CLAIMS

1. A method (300) for detecting fraud in a Reverse Vending Machine System, the Reverse Vending Machine System having at least one radiation emitting device, a radiation detecting device and at least one processing unit, the method comprising the steps of:

- receiving (302) a food or beverage container, which carries a validation mark and a background around said validation mark wherein said validation mark is a security mark or a barcode, which security mark is configured to be read by use of barcode decoding, and/or by use of character recognition and/or letter recognition and/or pattern recognition;

- illuminating (304) the surface of said food or beverage container with radiation comprising wavelengths within the wavelength range of optical radiation, which radiation is emitted from said at least one radiation emitting device;

- detecting radiation (306) being emitted from said at least one radiation emitting device and subsequently reflected at said food or beverage container, and/or radiation being emitted from said at least one radiation emitting device and subsequently transmitted at said food or beverage container, and/or detecting radiation emitted from said food or beverage container in response to said illumination with said radiation detecting device;

- transmitting information (308) corresponding to the detected radiation from said radiation detecting device to said at least one processing unit;

- at said at least one processing unit:

- analyzing said information (310) corresponding to the detected radiation to determine the existence of additional radiation emitted from said background, which additional radiation is not received from valid food or beverage containers, and which additional radiation comprises fluorescent radiation, and

- upon determination (312a) of the existence of said additional radiation classify said food or beverage container as fraudulent (314a).

2. A method according to claim 1, wherein

- said step of transmitting information corresponding to the detected radiation to said processing unit is performed only when detecting radiation comprising wavelengths outside the wavelength range received from valid food and beverage containers, and

- said step of determine the existence of additional radiation emitted from said background is equal to receiving information from said radiation detecting device.

3. A method according to claim 1 or 2, further comprising the step of:

- providing information representing at least one classified wavelength spectrum to said processing unit, each of said at least one classified wavelength spectrum being classified as valid or invalid; and wherein

- said step of detecting radiation comprises registering a wavelength spectrum;

- said step of transmitting information corresponding to the detected radiation to said processing unit comprises transmitting information representing said registered wavelength spectrum to said processing unit; and

- said step of determine the existence of additional radiation emitted from said background comprises comparing said information corresponding to the registered wavelength spectrum to said at least one classified wavelength spectrum, and based on this comparison identifying any existence of additional radiation.

4. A method according to any of claims 1-3, wherein said step of analyzing said information corresponding to the detected radiation to determine the existence of additional radiation from said background, does not include comparing information representing a spatially resolved image of the container surface to information representing a predetermined image of a valid security marking or validation mark.

5. A method according to any one of claims 1-4, wherein at said processing unit a further test is performed comprising the steps of:

- identifying a validation area on said container, which validation area contains said validation mark and a background around said validation mark;

- performing a reading operation on the validation mark contained in said validation area by use of barcode decoding, and/or by use of character recognition and/or letter recognition and/or pattern recognition,

- upon a successful reading of the validation mark classify said food or beverage container as potentially valid.

6. A method according to any one of said preceding claims, wherein said step of determining additional radiation emitted from said background comprises detecting a fraudulent material (114) present on said food or beverage container, and which fraudulent forms the background to said validation mark and optionally is selected from a group consisting of paper, plastic foils, metal foils, textiles, bulk plastic or combinations of the same.

7. A method according to any one of the preceding claims, wherein said step of analyzing said information (310) corresponding to the detected radiation to determine the existence of additional radiation emitted from said background comprises the step of determining that the received radiation exceeds a predetermined threshold value,

8. A system (100) for fraud detection in a Reverse Vending Machine (1), said system comprises:

- at least one radiation emitting device (104) configured to emit radiation (106) within the wavelength range of optical radiation for illuminating an area of said a food or beverage container (102) being received by said reverse vending machine, which area contains a validation mark and a background around said validation mark, wherein said validation mark is a security mark and/or a barcode,

