CLAIMS

1. A pest control device comprising:

a sensor including a sensor cell, wherein a surface of a sensor cell is coated with an agent that reacts with a targeted biochemical analyte secreted by pests, and

a controller coupled to the sensor, the controller being configured to:

receive sensor data from the sensor cell indicative of a rate of change in sensor mass detected on the surface of the sensor cell, the rate of change correlating to an increase in the concentration of the targeted biochemical analyte,

determine whether the rate of change in the sensor mass based on the received sensor data exceeds a predefined threshold rate, and

transmit a pest detection alert notification to a server in response to a determination that the rate of change exceeds the predetermined threshold rate;

wherein the controller is further configured to:

activate a timer when the rate of change exceeds a predefined threshold rate,

deactivate the timer when the rate of change returns to less than the predefined threshold rate,

determine an amount of time that the rate of change in the sensor mass exceeded the predefined threshold rate, and

determine whether the amount of time is greater than a predefined time period,

wherein to transmit the pest detection alert notification comprises to transmit a pest detection alert notification in response to a determination that the amount of time is greater than the predefined time period.

2. The pest control device of claim 1 further comprising a handle providing a grip for a human operator to move the pest control device to identify a localized area of the targeted biochemical analyte.

3. The pest control device of either claim 1 or 2, wherein the predefined threshold rate is a base mass change rate in the presence of bed bugs and the targeted biochemical analyte comprises an analyte found in secretion of bed bugs.

4. The pest control device of any of claims 1 to 3, wherein the agent comprises dioctyl cyclic thiol intermediate (dioctyl-CTI).

5. The pest control device of any of claims 1 to 4, wherein the agent comprises cyclic thiol intermediate (CTI).

6. The pest control device of any of claims 1 to 5, wherein the sensor is a quartz crystal microbalance and the sensor cell is a quartz crystal resonator.

7. The pest control device of any of claims 1 to 6, wherein the surface of the sensor cell is coated with a coating gel compound that includes a polymer gel and the agent.

8. A method of detecting a presence of pests comprising:

receiving data indicative of a sensor mass rate of change from a sensor,

determining whether the sensor mass rate of change exceeds a predefined threshold rate, and

transmitting a pest detection alert notification to a server in response to a determination that the rate of change exceeds the predetermined threshold rate,

wherein the sensor includes a coating that reacts with a targeted biochemical analyte secreted by pests, and the sensor mass rate of change correlates to an increase in a concentration of a targeted biochemical analyte;

activating a timer when the rate of change exceeds a predefined threshold rate, deactivating the timer when the rate of change returns to less than the predefined threshold rate,

determining an amount of time that the rate of change in the sensor mass exceeded the predefined threshold rate, and

determining whether the amount of time is greater than a predefined time period, wherein transmitting the pest detection alert notification comprises transmitting a pest detection alert notification in response to a determination that the amount of time is greater than the predefined time period.

9. The method of claim 8, wherein the predefined threshold rate is a base mass change rate in the presence of bed bugs.

10. The method of either claim 8 or 9, wherein the coating comprises dioctyl cyclic thiol intermediate (dioctyl-CTI).

11. The method of any of claims 8 to 10, wherein the coating comprises cyclic thiol intermediate (CTI).

12. The method of any of claims 8 to 11, wherein the sensor is a quartz crystal microbalance.

13. The method of any of claims 8 to 12, wherein the coating is a coating gel compound that includes a polymer gel and the agent.

14. A method of detecting a presence of pests comprising:

receiving first sensor data from a sensor,

receiving second sensor data from the sensor,

determining a first slope of signal change based on the first and second sensor data, receiving third sensor data from the sensor,

determining a second slope of signal change based on the second and third sensor data, determining if the second slope is different from the first slope, and

transmitting a pest detection alert notification to a server in response to a determination that the second slope is different from the first slope, wherein the sensor includes a coating that reacts with a targeted biochemical analyte secreted by pests, and the signal change correlates to an increase in a concentration of a targeted biochemical analyte;

activating a timer when the second slope is different from the first slope,

receiving sensor data from the sensor and determining a slope of signal change based on the sensor data while the timer is active,

deactivating the timer upon detecting no change in slope,

determining a time interval measured by the timer, and

determining whether the time interval is greater than a predefined time period,

wherein transmitting the pest detection alert notification comprises transmitting a pest detection alert notification in response to a determination that the time interval is greater than the predefined time period.

15. The method of claim 14, wherein the predefined threshold rate is a base mass change rate in the presence of bed bugs.

16. The method of either claim 14 or 15, wherein the coating comprises dioctyl cyclic thiol intermediate (dioctyl-CTI) or cyclic thiol intermediate (CTI).

17. The method of any of claims 14 to 16, wherein the coating is a coating gel compound that includes a polymer gel and one of dioctyl cyclic thiol intermediate (dioctyl-CTI) or cyclic thiol intermediate (CTI).