Optimised anaerobic treatment of house-sorted biodegradable waste and slaughterhouse waste in a high loaded half technical scale digester

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INTRODUCTION

In an EU-CRAFT research project the anaerobic digestion of organic wastes from households, slaughterhouses and processing industries was optimised in half technical scale. AD processes are an ideal biological treatment technology for organic wastes. However, prior to the treatment of new waste streams as substrates series of investigations are required to develop and optimise an efficient and stable process.[1] Due to change in market and regulation slaughterhouse wastes are a new challenge to be treated anaerobically. New regulations (e.g. Animal by-product regulation (ABP) (EC) No 1774/2002) define clearly which waste streams from slaughterhouses and food processing industry can be used for AD.

The main intent of this project was:
• To assess the treatment concept of OFMSW (pressed liquid) and high organic waste streams from slaughterhouses and food processing industry
• To establish a stable AD process under very high organic an nitrogen loading rates, focused on free ammonia inhibition [2]
• Test a high loaded first phase of a two phase AD process in half technical scale, that is advisable for highly biodegradable wastes containing fats.
• Only 3 feeds per day should improve the treatment of slower degradable a good quality end-components as well.
• After feed-stop the degradation was observed for another 15 days without additional feed. The HRT kept constant at 21 days.

MATERIALS AND METHODS

At the site of SESA waste treatment in Northern Italy a half technical scale pilot plant was set up: A 4 m³ Anaerobic Digester (CSTR, T= 37.5 °C) and a 700 l hygienisation unit following EU ABP-Directive
• Full PC - PLC control and intensive on-line and laboratory process control: VFA, COD, TSS, VSS, NH₄⁺-N, TKN, CH₄, CO₂, H₂, H₂S, Gas Flow
• The substrates were taken out of SESA organic waste treatment process: OFMSW (Door collection), food industry
  • Poultry slaughterhouse waste
  • Blood, fat, carcasses
  • Meat industry (concentrated animal fat, proteins)

RESULTS AND DISCUSSION

• The substrates were taken out of SESA organic waste treatment process: OFMSW (Door collection), food industry
  • Poultry slaughterhouse waste
  • Blood, fat, carcasses
  • Meat industry (concentrated animal fat, proteins)

According to the Austrian law, slaughterhouses are required to separate their waste streams into three fractions: (1) plastics and paper, (2) organic waste (dry fraction) and (3) liquid fraction. Since 2009 the liquid fraction is treated via composting at the site of SESA waste treatment in Northern Italy. The goal of this project was to optimise these treatment processes.

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