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Retsch®

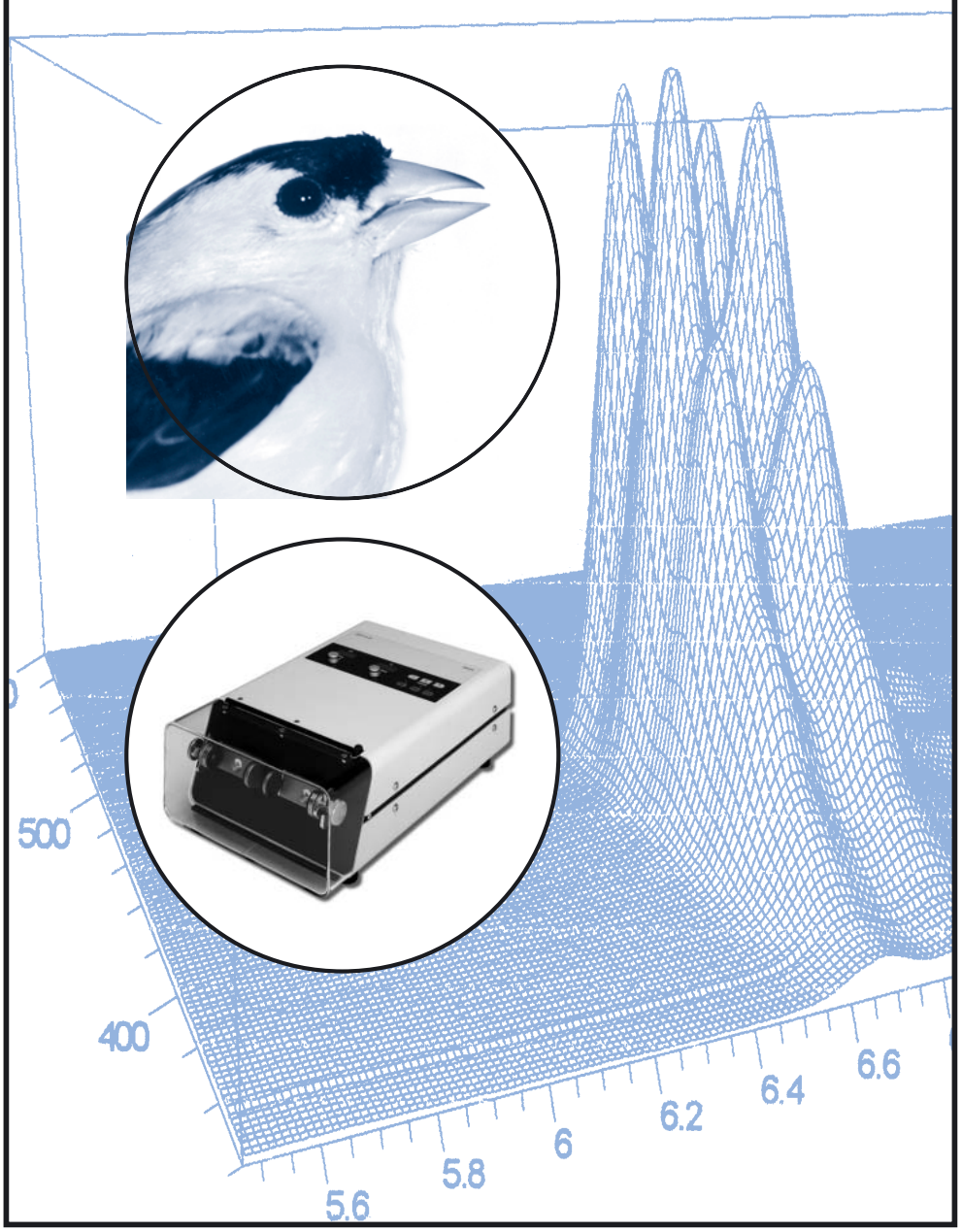
the sample

No. 23

Information and News from the field of solids preparation and characterisation in laboratories and industries

MAIN FOCUS:

- **NEW SIEVE SHAKERS AS 300 AND AS 400**
- **BIOLOGY/MEDICINE**



Contents

EDITORIAL

Dear Readers,
dear Customers and Business Friends,

Quality assurance starts with sample preparation. In close cooperation with you we can carry out a critical check – on request – of your whole sample preparation procedure for possible sources of error which could affect your measuring system and therefore falsify your analytical results.
This means that accurate knowledge of your particular requirements is important to contribute in direct contact with you, the user, to effective problem solutions.

