

# Microbiological cleanliness in a chemotherapy robot depending on different intervals of intensive cleaning in the working area

## What was done and why?

Automated preparation of ready-to-administer chemotherapy products with the APOTECACHemo® robot (see Fig. 1) is well established in a number of pharmacy departments. One of the few disadvantages, is the time-consuming, intensive cleaning and disinfection of the working area (clean room class A) by wiping with cleaning and disinfection solutions.

The aim of the study was to evaluate if the microbiological cleanliness of the working and loading area (carousel) of APOTECACHemo® is affected by extending the interval of intensive cleaning from biweekly to monthly cleaning intervals.



Figure 1: APOTECACHemo, Loccioni Group, Italy

## How was it done?

All surfaces in the working area (Fig. 2) and the carousel (Fig. 4) located behind the loading area (Fig. 3) of the APOTECACHemo® were wiped with ethanolic 0.5 mol/L NaOH solution in order to inactivate or remove cytotoxic spillages. In a second work step all surfaces were disinfected by wiping with spore-free alcohol (Perform® advanced, Schülke & Mayr GmbH). This procedure lasts in total about one hour.

At the end of each working session, critical surfaces (Identification unit, Balance, Gripper, Dosing device, Floor (see Fig. 5)) are cleaned and disinfected. Afterwards the working and loading area is irradiated with UV light for 4 hours.



Figure 2: Working Area



Figure 3: Loading Area

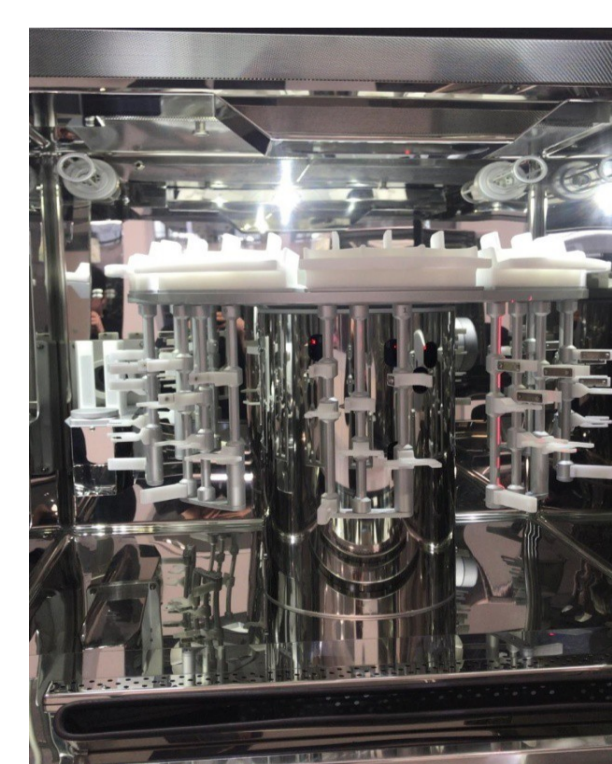


Figure 4: Carousel

According to the environmental sampling plan, passive air sampling with settle plates at the predefined locations S1, S2 and surface sampling with contact plates at the predefined locations C1, C2, C3 (comp. Fig. 5) is performed on a weekly basis.

Settle plates: CASO-Agar+LT 90mm ICR+, Merck KGaA; 90 mm diameter, Tryptic Soy Agar (TSA) with lecithin and tween. Exposed to the air for at least 4 hours.

Contact plates: CASO-Abklatsch+LT ICR+, Merck KGaA; 55 mm diameter, Tryptic Soy Agar (TSA) with lecithin and tween. Contact pressure was 500 - 1000 g.

Samples were incubated by the Institute of Hygiene, University Medical Center Mainz, colony forming units (CFU) counted and reported. Results were analyzed and compared for Period 1 and Period 2.

Limits for microbiological contamination:

