

# Antifoams in Brewing

Efficiency and quality benefits from  
using antifoams in brewing

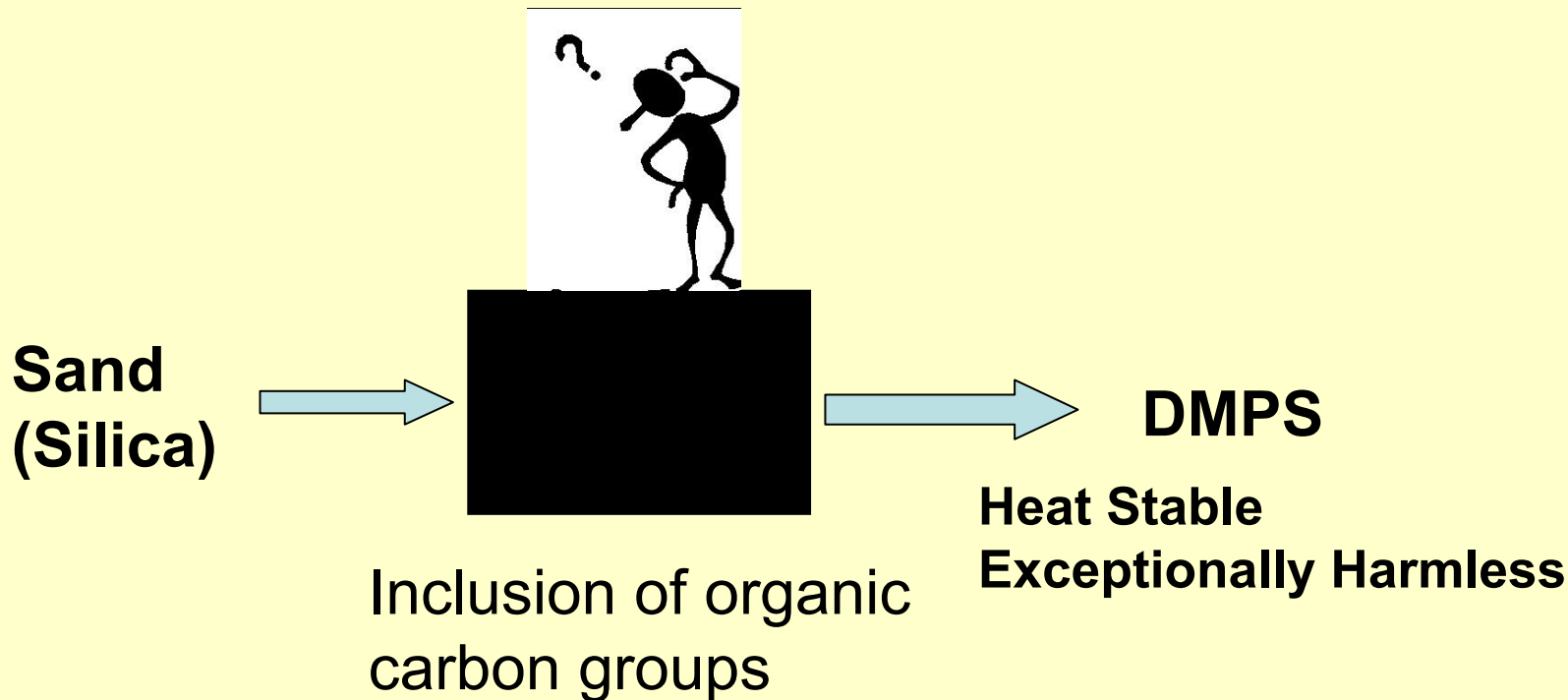
Brent Jordan



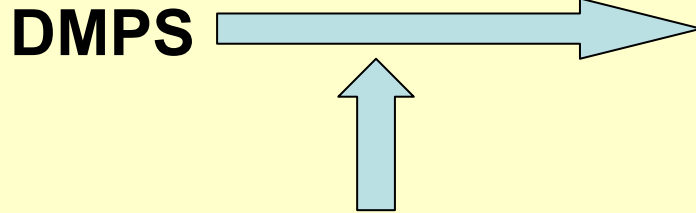
# Outline

- Properties of antifoams/mode of action
- Application methods
- Effects and benefits

