



VIGIE COVID-19+

Surveillance of SARS-CoV-2 in wastewaters: from a R&D program to a service offer for the local authorities

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Context

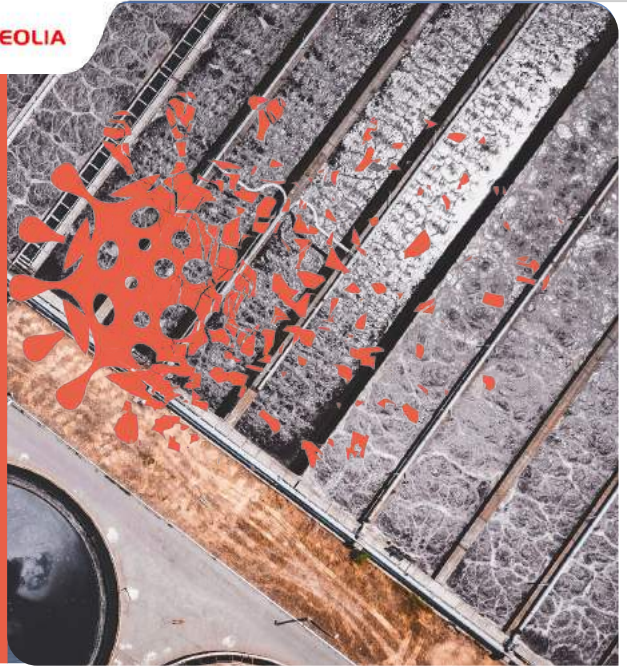
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Veolia R&D Project

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VIGIE COVID-19+
Commercial Offer

Context



How did it start?

Monitoring Covid-19 progression in Paris through wastewater analysis



Wastewater 4/11/2020 1:43



NEWS · 03 APRIL 2020 · CORRECTION 03 APRIL 2020

How sewage could reveal true scale of coronavirus outbreak

Wastewater testing could also be used as an early warning sign if the virus



Scientists have found traces of the coronavirus in several wastewater treatment plants in the Netherlands. Credit: Getty

medRxiv preprint doi: <https://doi.org/10.1101/2020.03.29.20049890>; this version posted March 30, 2020. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted medRxiv a license to display the preprint in perpetuity. All rights reserved. No reuse allowed without permission.

Title page

Title

Presence of SARS-Coronavirus-2 in sewage.

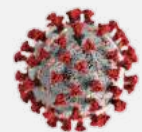
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At Veolia in the meantime

Development of "water and biosolids" RT-qPCR analysis methods:

- Monitoring of biosolids hygienization tests
- Proof of concept for wastewaters epidemiological surveillance
- Analytical expertise to validate the protocols of our partner laboratories

Since July 2020,
monitoring of 10 sites operated by Veolia



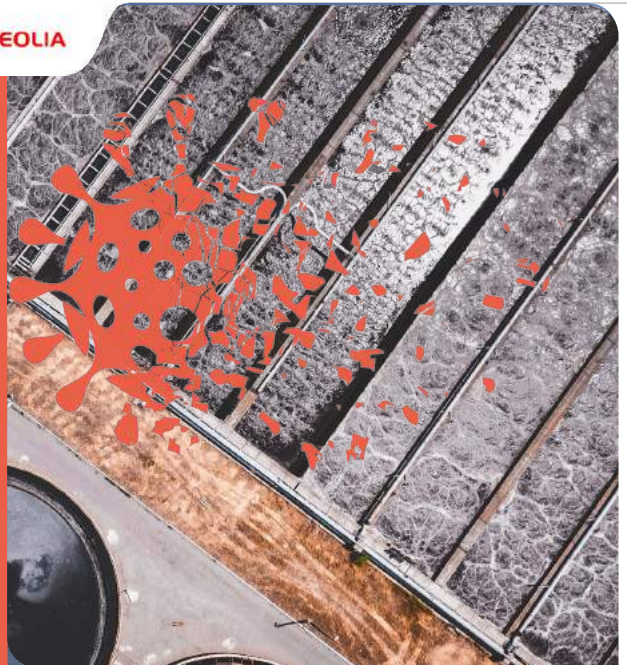
VIGIE COVID-19 offered
for WWTP **not included** in



(France)



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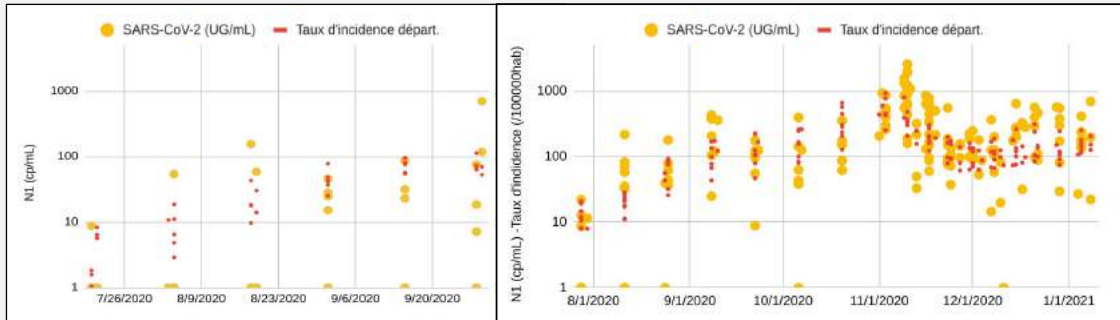