- at least one radiation detection device (110) configured to detect radiation (108) emitted from said at least one radiation emitting device and subsequently reflected at said food or beverage container, and/or emitted from said at least one radiation emitting device and subsequently transmitted through said food or beverage container and/or detecting radiation emitted from said food or beverage container in response to said illumination by said radiation detecting device;

- at least one processing unit (115) in communication with said at least one radiation detecting device, wherein the at least one processing unit is configured to:

- receive information corresponding to the detected radiation from said at least one radiation detecting device;

- identify a validation area on said container, which validation area contains said validation mark and said background around said validation mark;

- analyzing said information corresponding to the detected radiation to determine the existence of additional radiation emitted from said background, which additional radiation is not received from valid food or beverage containers, and which additional radiation comprises fluorescent radiation, and

- upon determination of the existence of said additional radiation classify said food or beverage container as fraudulent

- read the validation mark contained in said validation area by use of barcode decoding, and/or by use of character recognition and/or letter recognition and/or pattern recognition, and optionally

- upon a successful reading of the validation mark classify said food or beverage container as potentially valid.

9. A system according to claim 8, wherein said at least one radiation emitting device emits radiation within one or more wavelength ranges selected from a group consisting of the ultraviolet range, the visible range and the infrared range, and

wherein optionally said radiation emitting device emits radiation only within said one or more wavelength ranges.

10. A system according to any one of claims 8-9, wherein said additional radiation originates from a fraudulent material (114) present on said food or beverage container, wherein said fraudulent material preferably forms the background to said validation mark, and wherein said fraudulent material optionally is one or more elements selected from a group consisting of paper, plastic foils, metal foils, textiles, bulk plastic or combinations of the same.

11. A system according to claim 10, wherein validation mark is present on said fraudulent material, and which fraudulent material covers or replaces an original barcode or original security marking provided on said food or beverage container, or otherwise alters the appearance of said food or beverage container.

12. A system according to any one of claims 8-11, wherein said additional radiation comprises radiation within one or more wavelength ranges selected from a group consisting of the ultraviolet range, the visible range and the infrared range and/or fluorescent radiation.

13. A system according to any of claims 8-12, wherein

- said food or beverage container is provided with a barcode or security mark, and

- said radiation detection device is configured to receive light reflected at, or in the vicinity of, said barcode or security mark; and/or configured to receive light emitted at, or in the vicinity of, said barcode or security mark.

14. A system according to any of claims 8-13, wherein said radiation detection device is configured to detect radiation within one or more wavelength ranges selected from a group consisting of the ultraviolet range, the visible range and the infrared range.

15. A system according to any of claims 8-14, wherein said at least one processing unit is further configured to: upon determination of the non-existence of said additional radiation classify said food or beverage container as valid or potentially valid.

16. A system according to any of claims 8-15, wherein said at least one processing unit comprises at least a first and a second processing unit;

and

wherein said first and second processing units are configured to in cooperation perform said steps of:

- receive information corresponding to the detected radiation from said at least one radiation detecting device;

- analyzing said information corresponding to the detected radiation to determine the existence of additional radiation, which additional radiation is not received from valid food or beverage containers, and

- upon determination of the existence of said additional radiation classify said food or beverage container as fraudulent.

17. A Reverse vending machine provided with a system for fraud detection according to any one of claims 8-16.

18. A Reverse vending machine according to claim 17, wherein said at least one processing unit comprises a processing circuitry, and a first portion of said processing circuitry is arranged inside the housing of the reverse vending machine and a second portion of said processing circuitry is arranged outside the housing of the reverse vending machine; and

wherein said first and second portions of said processing circuitry are configured to in cooperation perform said steps of:

- receive information corresponding to the detected radiation from said at least one radiation detecting device;

- analyzing said information corresponding to the detected radiation to determine the existence of additional radiation, which additional radiation is not received from valid food or beverage containers, and

- upon determination of the existence of said additional radiation classify said food or beverage container as fraudulent.