# Production of Silicon Antifoams



# Production of Silicon Antifoams



High temperature  
Microbiological stabilisers  
Physical stabilisers



**Antifoam**

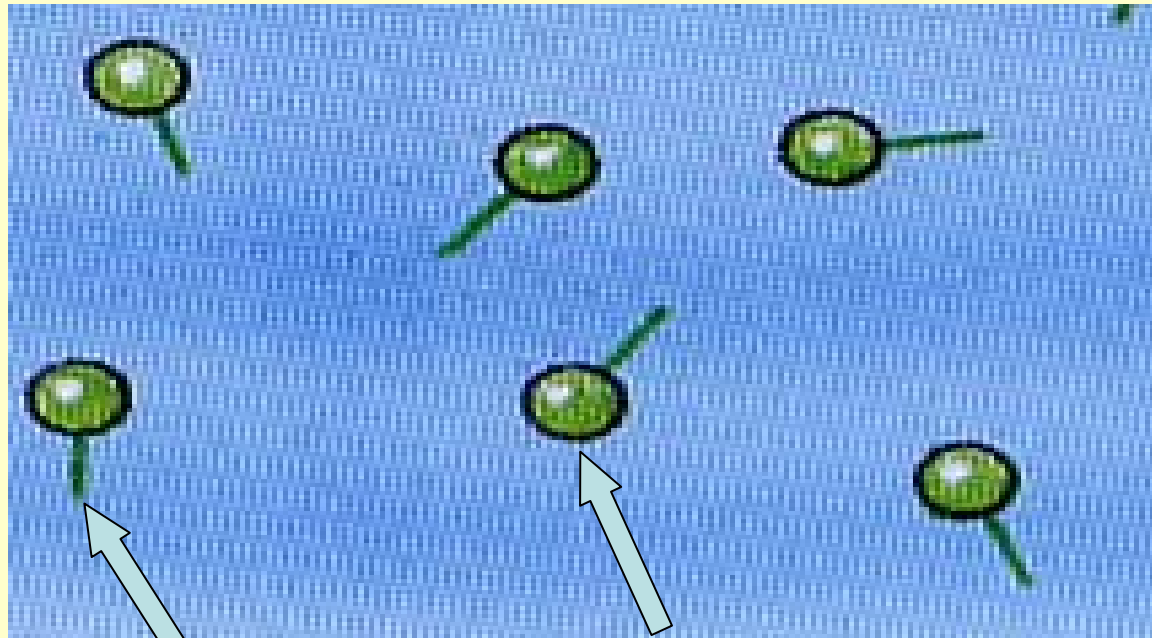
# Foam

Foaming in industrial processes is undesirable

Foaming during brewing production is particularly undesirable

Foaming occurs during wort boiling and fermentation

# Foam active components

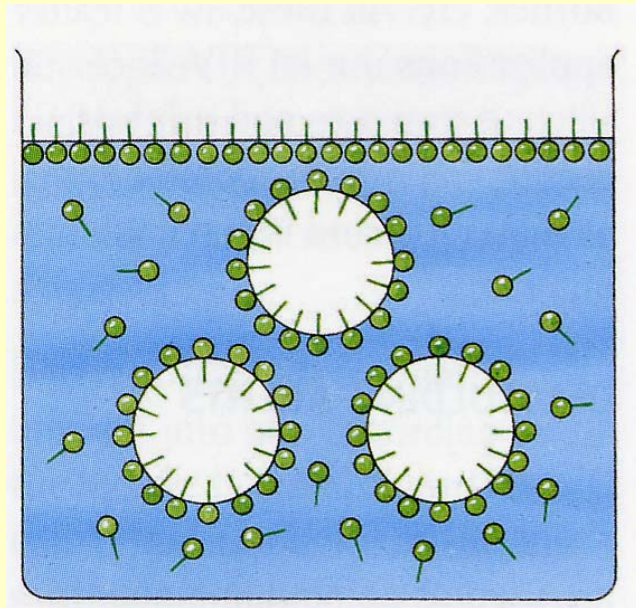


Hydrophobic

