

Typical problems in the fermentation biology

Apart from a deficiency in essential nutrients, there are a number of other issues that might cause problems in the fermentation process. These include "typical" operating problems, such as for example abrupt changes in the fermentation temperature or "overfeeding" after a substrate change. Problems can also arise, if substrate rich in protein or fat is added too quickly to the process.

Table 1 lists typical problems encountered in biogas plants, their causes and possible remedies.

Tab. 1: Typical problems in biogas plants, their causes and possible remedies

Problem	Cause	Remedy
Over-acidification	• Overfeeding	• Adjust substrate infeed • Increase circulation in secondary fermenter
	• Deficiency of essential nutrients	• Add BC.PRO, adjusted micro-nutrient mixture
	• Excessive ammonia in fermenter	• Reduce protein source in substrate (if possible) • With thermophile operation, reduce temperature to mesophile range • If occurring together with trace element deficiency: Add BC.PRO special mixture for plants with high ammonia concentrations
	• Temperature increase (fluctuations)	• Reduce substrate infeed • Increase circulation in secondary fermenter
Low gas yield	• Deficiency of essential nutrients	• Add BC.PRO, adjusted micro-nutrient mixture
	• Insufficient mixing of substrate (partial pressure inhibition)	• Reduce mixing intervals • Reduce dry substance content in fermenter, e.g. by means of recirculation • Upgrade mixing equipment
	• Occurrence of inhibitors, in particular NH ₃ and H ₂ S	• If possible, remove inhibitor from substrate mixture • Remove inhibitor by chemical reaction or precipitation, for example by using a special mixture from the BC.PRO product range • Reduce inhibiting effect by diluting mixture
	• Impaired hydrolysis (pH > 8)	• Increase C:N ratio of substrate • Lower temperature to 37-40°C • Reduce dwell time

Tab. 1 (continued) Typical problems in biogas plants, their causes and possible remedies

Problem	Cause	Remedy
Scum layers	<ul style="list-style-type: none"> • Add water • Increase temperature • Use of poorly macerated, fibre-rich substrate • Incorrect installation of solid infeed and mixer 	<ul style="list-style-type: none"> • Increase mixing rate and adjust infeed • Quickly increase dry substance content in fermenter • Lower substrate level to improve effect of mixer
Bottom deposits	<ul style="list-style-type: none"> • Add water • Increase temperature • Use of unmacerated cereal or maize cobs • Insufficient mixing rate 	<ul style="list-style-type: none"> • Crack or crush corn before adding it to the fermenter • Increase mixing rate once per month (homogeneous mixing)
Foam	<ul style="list-style-type: none"> • Generally associated with abrupt changes in ambient parameters (pH, temperature) • Change of substrate (changed content of fat, sugar, pectin, etc.) 	<ul style="list-style-type: none"> • Smooth transitions when changing substrate • Increase dosing interval (hourly) • Increase mixing rate • Increase or reduce dry substance content in the fermenter (depending on foam consistency) • Add substrate causing problem with great care • Use foam control agents
Technical problems	• Measuring equipment	• Regular inspections/servicing
	• Mixing equipment	• Carry out regular function checks
	• Pumps	• Carry out regular function checks
	• Control system	• Carry out regular function checks