



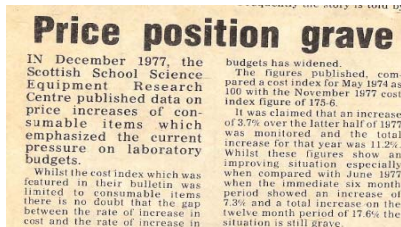
christison Particle Technologies

Thirty years on and what's so different?

Presenting the 2008 edition of the bank's influential Equity Gilt Study, strategist Tim Bond said an extended period of disinflationary growth that had accompanied the early industrialisation of developing countries such as China had come to an end. In a bleak assessment of the global outlook, he forecast "rising real resource prices and a degenerating ecosystem, in turn catalysing changes to the fundamental structure of the economy". He concluded: "In the future, fluctuations in output growth and employment may be somewhat larger than we have been accustomed to seeing over the past two decades." He predicted a period of painful retrenchment from today's "unsustainable" levels of household debt, and said the bursting of credit and housing bubbles was


inevitable. Portfolio investors should put the majority of their assets into the natural resources sector and invest in the emerging industries that would be spurred by higher commodity prices and increased scarcity, he added.

The echoes of the 1970s in Mr Bond's gloomy analysis of the outlook for the global economy were picked up in the study's statistical detail which showed that the 10-year return from shares was the worst since the decade between 1967 and 1977, a period that included the first Opec oil shock and the early days of stagflation, when prices rose sharply even as the economy stagnated.




The extract (left) is from the November 1977 'Christison News' and discusses the differences in the amount of money spent on laboratory research and equipment across the world. Thirty years ago Italy which has a similar population to the UK, spent 50% more than the UK whilst Holland with only a quarter of our population, spent 15% more than the UK.

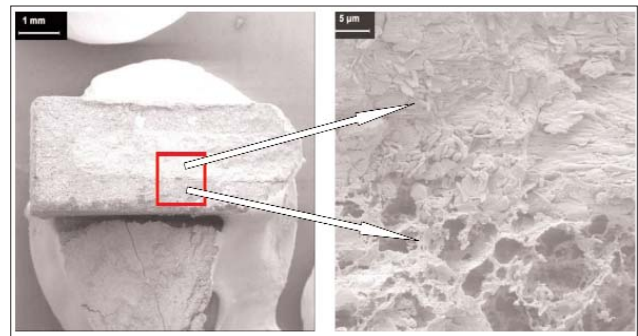
This extract from the January 1978 Christison News shows the concern felt when prices rose faster than budgets



If you're still hand grinding in a mortar and pestle - see the automated mortar grinder on page 4 - powdered tomato in a few minutes!



Determination of the particle size and particle shape of pharmaceutical granules with the Camsizer digital image processing system - see page 3



Diffusion front in a drug after 10 hours release. Left: 2 areas can be recognized: a) inner (lighter) area, structure with active substance and b) outer (darker) area, structure without active substance. Right: Magnification of the transition zone. Upper half: Active substance not yet dissolved; lower half: active substance has been dissolved and the structure is empty

Christison Particle Technologies Limited
Albany Road, Gateshead, NE8 3AT, UK

Tel: +44 (0) 191 478 8120 Fax: +44 (0) 191 490 0549

sales@christison.com www.christison.com

Determination of the Particle Size and Shape of Pharmaceutical Granules using the Camsizer Digital Image Processing System

Stefanie Christian; Dr Karl G. Wagner, Chair of Pharmaceutical Technology, University of Tübingen, Germany



Pharmaceutical granules often have irregular shapes and variable sizes, and are commonly prepared from mixtures of dry active substances, fillers and excipients using mills and sieving. More recently a "retard drug" form consisting of dry granules, which release the active drug over time, is benefitting patients compared to conventional drug forms.

Figure 1 shows a combination of the anti-asthmatic agent theophylline with ammonium methyl methacrylate co-polymer and ethyl cellulose. The greater the surface area to the particle volume and the smaller the particle, the more rapid the release of active substance. The most relevant calculation of surface/volume ratio was found to be based on an ellipsoid (see figure 2). In order to predict the release behaviour, surface area, volume and size distribution of the granules are required. These can be measured using the Camsizer® dynamic image analysis system in which the granules free fall past two CCD cameras measuring different size ranges, size and shape being evaluated in real time over typically five minutes analysis time. Many mathematical

parameters available in the Camsizer® software enable detailed characterisation of these irregularly shaped and sized granules. Theophylline release rates from five known sized sieve fractions of granules were studied (see figure 3) along with particle size and shape in order to provide a model for unknown granule fractions.

