

D 3.3.1 and D 3.3.2 Map, sampling point and plan of the experimental activities

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PROJECT AdSWiM

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1. ORGANISATION OF THE EXPERIMENTAL ACTIVITIES: MAP/SAMPLING POINTS AND EXPERIMENTAL PLAN

The core of the project is to measure nutrients, microelements and pollutants, microbiological indicators data to improve the knowledge about the current status of water quality in Adriatic areas. The criteria for the choices followed the project's main objectives were identified as those areas in the proximity of Depuration Plants (DPs) outfall in seawater. The three areas were (i) North Adriatic area, which includes the DPs of Lignano Sabbiadoro and San Giorgio di Nogaro (ii) the Zadar area with the city's DP, and (iii) the Split area with the point sources of Katalinica brig and Stobreč. The potential effect of DPs on the distribution of faecal indicators, nutrients and ion-metals pollutants suggested to select the sampling point according to increasing distances from the DP discharge emission. So that, the sampling points identified as during the last bathing season were in N. Adriatic on the IT side (① San Giorgio di Nogaro, ② Lignano Sabbiadoro, ③ in Croatia in the Zadar, Split (④ Katalinica brig, ⑤ Stobreč area, and Pescara (⑥ Francavilla al mare). The type of water sampled (at discharge point at sea BOTTOM and in Depuration Plant AFTER water treatment) and the frequency of the activities (Monthly from April to September) were defined after profitable discussion among PPs. A possible winter sampling was also considered.

Then a table with Parameters to be analysed and PP involved in sampling and analysis is shown and discussed with all PP to a clear organization of the whole work for the second bathing season, too. It is recommended to use CTD probe during all seawater samplings.

An excel document (here attached) was shared reporting the plan of the activities and the map for the sampling points.

Table 1 experimental plan

	Parameters to be analysed	PP involved in sampling and analysis
① San Giorgio di Nogaro	Nutrient concentration, anions, cations	sampling: CAFC, analyses: UnivPM, UNIUD
	Heavy metals' concentration	sampling: CAFC, analyses: UnivPM
	Escherichia coli abundance	sampling: CAFC, analyses: OGS
	Enterococci abundance	sampling: CAFC, analyses: OGS
	Pseudomonas abundance	sampling: CAFC, analyses: OGS
	Bacterial community structure (Emerging pathogens)	sampling: CAFC, analyses: OGS
	Biotoxicity	sampling: CAFC, analyses: IC-CNR
② Lignano Sabbiadoro	Nutrient concentration, anions, cations	sampling: CAFC, analyses: UnivPM, UNIUD
	Heavy metals' concentration	sampling: CAFC, analyses: UnivPM
	Escherichia coli abundance	sampling: CAFC, analyses: OGS
	Enterococci abundance	sampling: CAFC, analyses: OGS
	Pseudomonas abundance	sampling: CAFC, analyses: OGS

	Bacterial community structure (Emerging pathogens)	sampling: CAFC, analyses: OGS
	Biotoxicity	sampling: CAFC, analyses: IC-CNR
⑥ Villafranca almare (ACA)	Nutrient concentration, anions, cations	sampling: Pescara Mun, analyses: Pescara Mun
	Heavy metals' concentration	sampling: Pescara Mun, analyses: Pescara Mun
	Escherichia coli abundance	sampling: Pescara Mun, analyses: Pescara Mun
	Enterococci abundance	sampling: Pescara Mun, analyses: Pescara Mun
	Pseudomonas abundance	sampling: Pescara Mun, analyses: Pescara Mun
	Bacterial community structure (Emerging pathogens)	sampling: Pescara Mun, analyses: OGS
	Biotoxicity	sampling: Pescara Mun, analyses: IC-CNR

	Parameters to be analysed	PP involved in sampling and analysis
③ Zadar	Nutrient concentration	sampling: PHI, analyses: PHI
	Heavy metals' concentration	sampling: PHI, analyses: UnivPM
	Escherichia coli abundance	sampling: PHI, analyses: PHI
	Enterococci abundance	sampling: PHI, analyses: PHI
	Pseudomonas abundance	sampling: PHI, analyses: PHI
	Bacterial community structure (Emerging pathogens)	sampling: PHI, analyses: OGS
	Biotoxicity	sampling: PHI, analyses: IC-CNR
④ Katalinica brig	Nutrient concentration	sampling: FGAG (SW), VIK (DP); analyses: PHI (SW), VIK (DP)
	Heavy metals' concentration	sampling: FGAG (SW), VIK (DP); analyses: PHI (SW), VIK (DP)
	Escherichia coli abundance	sampling: FGAG (SW), VIK (DP); analyses: PHI (SW), VIK (DP)
	Enterococci abundance	sampling: FGAG (SW), VIK (DP); analyses: PHI (SW), VIK (DP)
	Pseudomonas abundance	sampling: FGAG (SW), VIK (DP); analyses: PHI (SW), VIK (DP)
	Bacterial community structure (Emerging pathogens)	sampling: FGAG (SW), VIK (DP); analyses: PHI-OGS (SW), VIK-OGS (DP)
	Biotoxicity ?	sampling: FGAG (SW), VIK (DP); analyses: IC-CNR
⑤ Stobreč	Nutrient concentration	sampling: FGAG (SW), VIK (DP); analyses: PHI (SW), VIK (DP)
	Heavy metals' concentration	sampling: FGAG (SW), VIK (DP); analyses: PHI (SW), VIK (DP)
	Escherichia coli abundance	sampling: FGAG (SW), VIK (DP); analyses: PHI (SW), VIK (DP)
	Enterococci abundance	sampling: FGAG (SW), VIK (DP); analyses: PHI (SW), VIK (DP)
	Pseudomonas abundance	sampling: FGAG (SW), VIK (DP); analyses: PHI (SW), VIK (DP)
	Bacterial community structure (Emerging pathogens)	sampling: FGAG (SW), VIK (DP); analyses: PHI-OGS(SW), VIK-OGS (DP)
	Biotoxicity ?	sampling: FGAG (SW), VIK (DP); analyses: IC-CNR

