

# The Variability of Textural Properties and Drying Characteristics of Dehydrated Sewage Sludge (Applied case - Liège Belgium)

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## RESUME

This study delves into the variability of drying behavior and textural properties of real samples of dehydrated sewage sludge (DSS), focusing on characterizing and correlate those parameters. A series of experiments including, dry matter content determination, volatile matter content analysis, convective micro-drying, convective macro-drying, texture profile analysis (TPA), penetrometry, volume and area change during drying, and amplitude sweep were conducted on DSS samples from five wastewater treatment plants (WWTP) located around the city of Liège (Belgium) as shown in figure 1, to explicate the diversity of DSS, covering the possible factors that can alter DSS drying, and texture such as origins, history of treatment, mechanical traits, and others.

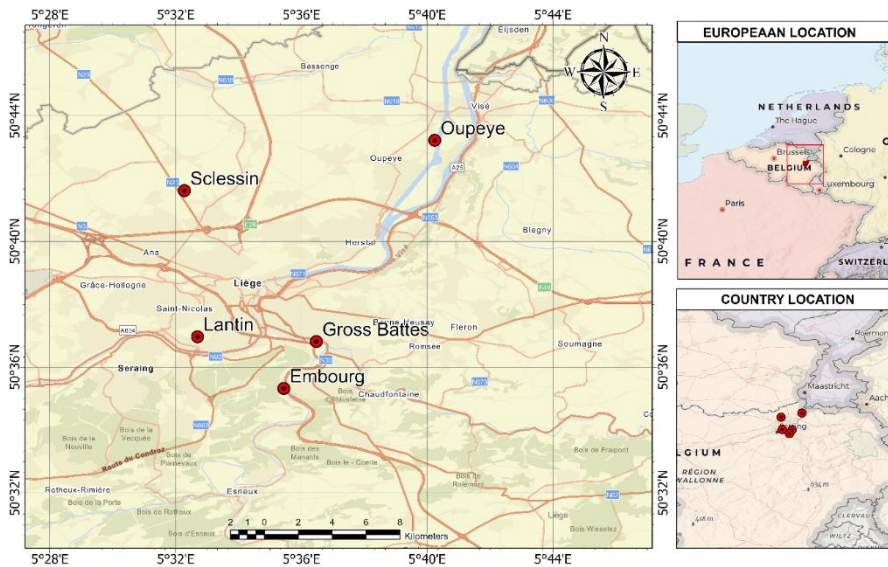


Figure 1: Map of Liège WWTPs considered in the study

Table 1 highlights the characteristics of the five WWTPs that were covered in this study, each utilizing similar or different treatment and mechanical methods. By characterizing properties such as adhesiveness, cohesiveness, hardness, viscoelastic, and rheological behavior, it is possible to establish their correlation with the drying process performance, as indicated by factors like drying rate, duration, and alterations in moisture content. The research provides a contribution to a better future, adding knowledge to a field that still has room for enhancement.

**Table 1: Highlights of the WWTPs considered in the study**

Station code	S1	S2	S3	S4	S4
Name	Embourg	Lantin	Gross Battes	Sclessin	Oupeye
Capacity [PE]	24300	31500	53100	135000	402000
Commisioning	Belt Filter	2003	2002	2001	2007
Dewatering technology	Belt Filter	Belt Filter	Belt Filter	Press Filter	Centrigration
Liming	X	X	X/√	√	X
Carbon treatment	√	√	√	√	√
Nitrogen treatment	√	√	√	√	√
Phosporus treatment	√	√	√	√	√
Bacteriological treatment (UV)	X	X	X	X	X

The findings may empower wastewater treatment facilities to make decisions regarding DSS handling by presenting the impact of rheological and texture properties on the drying behavior, aiming to enhance operational efficiency, reduce environmental impacts, and align with sustainable waste management practices. Finally, the DSS liming effect on the various parameters was analyzed, showing the benefits and possible limitations.

**MOTS-CLES DU THEME :** *Traitement, valorisation, déchet.*

**MOTS-CLES LIBRES :** *Sewage Sludge; drying; texture, viscoelasticity.*

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