The release profile of the theophylline can be predicted for any granule fraction provided that size and surface/volume ratios are known (see figure 4). In conclusion, the Camsizer® is a more efficient alternative to traditional image analysis for characterising size and shape of inhomogeneous granular materials. Determination of the surface/volume ratio describes exactly individual granule fractions such that the future release profile prediction of unknown granule fractions will become a reality.

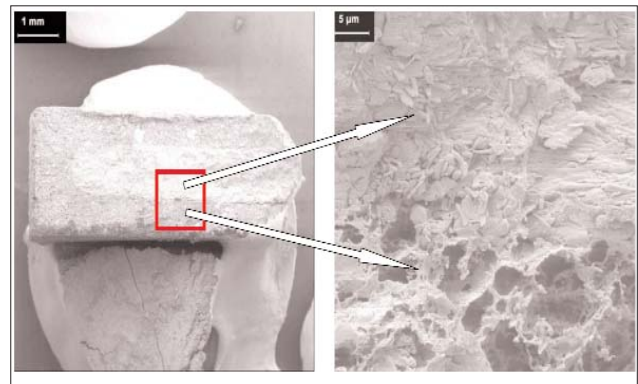


Fig.1. Diffusion front in a drug after 10 hours release. Left: 2 areas can be recognized: a) inner (lighter) area, structure with active substance and b) outer (darker) area, structure without active substance.

Right: Magnification of the transition zone. Upper half: Active substance not yet dissolved; lower half: active substance has been dissolved and the structure is empty

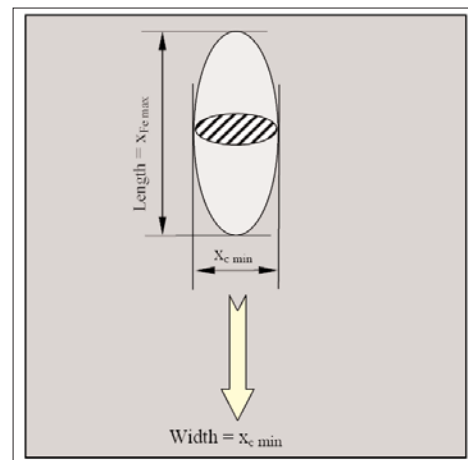


Fig. 2 Ellipsoid calculation model

$$V_{\text{Ellipsoid}} = \frac{x_{Fe \max} \cdot (x_{c \min})^2 \cdot \pi}{6}$$

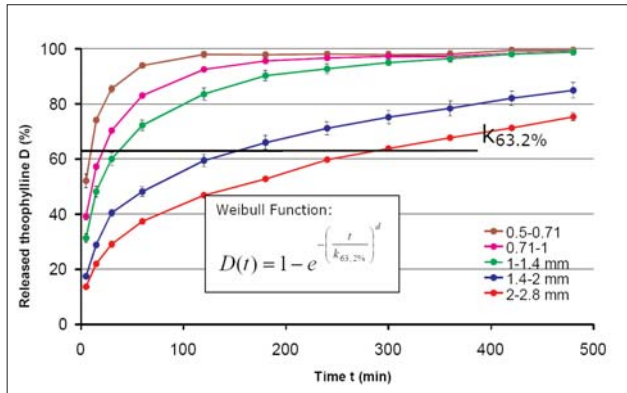


Fig. 3: Release rate as a function of granule size for the 5 fractions studied. The smaller the granule, the greater the amount of theophylline released. t is the time in minutes and d a formulation-dependent constant with the value 0.5

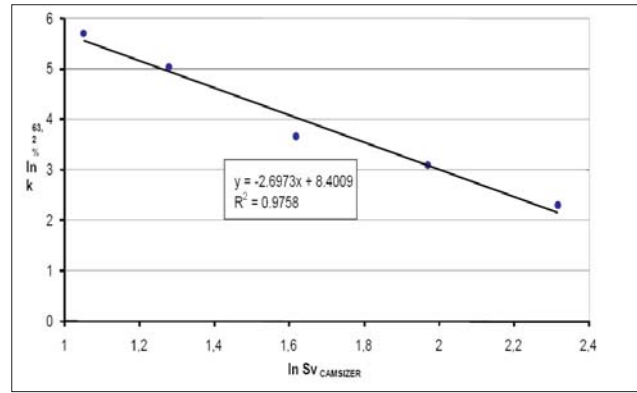


Fig. 4: shows the relationship between the surface/volume ratio S_v (determined with the Camsizer) and the Weibull parameter $k_{63.2\%}$, determined via the release profile

