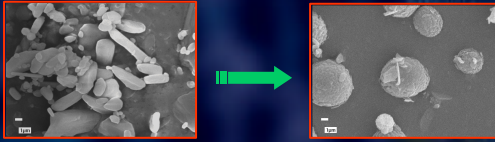


Processing of Spherical Crystalline Particles via a novel Solution Atomisation and Xtallisation by Sonication (SAXS) Technique



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Particle Engineering Approach

Requirements

Highly dispersible particles with low cohesive and adhesive interactions

Parameters

Minimise surface free energy

Crystalline structure or an interfacial free energy lowering agent

Particle Size

Aerodynamic \AA 0.5 - 5 μm

Stability

Crystalline structure

Reduce contact area

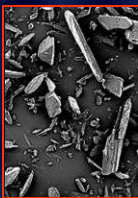
Spherical shape and surface rugosity

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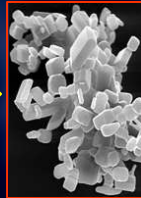
Drug Particle Morphology

$$\gamma^{\text{LW}} = 41.6 \text{ mJm}^{-2}$$

$$\gamma^{\text{LW}} = 31.3 \text{ mJm}^{-2}$$



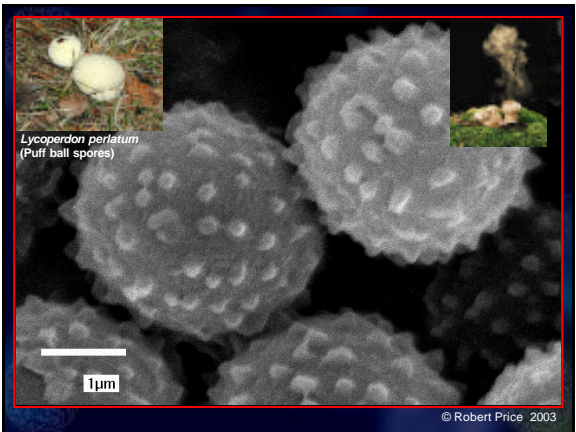
Micronised Drug



Controlled Crystallisation

Future?

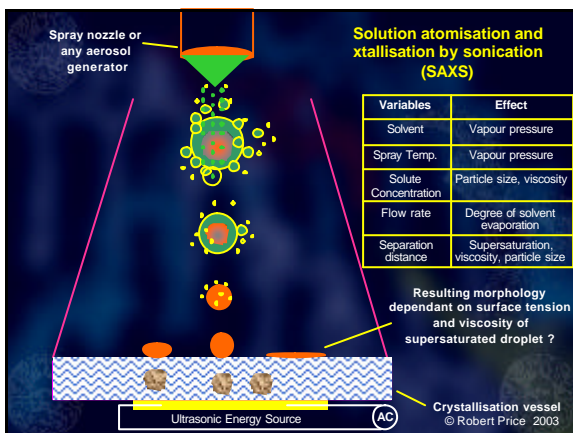
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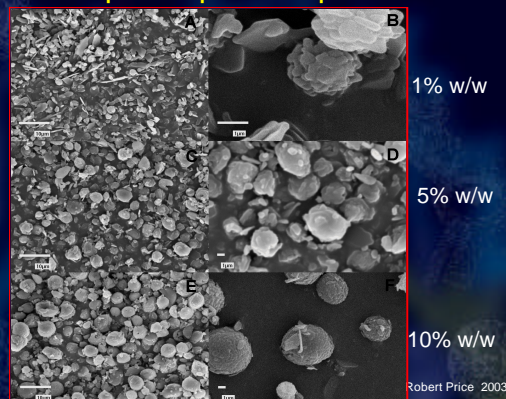
Lycopodium perlatum
(Puff ball spores)

1 μm

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SAXS produced paracetamol particles

