

Revisiting the potential of anaerobic digestion for the production of biomethane and high added value products



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Biogas production plants in Europe



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Biogas upgrading plants in Europe



(IEA Bioenergy 2018)







Biological CO₂ Removal Technologies





A P. B. Prat





Biological CO₂ Removal Technologies



Photosynthetic Upgrading









Upgrading Capacity: 300 Nm³/h of biogas



Biological CO₂ Removal Technologies

Photosynthetic Upgrading



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A comparative analysis of biogas upgrading technologies: Photosynthetic vs physical/chemical processes

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Siloxanes Removal Technologies

Biological Siloxane Removal Technologies

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- Siloxanes are biodegradable
- Siloxanes removal is limited by gas-liquid mass transfer





Two-Phase Partitioning Bioreactors

TPPBs are based on the addition to a bioreactor of an immiscible, non-volatile, biocompatible and non-biodegradable organic solvent with a high affinity for the target gas pollutant.....

e. q. Silicone oil Heptamethylnonane



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Biogas

Biogas + Valeric acid



98

100

75

2

0

25

 47.9 ± 0.7

52.2 ± 2.1

 53.8 ± 0.8







55 % biogas to CHP+ 45 % biogas to PHA

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- Biotechnologies for biogas upgrading are being successfully scale-up and validated
- Photosynthetic biogas upgrading can support a simultaneous H₂S and CO₂ removal with a concomitant removal of nutrients from digestate

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- TPPB can support an effective siloxane removal
- Biogas represents a valuable feedstock for the production of commodities and high-added value products



Co-authors



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Thank you for your Attention

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