Table X1	
Granule fraction (mm)	$k_{63.2\%}$ Parameter (min)
0.5 - 0.71	10
0.71 - 1	27
1 - 1.4	39
1.4 - 2	154
2 - 2.8	300

Table X2	
Granule fraction (mm)	S_v CAMSIZER
0.5 - 0.71	10.14
0.71 - 1	7.17
1 - 1.4	5.04
1.4 - 2	3.59
2 - 2.8	2.86

Waring Laboratory Blenders



All Waring blenders are ruggedly constructed and designed for frequent use when processing free-flowing material with a high liquid content. The wide range of blending accessories meet the most demanding needs.

The bases on all 1-Litre blenders have epoxy coated motor housings and are complete with either a stainless steel or heat resistant glass container each fitted with a standard blending assembly. All containers supplied with new blenders have a handle and a two-piece vinyl/styrene lid.

The two-speed 2-Litre blender has a powerful 1-HP motor and will grind, shred, disintegrate or mix a wide spectrum of free-flowing materials with a high liquid content. All 1-Litre and Mini containers can be used on the 2-Litre motor base unit providing

the 21/AD2 adaptor is purchased.

The top of the range 4-Litre blender is ruggedly constructed, easy to move and clean. The epoxy coated motor base unit has push-button control panel and full traction rubber feet for greater stability. The stainless steel container has two handles and a see-through clamp-on polycarbonate lid. Any 1-litre or mini container can be used on the 4-Litre motor base providing the 21/AD1 adapter is purchased

Visit our web site or email us at sales@christison.com for more information on the many containers and accessories we keep in stock. We also stock thousands of spare parts. If you need help with your blending application our Technical Sales department will be pleased to advise you. Tel: 0191 478 8120

Thanks to the gentle grinding, one of the main applications for this mill is in the pharmaceutical industry to confirm the quantity of active ingredients in tablets.

10 - 20 tablets are ground in either an agate or porcelain grinding set and after 1 to 5 minutes a fine (< 100 microns) homogeneous powder is produced ready to be analysed.

In addition to comminution, other applications for this mortar grinder

include the mixing of solids or the mixing of solids with liquids. For instance, it is used for mixing pure liquid mercury with a fine metal powder.

Another application is the mixing of a metallic powder with a high-viscosity synthetic resin. Using a grinding set of hardened steel and a grinding time of 30 mins, it is possible to homogeneously mix solids to over 80 percent by weight by gradual addition of the powder

Pulverisette 2 Mortar Grinder

Grinding Sets available in Agate, Porcelain, Stainless Steel, Sintered Corundum, Tungsten Carbide and Tempered Steel

- Applications**
- Pharmaceuticals
 - Chemistry
 - Foodstuffs
 - Agriculture
 - Ceramics
 - Metallurgy
 - Mining
 - Metallurgy
 - Rocks
 - Soils



The images above show the 'doping' of ceramic powders with very small quantities of substances dissolved in a liquid. During operation of the mill, roughly 1ml of coloured liquid was slowly dripped into the ceramic powder. After five minutes, a homogeneous, visually uniform powder is obtained.



The image above shows the grinding of tomato pieces which are first frozen in liquid nitrogen to make them brittle. They are then placed in a stainless steel mortar bowl with some liquid nitrogen and after a few minutes grinding the result is a fine, homogeneous powder

SPECIAL OFFERS

All of these items may be viewed at our premises in Gateshead

Further information from
Mary Gourley
sales@christison.com
Tel: 0191 478 8120

Prices do not include carriage or VAT



Gilsonic sonic sieve, used in our own laboratory, fair condition. Less than half the price of a new unit
First offer over **£3,000**



Endecott EFL2 Mark 2 and Mark 3 sieve shakers available, old model, reasonable condition, sold as seen, suitable for 300mm sieves. **OIR £350**



Ex-demo digital fluid bed dryer base unit, fair condition, sold as seen
£1,499



As New Waring 21/CB62T 4-litre commercial 3-speed heavy duty blender with timer
£999



2-litre Waring Blender, stainless steel container, refurbished, 3 months warranty **£450**