Quality assurance also means test agent monitoring. If the test agents – as sieve shakers and test sieves – have not been checked then the subsequent analytical result must be accompanied by a question mark.
This is why we, provide you with test agents that can be calibrated and recalibrated within the framework of proper test agent monitoring. In this respect calibration certificates are also demanded for company certification according to ISO 9000 ff.

The test agent must be designed so that its measurable variables, can be traced back to a national standard at any time. This means that a gapless "calibration chain" must be demonstrated and documented from the instrument to a national standard via works standards and reference standards.
All test agent certificates issued by our company confirm that this sequence has been observed.
The real purpose of this traceability is the exact quantification of the measuring tolerance of an instrument. With the calibration we provide you the evidence that the relevant parameters of the Retsch instruments (like amplitude, number of revolutions, sieve acceleration, time) are within the narrow tolerances. Digital setting and integrated control of these parameters signify for you reproducible and accurate results.

In this context we are particularly proud of the realisation of the sieve frame acceleration as a reference value in sieve analysis. This means that the analytical result is completely independent of operational parameters such as power frequency, loading, age or condition of the unit and that particle size distributions determined in this way can always be interpreted with confidence and compared world-wide with each other. More information can be found in this edition of "the sample" in the articles about our new sieving machines AS 300 und AS 400 control.

Yours

Dr. Jürgen Pankratz
Managing Director

AS 300 CONTROL

SIEVE ANALYSIS WITH CONTROLLED ACCELERATION

The new analytical sieve shaker AS 300 control offers numerous innovations:
- *Large sieve diameter for large amounts of sample*
- *Effective sieving by 3-dimensional sample motion*
- *Very short analysis and sieving times*
- *Controlled sieve frame acceleration*
- *Up to 9 parameter combinations permanently stored*

This means that the AS 300 control provides the ideal preconditions for efficient, reproducible analyses.

With test sieves of 305 mm diameter the effective sieving area of the Retsch AS 300 control is 2.25 times as great with 200 mm diameter sieves. This larger sieving area primarily means a considerably shorter sieving time, as a larger amount of sample – up to 6 kg – can be separated in a single run. The measuring range covers the whole range between 36 µm and 40 mm. With these features the AS 300 control opens the way to a far more effective and therefore far more economic sieving analysis.

In the new AS 300 control this high efficiency is combined with the highest degree of precision and reproducibility.

The patented electromagnetic drive works with a microprocessor-controlled measuring and control unit. It provides the 3-dimensional throwing movement which distributes the sample uniformly over the whole area of the sieve. The measuring and control unit automatically compensates for alterations in load and tension. High loading, short sieving times, high separation sharpness and extremely quiet running are the resulting advantages.

The AS 300 is excited at its natural frequency, i.e. the sieving frequency changes with the load. It is dependent on the number of sieves and amount of sample. In order to ensure that the results are reproducible you can switch from the oscillation amplitude setting to sieve frame acceleration (sieving at the same acceleration). In this way the instrument operates completely independent of operating parameters such as power frequency, load, age or condition of the machine.

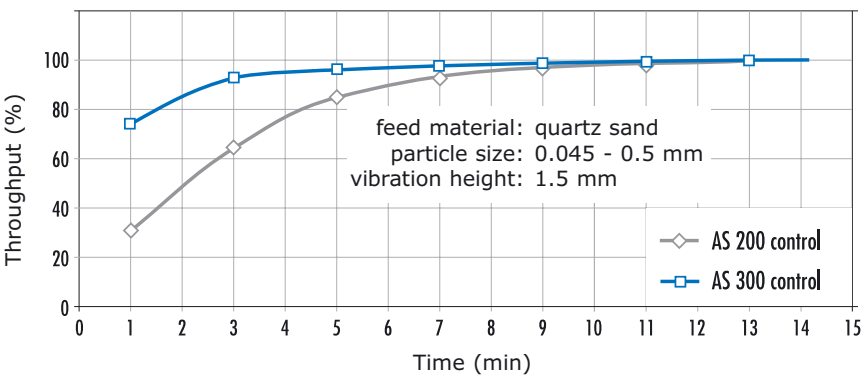
All the sieving parameters are set digitally. Up to 9 specific parameter combinations can be stored for frequently repeated sieving processes. The AS 300 control can be calibrated as a matter of course and can therefore be used as a test agent according to DIN ISO 9000 ff. A built-in serial interface means that the sieve shaker can communicate with the EasySieve® evaluation software. Not only the analytical results can be evaluated quickly and easily, but all the parameters of the sieve shaker can also be set and controlled by a PC.

