SAMPLE COLLECTION DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to US Provisional Application No. 62/171,870, filed June 5, 2015 and to US Provisional Application No. 62/237,492, filed October 5, 2015, the disclosures of each are herein incorporated by reference in their entireties.

BACKGROUND OF THE INVENTION

[0002] Devices and processes for sampling biological material, such as plant specimens, can be complex and expensive. To correlate test results accurately, many systems utilize expensive and complex computer based GPS tracking methods, which include barcode reading, GPS tracking, and / or electronic sampling, and accordingly require highly trained personnel, who may not be available in all regions.

BRIEF SUMMARY OF THE INVENTION

[0002a] According to a first aspect of the present invention, there is provided a sampling device including: a lower portion comprising a sample container; a cap moveably attached with the lower portion and comprising a cutting edge configured for cutting a leaf, such that when the cap is attached to the lower portion with a leaf therebetween, a leaf sample is deposited into the sample container of the lower portion, the cap also comprising a dead space opening configured to receive a first pipette, wherein the cap is moveably attached to the lower portion by an elongated post extending out of the lower portion, and wherein the cap includes a vent in fluid communication with the sample container such that the leaf sample is dried during transport of the sampling device, the vent being configured to receive a second pipette.

[0002b] According to a second aspect of the present invention, there is provided method for sampling a leaf of a plant using a sampling device system, the method including: obtaining a plurality of the above sampling devices; arranging the plurality of sampling devices in first and second sampling device arrays; positioning the plurality of sampling devices adjacent to an array of pipettes, the array of pipettes

comprising a first plurality of pipettes and a second plurality of pipettes arranged in alternating rows; moving the array of pipettes such that the first plurality of pipettes move into the vents of the first sampling device array and the second plurality of pipettes lower into the dead space openings of the first sampling device array; withdrawing fluid from the vents of the first sampling device array using the first plurality of pipettes; moving the array of pipettes such that the first plurality of pipettes moving into the dead space openings of the second sampling device array and the second plurality of pipettes lower into the vents of the second sampling device array; withdrawing fluid from the vents of the second sampling device array using the second plurality of pipettes.

[0003] Embodiments of the invention can be related to a sampling device and associated methods for use. Each sampling device can include a lower portion, a cap, and an attached label. The lower portion can contain a sample container. The cap can include a cutting post and be configured to attach to the lower portion while simultaneously cutting a sample there between.

[0004] The sample can be a biological sample, such as plant matter, and more specifically a leaf, and the sampling device can be specifically constructed only for use with plant matter, such as a leaf. For example, the cutting post of the cap can be constructed from a polymer which would be unsuitable for other biological materials (e.g. skin, fat) by not having a sharp enough cutting edge. In addition, the cap can be fluidly vented in order to dry vegetable matter samples after procurement and provide a channel to add testing fluid during processing. Such a vent may be incompatible

CLAIMS

1. A sampling device comprising:

a lower portion comprising a sample container;

a cap moveably attached with the lower portion and comprising a cutting edge configured for cutting a leaf, such that when the cap is attached to the lower portion with a leaf therebetween, a leaf sample is deposited into the sample container of the lower portion, the cap also comprising a dead space opening configured to receive a first pipette,

wherein the cap is moveably attached to the lower portion by an elongated post extending out of the lower portion, and wherein the cap includes a vent in fluid communication with the sample container such that the leaf sample is dried during transport of the sampling device, the vent being configured to receive a second pipette.

2. The sampling device of claim 1, wherein the dead space opening and the vent are spaced 9 mm apart.

3. The sampling device of claim 1, wherein the sampling device is configured to be arranged in an array of similarly configured sampling devices.

4. The sampling device of claim 1, wherein the lower portion comprises an at least partially oval-shaped sample container.

5. The sampling device of claim 1, wherein a dead space passage is at least partially formed within the elongated post.

6. The sampling device of claim 1, wherein the cap comprises an elongated cutting post that extends into the sample container.

7. The sampling device of claim 6, wherein the elongated cutting post is configured to immobilize the leaf sample at a bottom portion of the sample container.

8. The sampling device of claim 7, wherein the bottom portion comprises a depth limiting wall for limiting ingress of the bottom portion over a leaf.

9. The sampling device of claim 1, further comprising a rigid label that extends in cantilever.

10. The sampling device of claim 1, wherein the vent is configured to act as a filling conduit for a sample preparation fluid.

11. A method for sampling a leaf of a plant using a sampling device system, the method comprising:

obtaining a plurality of sampling devices as recited in claim 1;

arranging the plurality of sampling devices in first and second sampling device arrays;

positioning the plurality of sampling devices adjacent to an array of pipettes, the array of pipettes comprising a first plurality of pipettes and a second plurality of pipettes arranged in alternating rows;

moving the array of pipettes such that the first plurality of pipettes move into the vents of the first sampling device array and the second plurality of pipettes lower into the dead space openings of the first sampling device array;

withdrawing fluid from the vents of the first sampling device array using the first plurality of pipettes;

moving the array of pipettes such that the first plurality of pipettes moving into the dead space openings of the second sampling device array and the second plurality of pipettes lower into the vents of the second sampling device array;

withdrawing fluid from the vents of the second sampling device array using the second plurality of pipettes.

12. The method of claim 11, wherein the dead space opening and the vent are spaced 9 mm apart.

13. The method of claim 11, wherein the plurality of sampling devices arranged in a sampling device array are positioned to where the distance between the dead space opening and the vent of a first sampling device is the same as the distance between the vent of a first sampling device and the vent of a second sampling device in the array.

14. The method of claim 13, wherein the distance between the dead space opening and the vent of a first sampling device is 9mm and the distance between the vent of a first sampling device in the array and the vent of a second sampling device in the array is also 9mm.

15. The method of claim 11, wherein the first and second sampling array are arranged so as to be accessible by the same liquid handling device.

16. The method of claim 15, wherein the first sampling array directly abuts the second sampling array.

17. The method of claim 16, wherein the second sampling array is arranged as a mirror image of the first sampling array.

18. The method of claim 11, wherein the plurality of sampling devices comprises 96 sampling devices.

19. The sampling device of claim 9, wherein the rigid label extends from the lower portion of the sample container or an upper portion of the sample container, and is detachable therefrom.