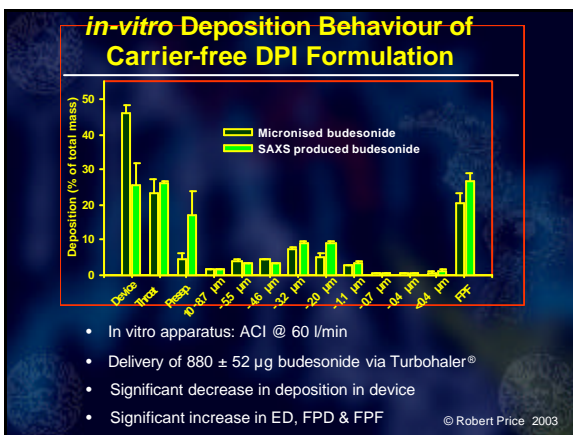
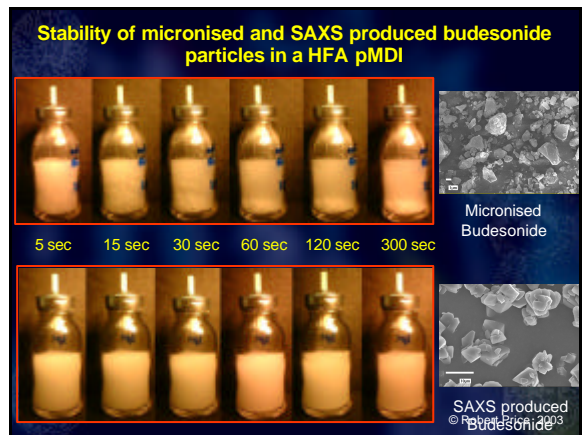
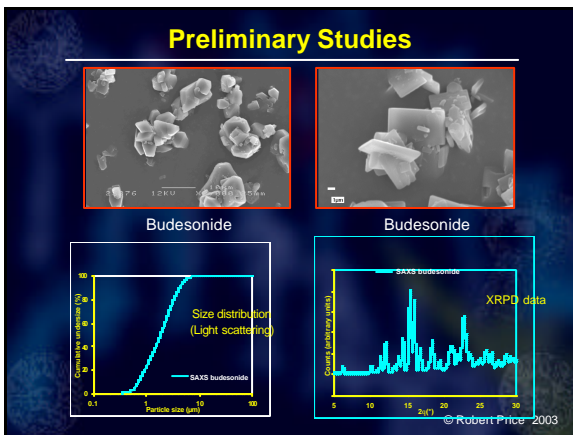
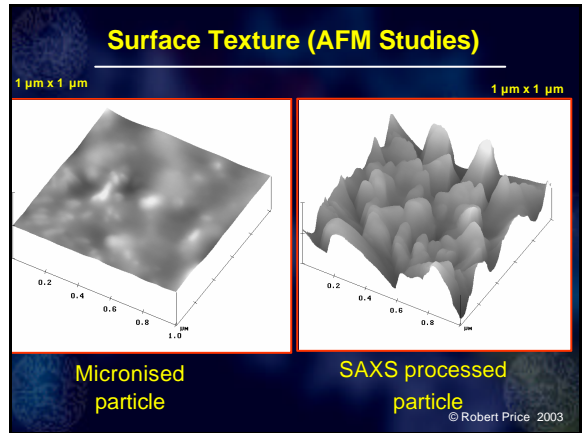
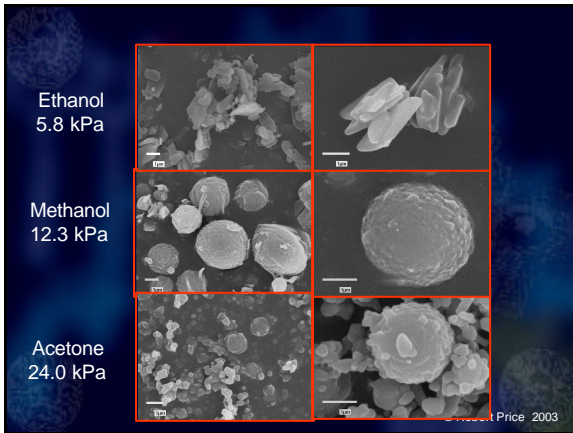


1% w/w

5% w/w

10% w/w

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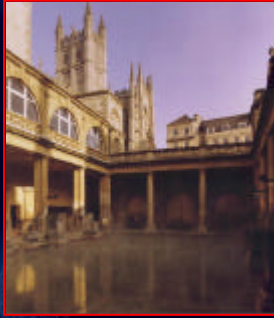
Conclusions

- The single step SAXS process can produce particles:
 - In the desired size range.
 - Crystalline structure.
 - Spherical-like morphology.
 - Degree of surface asperities.

SAXS particles exhibit increased stability in model pMDI formulations and a significant increase in ED and FPD for a drug only DPI formulation.

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