Air samples CFU/ 4h: <1; Contact plates CFU/plate: <1

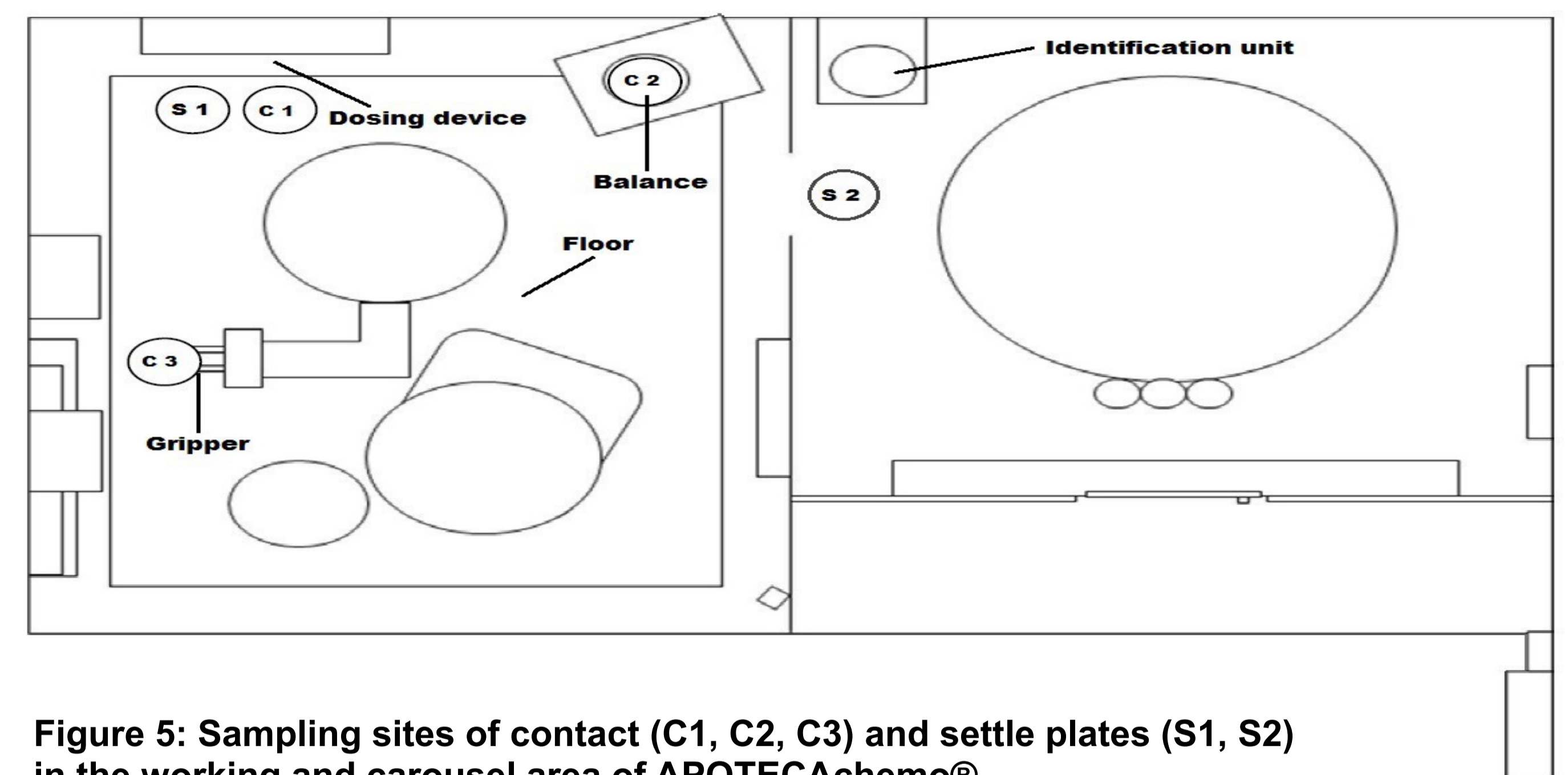


Figure 5: Sampling sites of contact (C1, C2, C3) and settle plates (S1, S2) in the working and carousel area of APOTECACHemo®

The action limits set for the Grade A zone were exceeded only once in 18 months. In this case 22 CFUs were detected on contact plate C2.

Number of CFU detected by passive air sampling and contact plates are shown in Figure 6 for Period 1 and in Figure 7 for Period 2.

Period 1 (07-12/2018)		Biweekly intensive cleaning				
Sample		S1 (n=26)	S2 (n=26)	C1 (n=27)	C2 (n=27)	C3 (n=27)
Number of CFE [n]		0	0	1	1	0
CFU per Plate [n]				1	22	

Figure 6: Number of colony forming events (CFE) and CFU in Period 1 (07-12/2018) on settle (S) or contact (C) plates

Period 2 (01-12/2019)		Monthly intensive cleaning				
Sample		S1 (n=50)	S2 (n=49)	C1 (n=47)	C2 (n=46)	C3 (n=47)
Number of CFE [n]		2	1	2	1	0
CFU per Plate [n]		1	1	1	1	1

Figure 7: Number of colony forming events (CFE) and CFU in Period 2 (01-12/2019) on settle (S) or contact (C) plates

## What has been achieved?

The extended interval of the intensive cleaning procedure did not affect the microbiological cleanliness in the working area of the robot APOTECACHemo®.

Maintaining the daily cleaning procedure, the interval of the intensive cleaning procedure can be extended to one month without increasing the microbiological contamination risk and saving two hours of cleaning.

## What is next?

Monthly intensive cleaning will be attended by trending the microbiological results.



<https://www.eahp.eu/gpi/microbiological-cleanliness-chemotherapy-robot-depending-different-intervals-intensive-cleaning>