limit the volume of material that can be processed at a given time. Also, certain conventional purification techniques may require a laboratory technician to manually pipette fluids between various containers, which can be inefficient and may increase the risk of cross-contamination.

[0005] The present disclosure sets forth purification related apparatuses and methods embodying advantageous alternatives to existing purification apparatuses and methods, and that may address one or more of the challenges or needs mentioned herein, as well as provide other benefits and advantages.

SUMMARY

[0006] One aspect of the present disclosure provides a magnetic separator for separating or removing a target substance from a medium in which the target substance is suspended. The magnetic separator may include a frame having a first opening configured to receive at the least one container or vessel containing the medium, a first vertical sidewall, a second vertical sidewall, a bottom wall extending between the first vertical sidewall and the second vertical sidewall, and at least one beam extending between the first vertical sidewall and the second vertical sidewall. The magnetic separator may also include a first magnetic field generating element mounted on the first vertical sidewall and a second magnetic field generating element mounted on the second vertical sidewall. The first and second magnetic field generating elements may be mounted on opposing sides of the frame at a distance from each other such that the at least one container is positionable between the first and second magnetic field generating elements.

[0007] Another aspect of the present disclosure provides a purification method which may include: (a) adding a medium in which a target substance is suspended to a container or vessel; (b) adding a plurality of magnetic beads to the container, the target substance temporarily binding to the plurality of magnetic beads; and (c) positioning the

container between a first magnetic field generating element mounted on a first vertical sidewall and a second magnetic field generating element mounted on a second vertical sidewall, the first and second magnetic field generating elements being held at a distance from each other by a frame including the first vertical sidewall, the second vertical sidewall, a bottom wall extending between the first vertical sidewall and the second vertical sidewall, and at least one beam extending between the first vertical sidewall and the second vertical sidewall, at least one of the first magnetic field generating element or the second magnetic field generating element magnetically attracting and holding the plurality of magnetic beads against an interior surface of the container.

[0008] There is disclosed a workstation for separating a target substance from a medium in which the target substance is suspended. The workstation may include a work surface for receiving at least one container or vessel containing the medium, and a fluid transfer member configured to transfer fluids to and from the at least one container. Additionally, the workstation may include an automated manipulator configured to move the fluid transfer member relative to the work surface. Moreover, the workstation may include a plurality magnetic field generating elements each being moveable relative to the work surface between a first position remote from the at least one container and a second position adjacent to the at least one container.

[0009] There is disclosed a purification method which may include: (a) providing a workstation having a work surface, an automated manipulator moveable relative to the work surface and carrying a

fluid transfer member, and a plurality of magnetic field generating elements laterally spaced apart from each other to define a plurality of rows; (b) adding at least one medium in which a target substance is suspended to a plurality of containers or vessels; (c) adding a plurality of magnetic beads to the plurality of containers, the target substance temporarily binding

What is claimed is:

1. A magnetic separator for separating a target substance from a medium in which the target substance is suspended, the medium being contained in at least one container, the magnetic separator comprising:

a frame having a first opening configured to receive the at the least one container, a first vertical sidewall, a second vertical sidewall, a bottom wall extending between the first vertical sidewall and the second vertical sidewall, and at least one beam extending between the first vertical sidewall and the second vertical sidewall; and

a first magnetic field generating element mounted on the first vertical sidewall and a second magnetic field generating element mounted on the second vertical sidewall, the first magnetic field generating element and the second magnetic field generating element being mounted on opposing sides of the frame at a distance from each other such that the at least one container is positionable between the first and second magnetic field generating elements.

2. The magnetic separator of claim 1, the first magnetic field generating element being mounted on an inwardly facing surface of the first vertical sidewall, and the second magnetic field generating element being mounted on an inwardly facing surface of the second vertical sidewall.

3. The magnetic separator of claims 1 or 2, the first vertical sidewall being parallel to the second vertical sidewall.

4. The magnetic separator of any one of claims 1 to 3, the bottom wall extending between the inwardly facing surface of the first vertical sidewall and the inwardly facing surface of the second vertical sidewall.