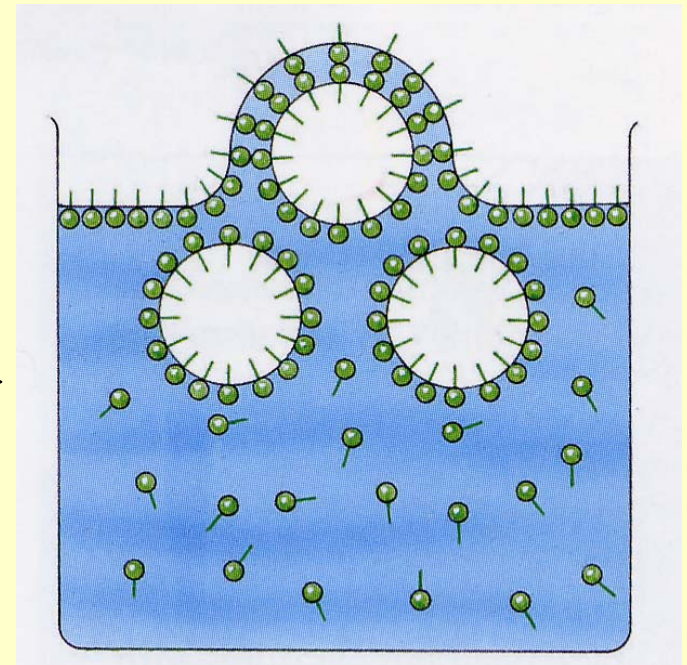
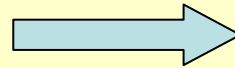
Hydrophilic

# Foam/Bubble Formation

Foam active components + gas



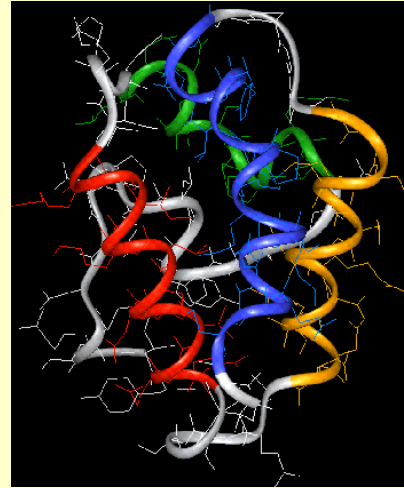
Gas bubble evolution in liquid



Interaction of foam active materials at liquid surface

# Foam Active Substances in Beer

Proteins/polypeptides  
-modified LTP  
-Protein Z



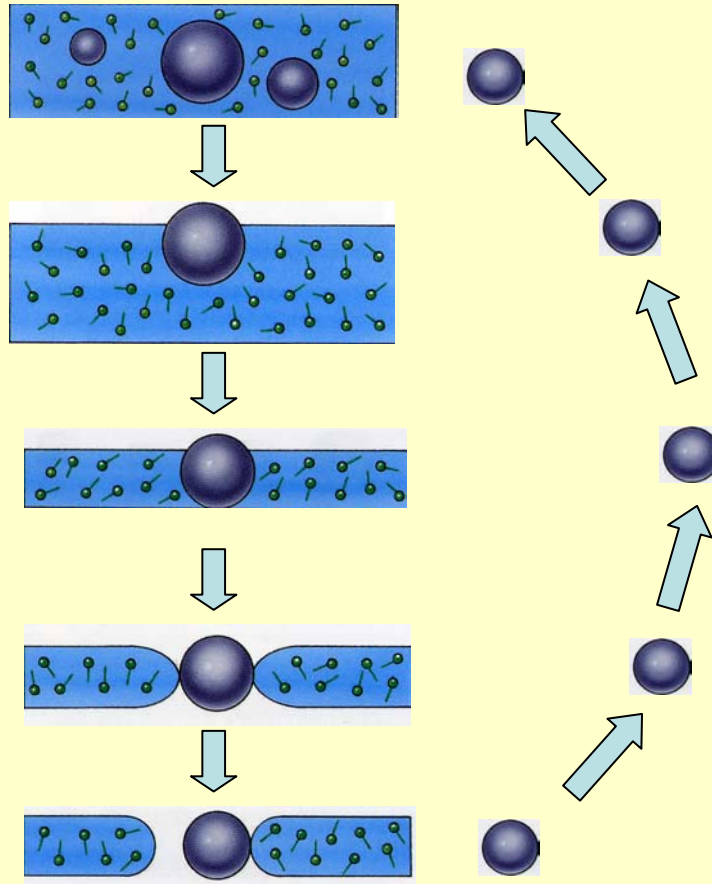
Iso-alpha acids – a supporting role!