AS 300
Reference number 1

AS 300 CONTROL – SHORT OVERVIEW

- Sieving with 3-D effect
- For sieves with 305 mm (12”) diameter
- Measuring range: 36 µm to 40 mm
- Max. sample load: 6 kg
- Max. number of fractions: 9
- 9 parameter combinations can be stored
- Digital setting of sieving parameters

Comparision AS 200 / AS 300 with high feed quantity



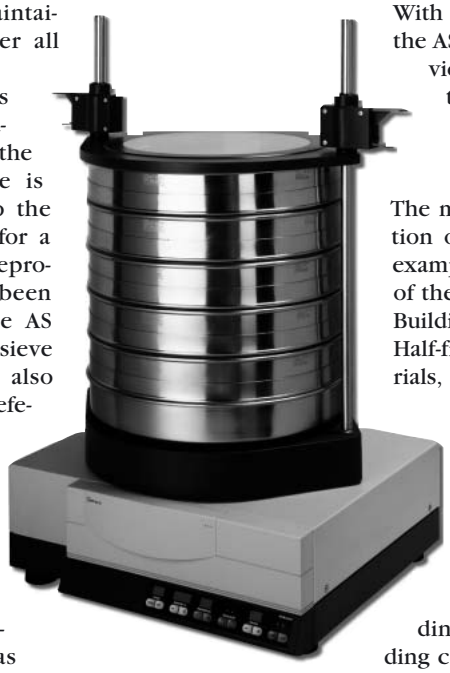
This chart exemplifies the average sieving times of an AS 200 control and an AS 300 control under equivalent circumstances. With the large sieving area of the AS 300 control perfect sieving results are achieved within a very short time. This shows a direct comparison between the throughput of the AS 300 and that of a 200 mm diameter sieve shaker. With the AS 300 the result is achieved in half the time.

AS 400 CONTROL –

SIEVING IN ONE PLANE

Horizontal sieving is stipulated as the analytical method for particle characterization in many standards. With the newly developed AS 400 control sieve shaker Retsch now provides the ideal preconditions for exact and reproducible analyses. In addition, this sieve shaker with its large 400 mm sieve diameters for high sample throughput and short sieving times has been optimized for economic viability and efficiency.

The innovative drive concept realized in the AS 400 control, with its mains-frequency-independent controlled drive, ensures reproducible results anywhere in the world. All the sieving parameters – speed or sieve acceleration and sieving time – are set digitally. The speed can be finely set in the range from 50 to 300 min-1 and the AS 400 control automatically ensures that this speed is maintained exactly under all operating conditions. This means that not only a rapid adaptation to the particular sample is possible, but also the ideal conditions for a high degree of reproducibility have been created. With the AS 400 control the sieve acceleration can also be selected as a reference value. This ensures that the results of the sieve analyses are completely independent of operating parameters such as mains frequency, load, age and condition of the sieve shaker.
For frequently repeated sieving procedures up to 9 specific parameter combinations can also be stored in the AS 400.



With the AS 400 control sample amounts of up to 5 kg can be separated in a single run. A built-in counterweight ensures stable operation even with high sieve stacks. The possibility of also using sieves of 100 mm to 400 mm diameter guarantees versatile use. The time-proven and extremely convenient "comfort" quick-clamping device is also available for clamping the sieves. The sieve stack is easily clamped in position in only a few seconds.

With the AS 400 control both fine and coarse particles from the chemical, quarrying, soils, milling and brewery sectors as well as from the wood and plastic industries can be separated exactly.

With its specific advantages the AS 400 all offers its services as an alternative to throw-action sieving as well as for horizontal sieving.

