CLAIMS

1. A methane fermentation pretreatment apparatus used for pretreatment before a methane fermentation treatment is performed on organic waste, the apparatus comprising:

a solubilization tank in which a solubilization treatment is performed on the organic waste;

a screen that is a first solid-liquid separator through which a solubilized liquid obtained by performing a solubilization treatment in the solubilization tank on the organic waste is passed to remove a first unsuitable waste for fermentation from the solubilized liquid; and

a second liquid-solid separator having a hydrocyclone that receives the solubilized liquid passed through the screen and centrifugalizes the solubilized liquid to separate a second unsuitable waste for fermentation from the solubilized liquid, and a drainage device that receives and dehydrates the second unsuitable waste for fermentation separated by the hydrocyclone.

2. The methane fermentation pretreatment apparatus according to Claim 1, further comprising:

a re-solubilization tank that receives the solubilized liquid separated by the hydrocyclone and performs a solubilization treatment on the solubilized liquid, wherein part of the solubilized liquid is returned from the re-solubilization tank to the solubilization tank.

3. The methane fermentation pretreatment apparatus according to Claim 1 or 2,

further comprising:

a dehydrator that receives and dehydrates the first unsuitable waste for fermentation removed by the screen that is the first solid-liquid separator, and a third unsuitable waste for fermentation removed by the second solid-liquid separator.

4. The methane fermentation pretreatment apparatus according to any one of Claims 1 to 3, further comprising:

a crushing pump provided between the solubilization tank and the screen,

wherein the driving of the crushing pump causes the solubilized liquid to be fed to the screen while being crushed from the solubilization tank, and causes part of the solubilized liquid to be returned from the crushing pump to the solubilization tank or from the screen to the solubilization tank.

5. The methane fermentation pretreatment apparatus according to any one of Claims 1 to 3, wherein the solubilization tank includes:

a solubilization section that receives and solubilizes the organic waste, and an adjustment section that makes a solubilized liquid obtained by performing a solubilization treatment on the organic waste in the solubilization section overflow from the solubilization section, and receives the solubilized liquid, and

wherein a crushing pump is provided to suction the solubilized liquid within the solubilization section by the driving of the crushing pump and returns the solubilized liquid to the solubilization section while crushing the solubilized liquid by the driving of the crushing pump.

6. The methane fermentation pretreatment apparatus according to any one of

Claims 1 to 5,

wherein the drainage device includes a gravity separator that receives the second unsuitable waste for fermentation separated by the hydrocyclone as a sedimentary unsuitable waste concentrated liquid, and further gravitationally precipitates the second unsuitable waste for fermentation to concentrate the unsuitable waste again, a concentrated liquid fixed-amount discharger that discharges the sedimentary unsuitable waste concentrated liquid in a fixed amount from the hydrocyclone to the gravity separator discharger, and an unsuitable waste discharger that receives the second unsuitable waste for fermentation concentrated again by the gravity separator within a pipe, and conveys and discharges the unsuitable waste using a blade that moves inside the pipe.

7. The methane fermentation pretreatment apparatus according to Claim 6,

wherein a brush for scooping up and conveying the second unsuitable waste for fermentation within the pipe is attached to the blade of the unsuitable waste discharger.

CLAIMS

1. A methane fermentation pretreatment apparatus used for pretreatment before a methane fermentation treatment is performed on organic waste, the apparatus comprising:

a solubilization tank in which a solubilization treatment is performed on the organic waste;

a screen that is a first solid-liquid separator through which a solubilized liquid obtained by performing a solubilization treatment in the solubilization tank on the organic waste is passed to remove a first unsuitable waste for fermentation from the solubilized liquid; and

a second liquid-solid separator having a hydrocyclone that receives the solubilized liquid passed through the screen and centrifugalizes the solubilized liquid to separate a second unsuitable waste for fermentation from the solubilized liquid, and a drainage device that receives and dehydrates the second unsuitable waste for fermentation separated by the hydrocyclone,

wherein the drainage device includes:

a gravity separator that receives the second unsuitable waste for fermentation separated by the hydrocyclone as a sedimentary unsuitable waste concentrated liquid, and further gravitationally precipitates the second unsuitable waste for fermentation to concentrate the unsuitable waste again;

a concentrated liquid fixed-amount discharger that discharges the sedimentary unsuitable waste concentrated liquid in a fixed amount from the hydrocyclone to the gravity separator discharger;

an unsuitable waste discharger that receives the second unsuitable waste for fermentation concentrated again by the gravity separator within a pipe, and conveys and discharges the unsuitable waste using a blade that moves inside the pipe; and

a drainage port that drains a liquid component of the sedimentary unsuitable waste concentrated liquid by overflow, and

wherein the pipe of the unsuitable waste discharger is arranged over different heights, and a discharge port of the unsuitable waste discharger is arranged at least at a position higher than an overflow position of the drainage port of the drainage device, and

wherein the liquid component drained from the drainage port of the drainage device is returned to the solubilization tank.

2. The methane fermentation pretreatment apparatus according to Claim 1, further

comprising:

a re-solubilization tank that receives the solubilized liquid separated by the hydrocyclone and performs a solubilization treatment on the solubilized liquid, wherein part of the solubilized liquid is returned from the re-solubilization tank to the solubilization tank.

3. The methane fermentation pretreatment apparatus according to Claim 1 or 2, further comprising:

a dehydrator that receives and dehydrates the first unsuitable waste for fermentation removed by the screen that is the first solid-liquid separator, and a third unsuitable waste for fermentation removed by the second solid-liquid separator.

4. The methane fermentation pretreatment apparatus according to any one of Claims 1 to 3, further comprising:

a crushing pump provided between the solubilization tank and the screen,

wherein the driving of the crushing pump causes the solubilized liquid to be fed to the screen while being crushed from the solubilization tank, and causes part of the solubilized liquid to be returned from the crushing pump to the solubilization tank or from the screen to the solubilization tank.

5. The methane fermentation pretreatment apparatus according to any one of Claims 1 to 3, wherein the solubilization tank includes:

a solubilization section that receives and solubilizes the organic waste, and an adjustment section that makes a solubilized liquid obtained by performing a solubilization treatment on the organic waste in the solubilization section overflow from the solubilization section, and receives the solubilized liquid, and

wherein a crushing pump is provided to suction the solubilized liquid within the solubilization section by the driving of the crushing pump and returns the solubilized liquid to the solubilization section while crushing the solubilized liquid by the driving of the crushing pump.

6. The methane fermentation pretreatment apparatus according to Claim 1,

wherein a brush for scooping up and conveying the second unsuitable waste for fermentation within the pipe is attached to the blade of the unsuitable waste discharger.