CLAIMS

[Claim 1]

A microorganism screening system, comprising:

a container configured to store a liquid containing microorganism particles and a liquid medium; and

a microorganism separation device, wherein

the microorganism separation device includes:

a hydrodynamic separation device including a curved flow channel having a rectangular cross-section, and being configured to separate the liquid into a first segment containing relatively large microorganism particles and a second segment containing relatively small microorganism particles through use of a vortex flow generated in the liquid flowing through the curved flow channel; and

a liquid feeding unit configured to supply the liquid from the container to the hydrodynamic separation device, wherein

the hydrodynamic separation device includes:

a single inlet port through which the liquid is taken in; and

two outlet ports through which the first segment and the second segment are separately discharged,

the hydrodynamic separation device is capable of separating the liquid into only the first segment and the second segment being the rest, and

the microorganism particles include any one of a prokaryote, a eukaryote, and a virus.

[Claim 2]

The microorganism screening system according to claim 1, wherein the relatively large microorganism particles are concentrated and are contained in the first segment.

[Claim 3]

The microorganism screening system according to claim 1 or 2, wherein

the liquid feeding unit includes:

a pipe configured to connect the container and the hydrodynamic separation device to each other; and

a pump configured to apply a hydrodynamic pressure to the liquid for supplying the liquid to the hydrodynamic separation device.

[Claim 4]

The microorganism screening system according to any one of claims 1 or 3, further comprising:

a test device configured to measure a size of a microorganism particle contained in the liquid, wherein

a flow rate of the liquid supplied from the liquid feeding unit to the hydrodynamic separation device is changed based on a measurement result on at least one of the first segment and the second segment, the measurement result being obtained by the test device.

[Claim 5]

The microorganism screening system according to claim 4, wherein

the liquid feeding unit includes a flow rate control mechanism configured to control a flow rate of the liquid supplied to the hydrodynamic separation device.

[Claim 6]

The microorganism screening system according to any one of claims 1 or 3, further comprising:

at least one additional hydrodynamic separation device including a curved flow channel with a curvature or a rectangular cross-sectional shape being different from that of the hydrodynamic separation device, wherein

the liquid feeding unit includes a supply switching mechanism configured to supply the liquid to one of the hydrodynamic separation device and the additional hydrodynamic separation device and, at the same time, change a supply destination.

[Claim 7]

The microorganism screening system according to claim 6, further comprising:

a test device configured to measure a size of a microorganism particle contained in the liquid, wherein

the supply switching mechanism is configured to change a supply destination of the liquid based on a measurement result on at least one of a first segment and a second segment that are obtained by separating the liquid supplied to one of the hydrodynamic separation device and the additional hydrodynamic separation device, the measurement result being obtained by the test device.

[Claim 8]

The microorganism screening system according to any one of claims 1 to 7, wherein

the microorganism particles include any one of a virus, a eubacterium, an archaebacterium, a fungus, a myxomycete, an alga, and a protist.

[Claim 9]

The microorganism screening system according to any one of claims 1 to 8, wherein

the microorganism particles are a single species, and screening for target microorganism strains is performed through separation in the hydrodynamic separation device.

[Claim 10]

The microorganism screening system according to any one of claims 4, 5, and 7, wherein

the test device further includes means for measuring at least one of the number of particles, particle diameter distribution, and a survival rate of microorganism particles.

[Claim 11]

A microorganism screening method of performing screening for microorganism particles in accordance with a particle size through use of a liquid containing the microorganism particles and a liquid medium, the microorganism screening method comprising:

a hydrodynamic separation step of supplying the liquid to a curved flow channel having a rectangular cross-section and separating the liquid into a first segment containing relatively large microorganism particles and a second segment containing relatively small microorganism particles through use of a vortex flow generated in the liquid flowing through the curved flow channel; and

an isolation step of isolating at least one of the first segment and the second segment, wherein

the hydrodynamic separation step is separated by a hydrodynamic separation device,

the hydrodynamic separation device includes:

the curved flow channel;

a single inlet port through which the liquid is taken in; and

two outlet ports through which the first segment and the second segment are separately discharged,

the hydrodynamic separation device is capable of separating the liquid into only the first segment and the second segment being the rest, and

the microorganism particles include any one of a prokaryote, a eukaryote, and a virus.