The mains fields of application of the AS 400 are, for example, the sieve analysis of the following products:
Building materials,
Half-finished building materials,
Mineralogy and metallurgy materials,
Aggregates,
Insulation materials, particularly from sustainable raw materials,
Compression molding materials and molding compounds made from mineral substances or plastics

In many standards the two-dimensional sieving motion found in horizontal sieving is stipulated as, for example, in the particle size analysis of rocks and aggregates (DIN 52 098 and DIN 1996 part 14).
The two-dimensional sieving motion has been described for testing granulate molding compounds. Together with short sieving times this prevents abrasion of the sample material. In this way the AS 400 control minimizes the risk of falsifying the sample (DIN 53 477).

In addition, the AS 400 control is also suitable for characterizing fibers. It does not matter whether these are from wood chips, cellulose, paper scraps, China grass, hemp or even flax – with the AS 400 control all fibrous substances can be analyzed exactly. In particular, horizontal sieving is the recognized method for the analysis of sustainable insulation materials in order to be able to compare the results from different size reduction tests.

The AS 400 control has a built-in serial interface so that the sieve shaker can communicate with the EasySieve evaluation software. With this evaluation software the user can control and adjust all the sieve shaker parameters from a PC and also show the analytical results quickly and easily.

The AS 400 control is supplied with a test certificate and can be calibrated. This means that it can be used as a test agent in accordance with DIN ISO 9000 ff.

AS 400 control
Reference number 2

AS 400 CONTROL – SHORT OVERVIEW

- AS 400 control – short overview
- Sieving with circular horizontal sieving motion, e.g. according to DIN 53 477 and 53 583
- For sieve diameters from 100 mm to 400 mm
- Measuring range: 45 µm to 63 mm
- Max. sample weight: 5 kg
- Max. number of fractions: 7/9/17 (depends on the size of the sieves used)
- 9 parameter combinations can be stored
- Digital setting of sieving parameters

GENETIC ANALYSIS OF TEETH AND BONES WITH THE RETSCH MIXER MILL MM 301

In the meantime the analysis of genetic material forms an essential part of scientific research, particularly important in the fields of human biology and paleoanthropology. Thanks to current research even the DNA from historic and prehistoric materials can now be successfully extracted and amplified.

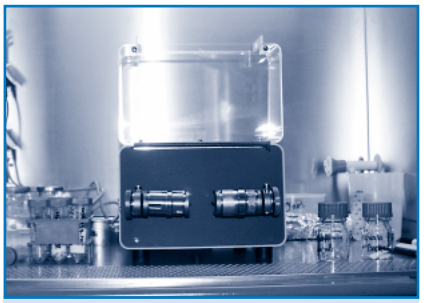


Figure 2:
Retsch Mixer Mill MM 301

Processing such samples involves certain problems, as on the one hand the materials available for the investigation (bones or teeth) are very hard and on the other hand foreign contamination by recent DNA must be avoided at all costs.

The area of bone used for DNA analysis is limited to the so-called Compacta which, in contrast to Spongiosa, consists of solid bone substance (Fig. 1). For the investigation the sample must be reduced to a powder; the smaller the particle size the better the chemical analysis.

A particle size less than 1 µm can be achieved with the Retsch Mixer Mill MM 301. A further advantage is that a high degree of fineness of the sample material can be achieved without interference from sample heating.

Teeth are among the hardest substances found in the human body and are even more resistant than bones.
The major part of the hard substance of teeth consists of the so-called dentine, which is covered by enamel in the crown area and by root cement in the root area (Fig. 2).

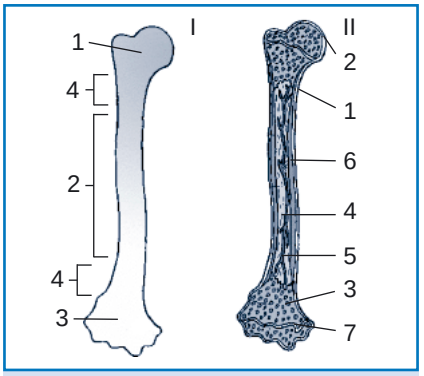


Figure 2:
Long bone constituents
I) External:
1) Proximal end of bone (epiphysis)
2) Shaft (diaphysis)
3) Distal end of bone (epiphysis)
4) Metaphysis

II) Internal
1) Periosteum
2) Top layer of cartilage (hyaline cartilage), protects the bone against pressure and friction
3) Osseous structure (spongiosa), with bone marrow producing red corpuscles
4) Medullary cavity with fatty yellow marrow
5) Endosteum
6) Compact bone substance (Substantia compacta)
7) Ossified growth line (epiphyseal cartilage)