5. The magnetic separator of any one of claims 1 to 4, the first opening being defined between the first and second vertical sidewalls and permitting the at least one container to be inserted in a horizontal direction into the magnetic separator.

6. The magnetic separator of claim 5, comprising a second opening formed in the frame and permitting access to the at least one container from above when the at least one container is positioned between the first magnetic field generating element and the second magnetic field generating element.

7. The magnetic separator of any one of claims 2 to 6, comprising a non-magnetic support rack configured to hold the at least one container and dimensioned for insertion through the first opening to position the at least one container between the first and second magnetic field generating elements.

8. The magnetic separator of claim 7, when inserted through the first opening, a first end of the non-magnetic support rack fitting beneath the first magnetic field generating element and a second end of the non-magnetic support rack fitting beneath the second magnetic field generating element.

9. The magnetic separator of any one of claims 7 or 8, the at least one container including a plurality of containers, the non-magnetic support rack being configured prevent lateral movement of the plurality of containers relative to each other.

10. The magnetic separator of any one of claims 1 to 9, the first magnetic field generating element including a first permanent magnet.

11. The magnetic separator of claim 10, the first permanent magnet having a maximum magnetic pull force equal to or greater than 100 Newtons (N).

12. A purification method comprising:

adding a medium in which a target substance is suspended to a container;

adding a plurality of magnetic beads to the container, the target substance temporarily binding to the plurality of magnetic beads; and

positioning the container between a first magnetic field generating element mounted on a first vertical sidewall and a second magnetic field generating element mounted on a second vertical sidewall, the first and second magnetic field generating elements being held at a distance from each other by a frame including the first vertical sidewall, the second vertical sidewall, a bottom wall extending between the first vertical sidewall and the second vertical sidewall, and at least one beam extending between the first vertical sidewall and the second vertical sidewall, at least one of the first magnetic field generating element or the second magnetic field generating element magnetically

attracting and holding the plurality of magnetic beads against an interior surface of the container.

13. The purification method of claim 12, wherein positioning the container between the first magnetic field generating element and the second magnetic field generating element comprises manually moving the container from a first position outside of the frame to a second position located between the first and second magnetic field generating elements.

14. The purification method of any one of claims 12 or 13, comprising removing the medium from the container while at least one of the first magnetic field generating element or the second magnetic field generating element magnetically attracts and holds the plurality of magnetic beads against the interior surface of the container.

15. The purification method of claim 14, comprising, after removing the medium from the container, adding an eluent to the container to elute the target substance bound to the plurality of magnetic beads and removing the container from between the first and second magnetic field generating elements so that the plurality of magnetic beads are free to disperse in the eluent.

16. The purification method of claim 15, comprising repositioning the container between the first and second magnetic field generating elements such that at least one of the first magnetic field generating element or the second magnetic field generating

element magnetically attracts and holds the plurality of magnetic beads against the interior surface of the container, and subsequently removing the eluent from the container.

17. The purification method of claims 14 to 16, comprising, after removing the medium from the container, adding a washing fluid to the container and removing the container from between the first and second magnetic field generating elements so that the plurality of magnetic beads are free to disperse in the washing fluid.

18. The purification method of claim 17, comprising repositioning the container between the first and second magnetic field generating elements such that at least one of the first magnetic field generating element or the second magnetic field generating element magnetically attracts and holds the plurality of magnetic beads against the interior surface of the container, and subsequently removing the washing fluid from the container.

19. The purification method of claims 12 to 18, the first magnetic field generating element being mounted on an inwardly facing surface of the first vertical sidewall, and the second magnetic field generating element being mounted on an inwardly facing surface of the second vertical sidewall.

20. The purification method of claim 19, wherein positioning the container between the first magnetic field generating element and the second magnetic field

generating element comprises inserting the container in a horizontal direction through an opening defined between the first and second vertical sidewalls.

21. The purification method of any one of claims 12 to 20, the first magnetic field generating element including a first permanent magnet.

22. The purification method of claim 21, the first permanent magnet having a maximum magnetic pull force equal to or greater than 100 N.