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Proof of concept for wastewaters epidemiological surveillance

2 main types of WWTP:

- **Touristic regions**, which were slightly affected by the first wave of the epidemic, and which faced a strong summer influx of population.
- **Metropolis** densely populated



→ greater variability for touristic regions

→ relevance of weekly sampling

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Proof of concept for wastewaters epidemiological surveillance

WWTP 1 - Touristic - Combined sewer - 60 000 PE:

- Upward trend of the virus in wastewaters at the beginning of December suggests a resurgence of the epidemic, but sensitivity to rainfall weakens the interpretation of the results

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Proof of concept for wastewaters epidemiological surveillance

WWTP 2 - Metropolis - Combined sewer - 550 000 PE:

- Good consistency between SARS-CoV-2 and the incidence rate, modulated by significant rainfalls that drop concentrations
- Irregular but constant increase of the virus from the beginning of December suggests a slow resurgence of the epidemic, seen about ten days later

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Proof of concept for wastewaters epidemiological surveillance

WWTP 3 - Metropolis - separate sewer - 90 000 PE:

- Good consistency between SARS-CoV-2 and the incidence rate
- From mid-November, an increase in the presence of the virus could show a local resurgence of the epidemic not seen in the incidence rate

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The technical foundations of the VIGIE COVID-19 offer

Surveillance of the evolution of the pandemic through wastewaters, is a **relevant** and **complementary** way to "traditional" epidemiological monitoring

Weekly sampling is required to hope for an anticipation of the pandemic's trend by a few days (increase, stagnation or decrease).

Contextualization of sampling is crucial to avoid misinterpretation.

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Offer for local authorities

Early warning and trends at local scale

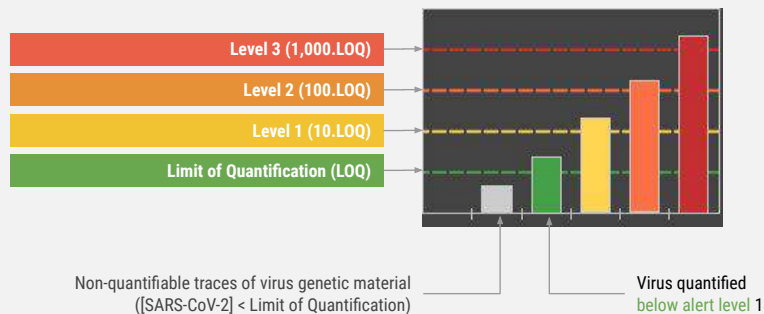


- Sampling Strategy
- Sampling and shipping
- Analysis of SARS-CoV-2
- **Dashboard:** Results interpretation within local context (weather, population, health indicators)



SARS-CoV-2 concentration

Facilitated reading of logarithmic scale using alert levels



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Dashboard to provide decision support



Results provided as table and graph, in their context:

- Rainfall
- WWTP inflow
- WWTP loads (PE)
- Epidemiological indicator

Emerging variants in wastewaters

A new name for the offer & first results

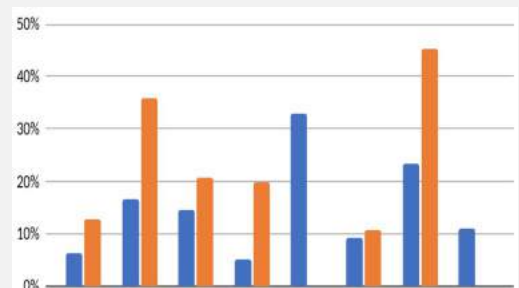
BREAKING NEWS

Emerging variant identification is now included in the offer VIGIE COVID-19+:

- % "UK" variant
- % "UK" + "South-African" + "Japanese-Brasilian")

Our results from 9 WWTPs (1/25/21 & 2/2/21) are consistent with those of Santé Publique France (Flash #1 survey conducted on 1/7/21 and 1/8/2021 and Flash #2 on 1/27/2021) from nasopharyngeal swabs :

- regional heterogeneity
- increased prevalence of emerging variants.



VIGIE COVID-19+

An accessible and customizable offer

3 months
duration
minimum



1 composite sample each week in the inflow of WWTP



SARS-CoV-2 analysis with ddPCR including **emerging variants**



BOD₅ to check on the population stability (Population Equivalent)



Display of the temporal evolution of the viral load of wastewaters within its context using an online dashboard for decision support