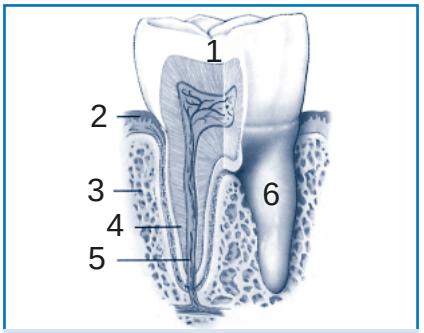


Figure 3: construction of a tooth
1: Enamel, 2: Gums,
3: Jaw, 4: Dentin,
5: Dental pulp 6: Root

Enamel is the hardest and most resistant of the three hard substances mentioned above and consists to 97% of inorganic

Figure 4:
Tooth sample before and after size reduction

salts, chiefly hydroxylapatite, which also makes a major contribution to the bone substance.

The enamel has a hardness of approx. 3250 HB (Brinell hardness). For comparison: hard noble metals have a hardness of approx. 2500 HB after hardening, while ceramic paste, as used by dentists, can have a hardness of up to 4000 HB.

With the Retsch Mixer Mill MM 301 complete teeth can be pulverized without the otherwise necessary preliminary size reduction (Fig. 3).

To summarize: it can be seen that the Retsch Mixer Mill MM 301 is an important technical tool for use in analysing the DNA found in historic and prehistoric bone and tooth constituents. Investigations would be virtually impossible if the samples were not pulverized. The properties of the instrument such as high performance, operating comfort, design and compactness characterize the MM 301.

Sterile work is a fundamental requirement for the analysis of prehistoric genetic material in order to obtain contamination-free and correct results. Thanks to its compact construction the MM 301 ideally fulfills the requirements for work in a sterile bank (Fig. 4).

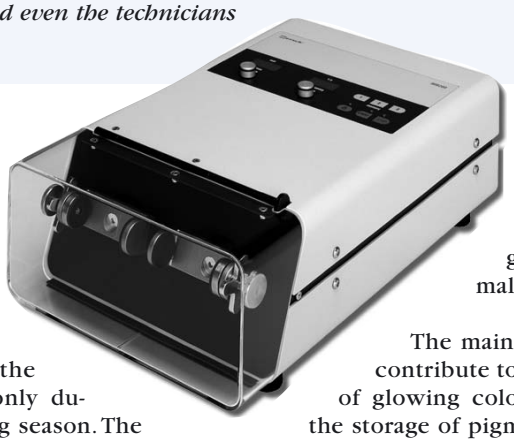
Mixer Mill MM 301
Reference no. 4

Dr. Hans Joos,
Institute for Human Genetics,
Dr. Kerstin Kreutz and Julia Diegmann, Institute for Anthropology,
Justus-Liebig-University, Giessen

CORNELL UNIVERSITY –

THE WEDDING DRESS OF AMERICAN GOLDFINCHES

The American Goldfinch certainly lives up to its name – it has glowing yellow feathers, particularly in summer. It is noticeable that, during the mating season, the females prefer the male goldfinches with the most strongly glowing plumage. The reason for this, why some songbirds have such colourful feathers at all and what influences the composition of this coloured splendour – these questions have fascinated Kevin McGraw from the Department of Neurobiology and Behaviour at Cornell University in Ithaca, New York. And that Kevin McGraw required an MM 200 Mixer Mill to answer these questions astonished even the technicians from Retsch Inc.

