



SLUDGE RECOVERY IN AGRICULTURE: ENVIRONMENT AND HEALTH PROTECTION



HOW TO FEED OUR SOIL? (RE)SEARCHING FOR SAFE AND SUSTAINABLE SOLUTIONS

Human everyday life impacts heavily on the environment. Water, soil and food may be contaminated with chemicals, possibly causing adverse effects even at negligible concentrations; natural resources, namely water and fertile soil, have been getting increasingly scarce and degraded. Their safeguard and preservation are therefore mandatory.

Agriculture, being a key pillar for human life and survival, should be highly improved in terms of efficiency and sustainability.

The SLURP project combines the **need of saving human health** and freshwater and soil ecosystems, while **simultaneously fostering the recovery of material resources** (water, organic matter, nitrogen, phosphorus, micronutrients), within the perspective of circular economy.

The leading principle of the SLURP project lies in the definition of conditions to guarantee the safe recovery of sewage sludge while fully preserving the well-being of agro-ecosystems, including crops, livestock, farmers, and consumers.

Sewage sludge production in Europe (EU27) is around 10 million tons (dry solids). Approximately 50% is spread on land for agricultural use. Indeed, sewage sludge is potentially an optimum substrate for agriculture due to its valuable content of organic carbon, nitrogen, phosphorus and several micronutrients.

FACTS AND FIGURES

- 10 million: tons of sludge produced in Europe (EU27) every year
- 50%: the percentage of sludge recovered in agriculture, in Europe
- 700.000: tons of sludge recovered in Lombardy every year
- 75%: fraction of phosphorus present in sewage that may be recovered with sludge
- 4: Research Centers involved in the project
- 17: stakeholders involved in the project drafting phase
- 30: researchers actively involved in the project
- 12: young researchers involved in the project, even with roles of responsibility
- 30: the SLURP project duration in months



Present regulations, in effect, encourage the recovery of sludge in agriculture, provided that a few chemical and microbiological indicators on sludge and soil comply with respective standards. The debate on the suitability of these regulations is still open and controversial: great attention has to be paid on potential adverse effects on ecosystem, crops, livestock and human health (also along the food chain), arising from the presence of harmful organic pollutants (also unknown), metals and microbiological contaminants.


To make the reuse of sludge safer and increase people awareness on real impacts, the actual effect of sludge (and other substrates) towards the different components of the ecosystem must be studied, thus giving a more realistic answer to the question: **is sludge reuse safe?** This is the way to promote the circular economy while ensuring the full protection of the environment and human health.

The **SLURP project** is the proposal of a multidisciplinary group, which includes experts of different disciplines: sanitary-environmental engineering, analytical and environmental chemistry, agronomy, agricultural microbiology, ecology, human and environmental toxicology, hygiene and public health.

Supported by



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 SLURP Project

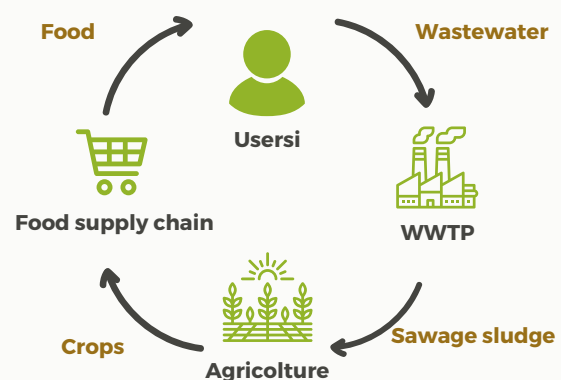
THE RESEARCH CONSORTIUM

The **University of Brescia**, leader of the project, participates with five departments and coordinates the activities carried out by the **University of Milan**, the **Mario Negri Institute of Pharmacological Research**, and the **Helmholtz Zentrum of Munich**.

WHAT ARE OUR OBJECTIVES?

The aim of the project is **to build a technical-scientific background for developing a characterization protocol of sewage sludge (and other residues)** based on chemical-physical and ecotoxicological assays which, together with a risk analysis that evaluates the exposure paths for organisms and humans, might be adopted for defining safe procedures for recovering organic substrates in agriculture.

SEWAGE SLUDGE AND CIRCULAR ECONOMY



Gli Stakeholder

Several stakeholders have been involved since the very beginning of the project, such as managers of wastewater treatment plants, companies operating in the field, public institutions devoted to define regulations and norms, companies which might benefit from the exploitation of the results of the research, organizations involved in the labelling-certification of products and technologies, environmental and sector associations etc.