Automated micro Loop Flow Reactor analyzer to measure sulfonamides by spectrophotometric method in sea water
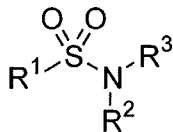
Sergio Bodini – Luca Sanfilippo
SYSTEA S.p.A.

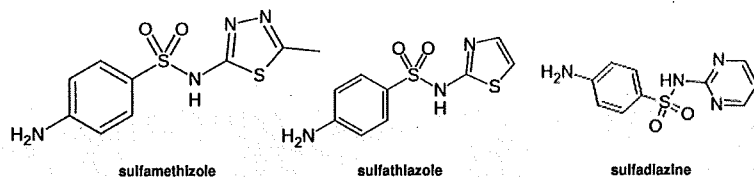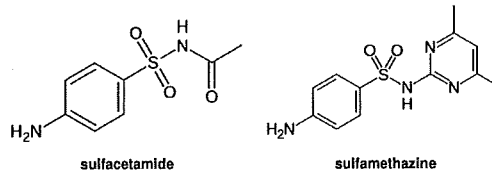*Sensing toxicants in Marine waters makes Sense using biosensors*

SULFONAMIDES
ACTIVE PRINCIPLES

SULFONAMIDES TESTED

Sulfanilamide (SNL)
Sulfadimethoxine (SDM)
Sulfamethoxazole (SOZ)
Sulfacetamide (SAA)
Sulfamethazine (SMZ)
Sulfamethizole (SML)
Sulfathiazole (STZ)
Sulfadiazine (SDZ)
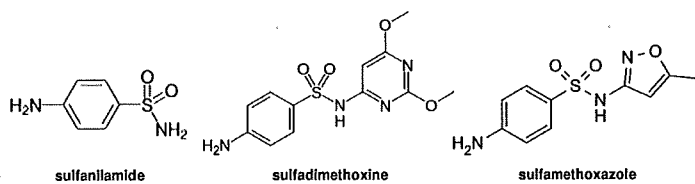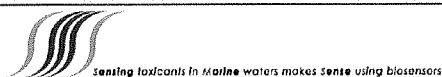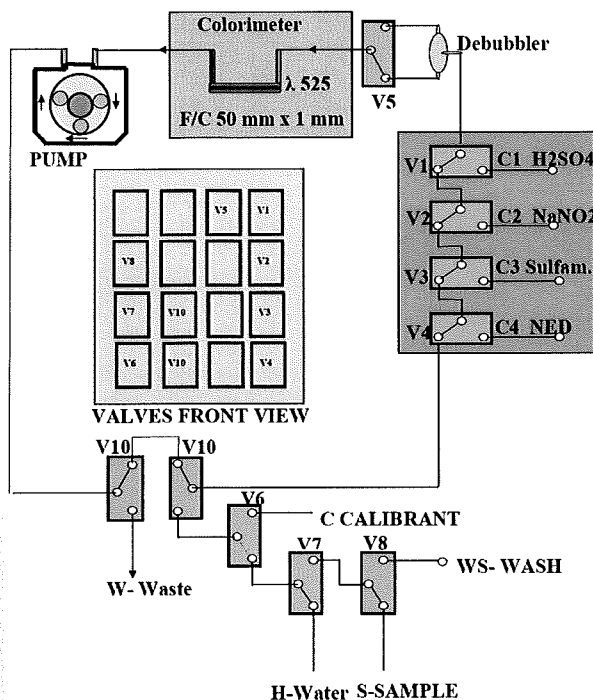
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SULFONAMIDE ANALYZER
HYDRAULIC DIAGRAM

Colorimeter

λ 525

F/C 50 mm x 1 mm

V5

Debubbler

PUMP

V1 — C1 H2SO4

V2 — C2 NaNO2

V3 — C3 Sulfam.

V4 — C4 NED

VALVES FRONT VIEW

V10 V10

V6 — C CALIBRANT

V7 V8 — WS- WASH

W- Waste

H-Water S-SAMPLE

DETERMINATION OF SULFONAMIDES
ANALYTICAL PROCEDURE

✓ *Update 1.5 mL loop with 7 mL of sample*

✓ *Add 0.07 mL of 0.2 % $NaNO_2$ and 0.07 mL of 14.4 % H_2SO_4*

✓ *Mix for 300 sec at room temperature (RT)*

✓ *Add 0.07 mL of 0.4 % Sulfamic Acid*

✓ *Mix for 90 sec at RT*

✓ *Add 0.07 mL of NED*

✓ *Mix for 90 sec at RT*

✓ *Measure Absorbance at 525 nm in a 50 mm flow cell*

✓ *Wash with DI water*

TOUCH SCREEN

DETECTOR

REAGENT AREA

HYDRAULICS

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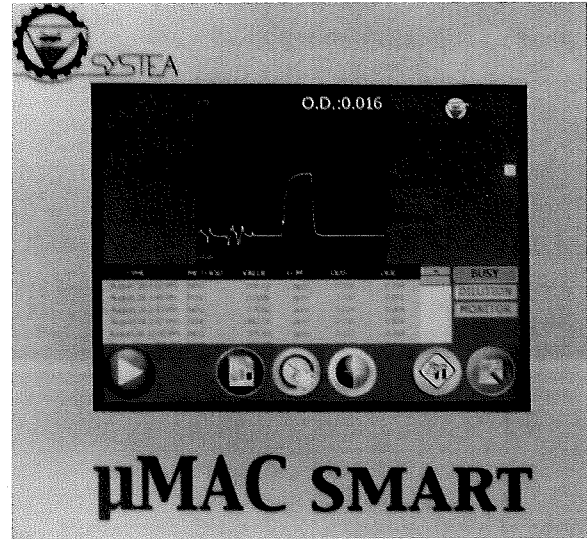
Automated measurement module
main features

⚬ **Very simple hydraulics directly accessible by operator**

⚬ **Applying the well-established µLFR analytical technology, it is suitable to run a large number of methods already developed and tested on field**

⚬ **Lower reagents consumption: from 100 to 200 µL for most of the reagents used**

⚬ **12 Vdc power supply allows to be powered by batteries**

⚬ **Very low maintenance**

⚬ **Instant start-up and operation**

⚬ **Extended user interface and built-in memory data storage**

- 8" colour touch screen
- All functions available on large screen buttons
- Memory data storage
- Alphanumeric tables and graphic data trends
- Extended user configuration
- Easy data export through USB port.

μMAC SMART

SAA CALIBRATION

INSTRUMENT PERFORMANCE

Precision at 100 %	± 1.4 %
Accuracy at 100 %	± 0.1 %
Precision at 5 %	± 5.0 %
Accuracy at 5 %	± 6.1 %

Standard Calibration

$y = 0.00110x + 0.00459$
$R^2 = 0.99997$

Range (mg / L)	0.002 – 0.500
LOD (mg / L)	0.0033
CoV	± 1.2 %

Measured Absorbance (y-axis): 0.00, 0.10, 0.20, 0.30, 0.40, 0.50, 0.60

Standard Value (ppb) (x-axis): 0, 100, 200, 300, 400, 500, 600

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