrane performance via fluorometric measurement during the circulation of the blend by detecting removal efficiency of the fluorescing substance by the membrane; and circulating the blend until a control criterion of membrane performance is met, wherein the component comprises a polymer of biological origin, wherein the polymer of biological origin comprises cellulose, methyl cellulose, polymethylcellulose, cellulose ether, or a combination thereof.

[0008b] In another aspect, there is provided the use of a conditioner comprising a component having a weight average molecular weight of from about 1,000 Daltons to about 10,000,000 Daltons, the component comprising a polymer of biological origin, wherein the polymer of biological origin comprises cellulose, methyl cellulose, polymethylcellulose, cellulose ether, or a combination thereof, in combination with monitoring membrane performance during water purification via fluorometric measurement.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. 1 is a bar graph of the results of the Example provided herein.

DETAILED DESCRIPTION

[0010] Methods of conditioning a membrane utilized for water purification are provided. In an embodiment, the method comprises monitoring membrane performance during water purification via fluorometric measurement of a fluorescing substance present in a feed stream and at least one of a permeate stream and a reject stream. The monitoring allows for the detection of removal efficiency of the fluorescing substance. A conditioner is introduced into the feed stream. The conditioner comprises a component that has a weight average molecular weight of from about 1,000 Daltons to about 10,000,000 Daltons and comprises a water soluble polymer, a polymer of biological origin, or a combination thereof. The conditioner is

introduced in the feed stream to increase the detected removal efficiency of the fluorescing substance by the membrane.

[0011] In another embodiment, the method comprises monitoring membrane performance during water purification via fluorometric measurement of a fluorescing substance present in a feed stream and at least one of a permeate stream and a reject stream. The monitoring allows for the detection of removal efficiency of the fluorescing substance. A conditioner is introduced into the feed stream. The conditioner comprises a precursor that is reacted to form a water soluble polymer that has a weight average molecular weight of from about 1,000 Daltons to about 10,000,000 Daltons. The conditioner is introduced in the feed stream and reacted to increase the detected removal efficiency of the fluorescing substance by the membrane.

[0012] In yet another embodiment, the method comprises monitoring membrane performance during water purification via fluorometric measurement of a fluorescing substance present in a feed stream and at least one of a permeate stream and a reject stream. The monitoring allows for the detection of removal efficiency of the fluorescing substance. The detected removal efficiency is compared to a control criterion to determine whether the control criterion is met. If the detected removal efficiency does not meet the control criterion,

CLAIMS

What is claimed is:

1. A method of conditioning a membrane utilized for water purification, the method comprising:

monitoring membrane performance during water purification via fluorometric measurement of a fluorescing substance present in a feed stream and at least one of a permeate stream and a reject stream to detect removal efficiency of the fluorescing substance; and

introducing a conditioner comprising a component having a weight average molecular weight of from about 1,000 Daltons to about 10,000,000 Daltons into the feed stream, the component comprising a water soluble polymer, a polymer of biological origin, or a combination thereof, to increase the detected removal efficiency of the fluorescing substance by the membrane,

wherein the component comprises a polymer of biological origin, wherein the polymer of biological origin comprises cellulose, methyl cellulose, polymethylcellulose, cellulose ether, or a combination thereof.

2. A method of conditioning a membrane utilized for water purification, the method comprising:

monitoring membrane performance during water purification via fluorometric measurement of a fluorescing substance present in a feed stream and at least one of a permeate stream and a reject stream to detect removal efficiency of the fluorescing substance;

determining whether the detected removal efficiency meets a control criterion; and

if the detected removal efficiency does not meet the control criterion, introducing a conditioner comprising a component having a weight average molecular weight of from about 1,000 Daltons to about 10,000,000 Daltons into the feed stream, the component comprising a polymer of biological origin, wherein the polymer of biological origin comprises cellulose, methyl cellulose, polymethylcellulose, cellulose ether, or a combination thereof, to return the detected removal efficiency to meet the control criterion.

3. A method of conditioning a membrane utilized for water purification, the method comprising:

circulating a blend comprising water, a component having a weight average molecular weight of from about 1,000 Daltons to about 10,000,000 Daltons and a fluorescing substance through the membrane to improve removal efficiency of the fluorescing substance by the membrane, the component comprising a water soluble polymer, a polymer of biological origin, or a combination thereof;

monitoring membrane performance via fluorometric measurement during the circulation of the blend by detecting removal efficiency of the fluorescing substance by the membrane; and

circulating the blend until a control criterion of membrane performance is met,

wherein the component comprises a polymer of biological origin, wherein the polymer of biological origin comprises cellulose, methyl cellulose, polymethylcellulose, cellulose ether, or a combination thereof.

4. The method of claim 3, further comprising purifying water using the membrane after the circulation of the blend has been stopped.

5. The method of any one of claims 1 through 4, wherein the membrane is nonporous, and/or wherein the membrane is a nanofiltration membrane, a reverse osmosis membrane, or a combination thereof.

6. The method of any one of claims 1 through 5, wherein the component and the fluorescing substance are a single composition.

7. The method of any one of claims 1 through 6, wherein the membrane performance is monitored via fluorometric measurement of the feed stream, the permeate stream, and the reject stream.

8. The method of any one of claims 1 through 7, wherein the membrane system performance is monitored via fluorometric measurements of the feed stream and the permeate stream.

9. The method of any one of claims 1 through 8, wherein the membrane system performance is monitored via fluorometric measurement of the feed stream and the reject stream.

10. Use of a conditioner comprising a component having a weight average molecular weight of from about 1,000 Daltons to about 10,000,000 Daltons, the component comprising a polymer of biological origin, wherein the polymer of biological origin comprises cellulose, methyl cellulose, polymethylcellulose, cellulose ether, or a combination thereof, in combination with monitoring membrane performance during water purification via fluorometric measurement.