CLAIMS

[Claim 1]

A system for preparing a sample solution for testing, the system being configured to prepare a sample solution for testing from an undiluted sample solution and comprising a microorganism separation device, the microorganism separation device comprising:

a hydrodynamic separation device including a curved flow channel having a rectangular cross-section and being configured to separate a liquid into a first segment and a second segment 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 undiluted sample solution to the hydrodynamic separation device, wherein

with the hydrodynamic separation device, particles contained in the undiluted sample solution are concentrated in the first segment,

the undiluted sample solution comprises a liquid raw material, a liquid intermediate, and a liquid final product in manufacturing food and drink or pharmaceutical products, and

the second segment is supplied as a sample solution for testing.

[Claim 2]

The system for preparing a sample solution for testing according to claim 1, wherein a pressure difference between an inlet pressure and an outlet pressure of the liquid supplied to the curved flow channel in the hydrodynamic separation device is controlled less than 0.60 MPa.

[Claim 3]

The system for preparing a sample solution for testing according to claim 1 or 2, wherein

the liquid feeding unit includes:

a supply channel being branched from a manufacturing line and connected to the hydrodynamic separation device; and

a pump configured to apply, to the undiluted sample solution, a hydrodynamic pressure for supplying the undiluted sample solution to the hydrodynamic separation device, and

part of a liquid raw material, a liquid intermediate, or a liquid final product that flows through a manufacturing line is supplied as the undiluted sample solution to the hydrodynamic separation device.

[Claim 4]

The system for preparing a sample solution for testing according to claim 3, wherein

the liquid feeding unit further includes a return channel that returns the first segment to the manufacturing line.

[Claim 5]

The system for preparing a sample solution for testing according to claim 1 or 2, wherein

the liquid feeding unit includes:

a container configured to store the undiluted sample solution;

a supply channel configured to connect the container to the hydrodynamic separation device; and

a pump configured to apply, to the undiluted sample solution, a hydrodynamic pressure for supplying the undiluted sample solution to the hydrodynamic separation device.

[Claim 6]

The system for preparing a sample solution for testing according to claim 5, wherein

the liquid feeding unit further includes a return channel configured to return the first segment to the container.

[Claim 7]

The system for preparing a sample solution for testing according to claim 4, wherein

the liquid feeding unit further includes a circulation channel configured to cause a part of the second segment to circulate to the supply channel.

[Claim 8]

The system for preparing a sample solution for testing according to claim 4, further comprising:

a test device;

a flow channel configured to connect the hydrodynamic separation device to the test device; and

a flow channel configured to connect the test device to the manufacturing line, wherein

the second segment is returned to the manufacturing line via the test device.

[Claim 9]

The system for preparing a sample solution for testing according to claim 4 or 6, wherein

the particles are microorganisms of at least one type selected from a virus, a eubacterium, an archaebacterium, a fungus, a myxomycete, an alga, and a protist, and

the first segment is supplied as a sample solution for testing.

[Claim 10]

The system for preparing a sample solution for testing according to claim 4 or 6, wherein

the particles are particle-like solid matters larger than microorganisms, and

the first segment is returned through the return channel or is discharged to an outside of the system.

[Claim 11]

A method for preparing a sample solution for testing, the method being performed to prepare a sample solution for testing from an undiluted sample solution and comprising microorganism separation processing, the microorganism separation processing comprising:

a hydrodynamic separation step of separating a liquid into a first segment and a second segment through use of a vortex flow generated in the liquid flowing through a curved flow channel having a rectangular cross-section; and

a liquid feeding step of feeding the undiluted sample solution to the hydrodynamic separation step, wherein

in the hydrodynamic separation step, particles contained in the undiluted sample solution are concentrated in the first segment,

the undiluted sample solution comprises a liquid raw material, a liquid intermediate, and a liquid final product in manufacturing food and drink or pharmaceutical products, and

the second segment is supplied as a sample solution for testing.