Background:
Automated Antimicrobial Susceptibility Systems provide reliable results improving clinical outcomes although the microbial suspension preparation is still completely manual. Colibri® is a new automated system able to pick colonies from plates, re-suspend them in saline solution, check the turbidity of the suspension with the on-board nephelometer and adjust it if required.

Objective:
The aim of the study was to compare manual microbial suspensions preparation for Antimicrobial Susceptibility Testing (AST) to Colibri® automated preparation.

Materials/methods:
Twenty-Two Gram negative and twenty-two Gram positive clinical strains were streaked on CPS®Elite (Biomérieux) agar plates using Copan WASP® and incubated in WASP®Lab® automation. Isolated colonies were manually picked and suspended in saline solution to obtain a 0.5 McFarland microbial concentration measured with the Biomérieux DensiCHECK Plus. The same plate was then processed by Colibri® selected bacteria colonies were automatically picked by the pipettor and transferred into a saline solution tube. The turbidity of the microbial suspension was verified by the on-board nephelometer. Manual and automated prepared microbial suspensions were used to perform the AST on the Biomérieux Vitek2 (version 07.01) as per manufacturer instructions. Gram negative (E. coli (n=6), E. cloacae (n=5), P. aeruginosa (n=3) S. marcescens (n=2), P. mirabilis (n=3), K. oxytoca (n=1), K. pneumoniae (n=1), C. freundii (n=1)) were processed with AST-N204 card and Gram positive (S. epidermidis (n=6), S. aureus (n=8), E. faecalis (n=4), E. faecium (n=3), E. gallinarum (n=1)) were processed with AST-P592 card. The viable count of 0.5 McFarland suspensions was performed using the serial dilution method on both the manual and automated preparations.

Colibri® is able to:
- Pick colonies using disposable tips (1)
- Release bacteria colonies in a saline solution tube (2)
- Check the microbial suspension turbidity using the on-board nephelometer (3)
- Adjust the microbial suspension adding colonies or saline to obtain a 0.5 MacFarland
- Prepare the microbial dilution needed for processing with AST system
- Prepare the purity plate from the microbial suspension (4)

Results:
The results were interpreted with Biomerieux Expert System EUCAST 2015:
- 318 antibiotic combinations were tested for Gram positive: 1 minor error (0.31%) and 1 major error (0.31%) were found.
- 306 antibiotic combinations were tested for Gram negative: 9 minor error (2.94%) and 1 very major error (0.32%) were found.
- Only 1 discrepant result could be related to the viable count where the manual preparation was 5-fold higher than Colibri® microbial preparation.

Five out of the 44 strains tested were defined as MDR organisms according to Magiorakos et al 2011 (1).

Conclusions:
The data generated in this study demonstrate Copan Colibri®:
- is able to automatically prepare microbial suspensions from different bacteria colonies directly from agar plate culture
- provides comparable results to those obtained with manual preparation
- standardizes the preparation of microbial suspensions for AST and purity plates eliminating the person to person variability.
- Reduce the exposure to pathogens improving staff safety

Reference: Magiorakos et al 2011; Multidrug-resistant, extensively drug-resistant and pandrug-resistant bacteria: an international expert proposal for interim standard definitions for acquired resistance; European Society of Clinical Microbiology and Infectious Diseases.