Foam negative substances in beer include alcohol, other fermentation by-products and also high concentrations of amino acids



# Antifoam Action

Surface tension of antifoam is lower than that of foam bubble's walls resulting in disruption of bubble wall, collapse and liquid drainage



# Antifoam – Foam Suppression



40hrs fermentation

- antifoam

(CONTROL VESSEL)

+ antifoam

(TEST VESSEL)

# Addition Methods



Simple but effective!

# Addition Methods



1000kg tank + automated dosing

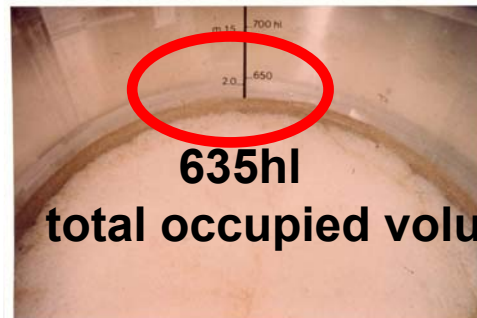
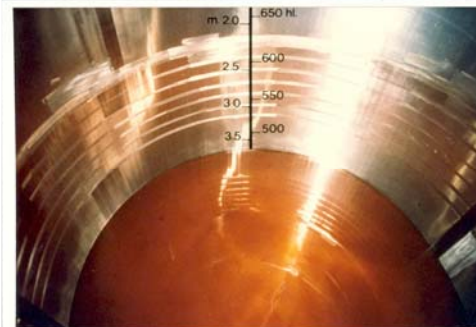
# Benefits of Using Silicon Antifoams in The Brewing Process

- Increased available fermenter capacity  
(immediate major benefit – plant utilisation/production efficiency improvement)

# Effect of Antifoam – lager fermentation



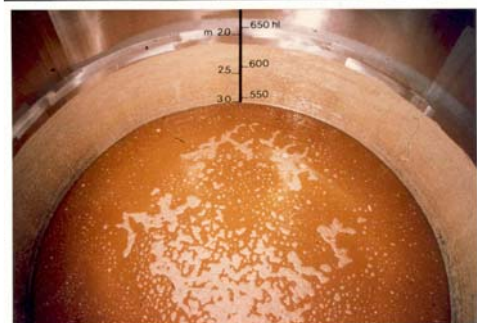
**start**



**40 hr**



**480hl  
total occupied volume**



**64 hr**



**- antifoam**

**+ antifoam**

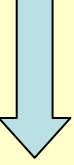
# Effect of Antifoam on Fermenter Capacity

Fermentation time	+ antifoam	- antifoam
start	470 hl (+0%)	540 hl (+0%)
18 hr	480 hl (+2%)	580 hl (+7%)
40 hr	480 hl (+2%)	630 hl (17%)
64 hr	480 hl (+2%)	540 hl (+0%)

# Improved Fermenter Utilisation = Direct Cost Reductions

More beer volume in  
each fermenter =

• CIP cost      \$↓  


• (Cooling cost?)      \$↓  




# Foam behavior by CCD camera during fermentation



**Foam oscillations happen in whole surface.**

# Benefits of Using Silicon Antifoams in The Brewing Process

- Improved foam stability in final beer  
(quality improvement)

# Effect of Antifoam on Final Pack Beer Foam

Antifoam Addition (ml/hl)	Beer Foam after Processing (Rudin $\frac{1}{2}$ Life)
0	97.5
1	98.4
2	98.1
4	98.1
8	97.6

# Benefits of Using Silicon Antifoams in The Brewing Process

- Improved hop utilisation  
(financial, significant)

# Effect of Antifoam on Final Pack Beer Bitterness

Antifoam addition rate	Trial A	Trial B
0 ml/hl	21.5 EBU	19.1 EBU
1 ml/hl	25.0	23.6
3 ml/hl	24.3	21.8

# SUMMARY

**Antifoams have been used in brewing for 30+ years**

**Easily measurable benefits;**

- **Capacity utilisation (+15-20%)**
- **Bitterness yield (+10-20%)**
- **Reduction in cleaning chemicals**
- **Improved foam formation in glass**
- **Cleaner CO2 recovery**
- **No negative effect on;**
- **Fermentation performance**
- **Beer flavour**
- **Beer bitterness quality**