Table 2: List of the unit responsible for collecting samples

DP's	at DP's	in sea water	Deep in sea water
①, ②	CAFC	CAFC	Bottom (18 mt)
⑥	ARTA	ARTA	Bottom (18 mt)
③	IHP	IPH/FGAG (for CTD probe)	Surface and Bottom
④, ⑤	VIK	FGAG	Surface and Bottom

VIK will control parameters in Table 1 for its DP, the control of effluents discharged at sea level is a problem whose resolution is under investigation (see text of Panel discussion.)

2. FINAL DISCUSSION AND OPERATIONAL ASPECTS OF THE ORGANISATION

All PPs agreed in adopting the experimental plan reported in table 1: parameters to control and PP's involved both in sampling and in analysis were accordingly defined.

The experimental plan will be carried out during the bathing season 2020 from April to September. One more sample in winter time (about in February 2020) was accepted for IT PP's (both at DP and at sea water).

IT PP's will collect just one sample at the bottom (about 18 mt) in sea water (close to diffusers)

HR PP's will collect two samples: surface and bottom in sea water (close to diffusers for each DP's). FGAG and IPH are responsible for collecting them (Table 2).

The points of sampling respect to the pipeline, apart to consider the already adopted coordinates, can be selected considering the models of circulation optimised by OGS and FGAG, respectively.

The samples collected in sea water will be analysed by partners as reported in Table 1.

CTD will be used during all sea water samplings: CAFC is ok; FGAG will use its own probe during the sampling at Split plants (in sea water) and it will support IHP with its CTD probe, in sampling at Zadar plant (sea water), taking part into the operation. FGAG and IHP will organise the staff displacement between them for this activity. No other costs are expected to arise from i.e. analyses or rents of materials or boats or other, to conduct the activities agreed during the Zadar meeting because already computed in each budget.

Delivery of collected samples: dr Sangulin collected samples for Viviana Scognamiglio (CNR), now samples are still in Zadar. CNR and IPH will be in contact to transfer these samples. In the future bathing season (2020), Anna Annibaldi (UNIVPM) will receive samples accordingly to the table 1 and will pass to Viviana Scognamiglio (CNR) an amount to perform the assays.

Comune di Pescara completed a public agreement with ARTA which is responsible of the analysis for the next bathing season. Depuration plant (DP) of Francavilla a Mare is involved in the experimentation and will organize with Comune di Pescara and ARTA both the operational and administrative aspects. CAFC is available in supporting this DP to any need to recover the late start of the activities.

VIK-FGAG: an issue is represented by the difficulties in sampling at the diffusers in sea water at Split depuration pilot plant ④, ⑤ and, secondly, in conducting the analysis of these samples. The problem of the sample collection at sea water had emerged immediately after KOM and had been addressed and resolved by a 20% of budget shift for FGAG partner (accepted by LP and approved by MA / JS) in order to

allocate an amount to purchase a boat to carry out this activity. This boat, however, is not currently received by FGAG that reassured LP, at Zadar meeting, about the delivery by the end of November or December by Christmas and its commissioning for the activities planned for the next bathing season 2020 (experimental plan of activities, as agreed by all PP's during Zadar meeting, is part of the present document).

The second question concerns the analysis of sea water samples, once collected at 2 pilot plants of Split, chosen during the KOM (④Katalinica brig and ⑤Stobreč). At the moment, VIK does not have the internal capacity to perform these analyses as expected during the preparation of the AF (2 years ago). In Zara, IHP was available in the execution of these analyses together with those performed at the Zara DP plant within the frame of the project. An agreement has been concluded with VIK, to provide IHP Zara, with the consumables needed to perform these analyses. After due verification, Programma rules are not allowing this procedure. Other solutions are now under consideration to sort out of this problem: the analysis of sea water collected at diffusors close to Split plants discharging points (④ and ⑤).

FGAG suggested to better organize the deliverables of WP 5. In Annex the suggested modifications. No discussion was undertaken during the meeting because with e-mails among PP's involved in this activities it was agreed about this rationalization without modification of AF (no deviation respect to AF).