CLAIMS

1. A system (1) for the automated sanitization of containers for biological samples comprising housing means (2) for containers for biological samples, a sanitization route (3) having an inlet opening (4) and an outlet opening (5), handling means (6) of said housing means (2), which are suitable for conveying the containers for biological samples along said sanitization route (3), a sanitization chamber (7) and means for drying (9) containers for biological samples, said sanitization chamber (7) comprising means for dispensing a biocidal fluid (8),
said system (1) comprising a packaging zone (16) comprising means for packaging (17) containers for biological samples, preferably said means for packaging (17) being suitable for packaging containers for biological samples in a secondary container for the transportation of containers for biological samples, more preferably being suitable for sealing, optionally air-tight sealing, said secondary container for the transportation of containers for biological samples, even more preferably said system (1) comprising a separation element (40), placed downstream of said sanitization chamber (7) and upstream of said packaging zone (16) along said sanitization route (3), said separation element acting as a barrier for said biocidal fluid, and
said system (1) comprising a sterilization chamber (20) for a secondary container for the transportation of containers for biological samples, said sterilization chamber (20) comprising sterilization means (19) for a secondary container for the transportation of containers for biological samples suitable for sterilizing the surface of said secondary container for the transportation of containers for biological samples, preferably said sterilization means (19) for a secondary container for the transportation of containers for biological samples being ultraviolet light lamps.

2. The system (1) according to claim 1, wherein said means for dispensing a biocidal fluid (8) are placed upstream of said means for drying (9) containers for biological samples along said sanitization route (3), preferably said system (1) comprising a drying chamber (10) wherein said

means for drying (9) containers for biological samples are placed.

3. The system (1) according to claim 1 or 2, wherein said means for dispensing a biocidal fluid (8) are a plurality of atomizer nozzles, preferably said atomizer nozzles comprise a dispensing hole for a jet of biocidal fluid, more preferably said dispensing hole having a shape suitable for providing the dispensation of a blade-shaped jet of biocidal fluid.

4. The system (1) according to claim 3, wherein said dispensing hole for a jet of biocidal fluid is suitable for dispensing a jet of biocidal fluid having an average size of fluid particles between 25 and 45 microns, preferably equal to 30 microns.

5. The system (1) according to claim 4, wherein the sanitization chamber (7) has two walls opposite each other (7a; 7b) on which said atomizer nozzles are placed, preferably said atomizer nozzles being at least two, more preferably six, each of which being respectively placed on one of said two walls opposite each other (7a; 7b).

6. The system (1) according to any one of claims from 3 to 5, wherein said atomizer nozzles allow jets of biocidal fluid to be dispensed, said jets having a jet opening angle between 60° and 90°, preferably between 65° and 85°.

7. The system (1) according to any one of the preceding claims, wherein said means for drying (9) containers for biological samples are suitable for dispensing a gas flow, preferably gas at room temperature, more preferably compressed air, even more preferably said means for drying (9) being drying nozzles having a jet opening angle between 0° and 120°.

8. The system (1) according to any one of the preceding claims, wherein said housing means (2) for containers for biological samples comprise a drilled plate (21) comprising through holes (22) which are suitable for receiving containers for biological samples, said through holes (22) being dimensioned to receive a single container for biological samples,

preferably said through holes (22) being suitable for receiving containers for biological samples suitable for storage and transportation of biological samples including nasal, salivary or nasal-oropharyngeal swabs, capillary blood samples for rapid serological test or blood sampling or urine samples, more preferably test tubes.

9. The system (1) according to claim 8, wherein said drilled plate (21) has an oblong shape, preferably rectangular, and said through holes (22) are longitudinally aligned along the length of said drilled plate (21).

10. The system (1) according to claim 9, wherein said drilled plate (21) comprises two portions (21a; 21b) which can be separated from each other along a separation line (21c) defined by the horizontal symmetry axis of said oblong shape, preferably rectangular.

11. The system (1) according to any one of the preceding claims 1 to 10, comprising a loading zone (24) placed close to said inlet opening (4) of said sanitization route (3), said loading zone (24) being suitable for allowing to temporarily house containers for biological samples before placing them in said housing means (2).

12. The system (1) according to claim 11, comprising means for transferring (28) containers for biological samples, which are suitable for transferring containers for biological samples from said loading zone (24) to said housing means (2), preferably said means for transferring (28) containers for biological samples being a gripper, more preferably a gripper provided with flexible gripping fingers, even more preferably said gripper being provided with active flexible gripping fingers, inflatable using compressed air, or a gripper provided with passive flexible gripping fingers, whose opening and closing is driven by an electrical motor placed inside the gripper.

13. The system (1) according to anyone of preceding claims, comprising scanning means suitable for reading labels or tags present on said containers for biological samples, preferably said scanning means being

optical scanners, laser scanners or scanning systems.

14. A process for the automated sanitization of containers for biological samples carried out using the system (1) according to any one of the preceding claims 1 to 12 and comprising the following steps:

- loading containers for biological samples into housing means (2);

- conveying said so-loaded housing means (2) along a sanitization route (3) using handling means (6) of the housing means (2) and, using means for dispensing a biocidal fluid (8) which are placed inside a sanitization chamber (7), applying a biocidal fluid, preferably a jet of biocidal fluid, onto said containers for biological samples;

- drying said containers for biological samples, thus providing containers for biological samples thereby sanitized and dried;

-transferring said containers for biological samples thereby sanitized and dried into a secondary container for the transportation of containers for biological samples.

15. The process according to claim 14, wherein said biocidal fluid is an aqueous solution of sodium hypochlorite, preferably said biocidal fluid being an aqueous solution having a concentration of sodium hypochlorite between 0.2% and 0.6%, more preferably of 0.5% by weight of the total weight of the solution.

16. The process according to claim 14 or 15, wherein, in said step of applying a biocidal fluid, a jet of biocidal fluid is applied and said means for dispensing a biocidal fluid (8) are a plurality of atomizer nozzles, the biocidal fluid being preferably dispensed by said atomizer nozzles as a blade-shaped jet, more preferably said biocidal fluid being dispensed by said atomizer nozzles as a jet having a jet opening angle between 60° and 90°, even more preferably between 65° and 85°.

17. The process according to claim 16, wherein said jet of biocidal fluid

has an average size of fluid particles between 25 and 45 microns, preferably equal to 30 microns.

18. The process according to any one of claims 14 to 17, wherein, in said step of applying a jet of biocidal fluid, the containers for biological samples are conveyed along said sanitization route (3) according to a step-by-step movement of said handling means (6) and in such a way that the containers for biological samples are entirely hit by the jet of biocidal fluid, gradually all over their height.

19. The process according to any one of claims 14 to 18, wherein, after said step of applying a biocidal fluid and before said drying step, the biocidal fluid is let act for a time period between 30 seconds and 2 minutes, preferably for about 1 minute.

20. The process according to any one of claims 14 to 19, wherein said drying step is carried out by dispensing compressed air, preferably compressed air at room temperature, by dispensing compressed air for a time period between 15 seconds and 2 minutes, even more preferably 30 seconds.

21. The process according to anyone of claims 14 to 19, comprises an additional step of tracking said containers for biological samples processed along said sanitization route, preferably said tracking step being carried out by means designated scanning means suitable for reading labels or tags present on said containers for biological samples.