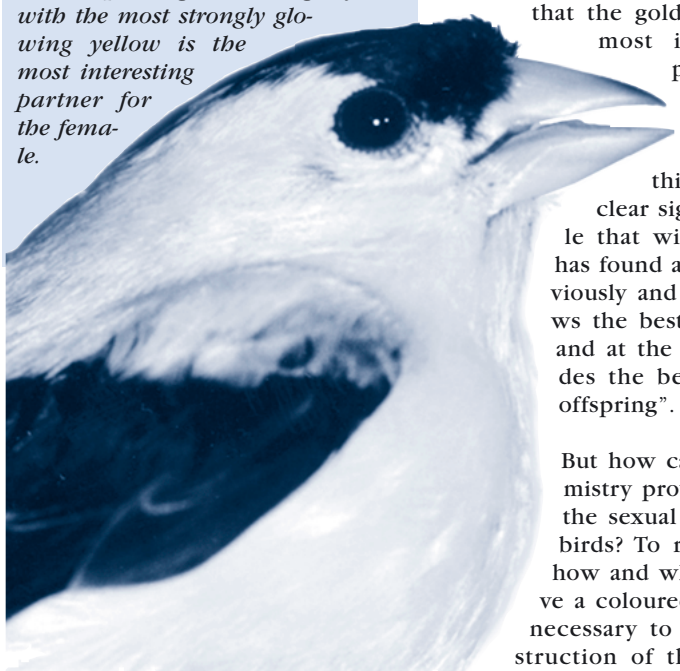


Songbirds with glowing colours, such as many finches and types of sparrows, regularly visit the feeding places in the university garden of Ithaca in New York State. When looking at these colourful birds the evolution biologist Kevin McGraw considered the following questions,

- What are the advantages of such a colourful plumage for the birds?
- Why does the bird attract attention – even that of its enemies – with such colourful plumage?

"The glowing colours actually do play a very important role in the mating behaviour of these animals" says McGraw. "In particular the male goldfinches that I selected for my studies developed a plumage which glowed considerably more than that of the females, but only during the mating season. The female goldfinches apparently select their partner according to the glowing power of the yellow plumage. They presumably hope that the male goldfinch with the strongest glow will provide them with as many offspring as possible during the Summer months".

The American Goldfinch boasts with its plumage. And the goldfinch with the most strongly glowing yellow is the most interesting partner for the female.



During his studies McGraw has found that the goldfinches with the most intensive yellow plumage are also the most healthy individuals in the group. "And this appears to be a clear signal for the female that with this male she has found a partner who obviously and very visibly knows the best sources of food and at the same time provides the best genes for the offspring".

But how can analytical chemistry provide insights into the sexual systems of these birds? To really understand how and why male birds have a coloured plumage it was necessary to analyse the construction of the feathers with great accuracy, in order to be able to say what gives the glowing yellow male such a glow.

The main components that contribute to the development of glowing colours in animals is the storage of pigments in hair, skin,

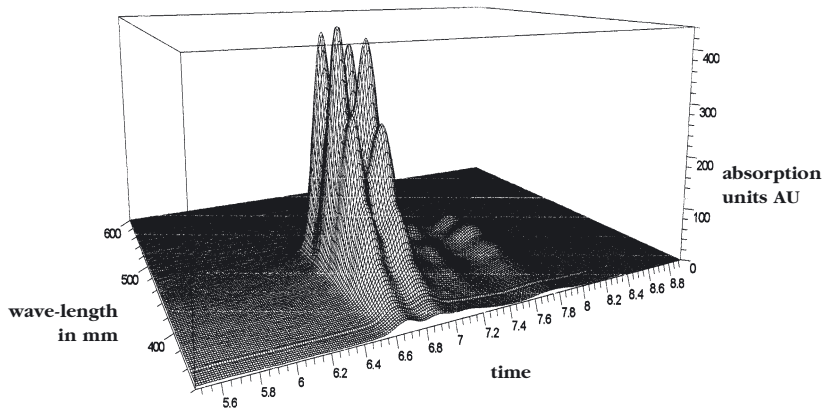
THE YELLOW FLASH

The American goldfinch (lat. Carduelis tristis), is very easy to recognize, particularly in Spring and Summer – it shoots through the air like a yellow flash. The short and very conical beak of the goldfinch is typical for north American seed eaters.

It breeds in southern Canada from British Columbia to Newfoundland and throughout most of the USA. It prefers trees and open countryside such as orchards and road verges. In Winter it only migrates a short distance southward.

The average length of the goldfinch is 11 cm, i.e. about the same size as a sparrow. In early Spring the goldfinch moults all its feathers, except for the black wing and tail feathers, and its beak turns orange. The male then develops glowing, canary-yellow breast feathers and black head feathers.

scales or feathers. The yellow colour in animals, just like orange and red, is based on the storage of carotinoid pigments. "This is the same colouring agent that makes carrots orange and makes leaves colourful in Fall. Finches take up these substances exclusively with their food, particularly seeds and fruit, and store them in their feathers. If it is known which type of these yellow pigments is found in goldfinch feathers and at which concentration, then we will obtain a kind of historical record of the feeding behaviour of this bird. This allows conclusions to be drawn as to why one is more attractive and healthier than the others".

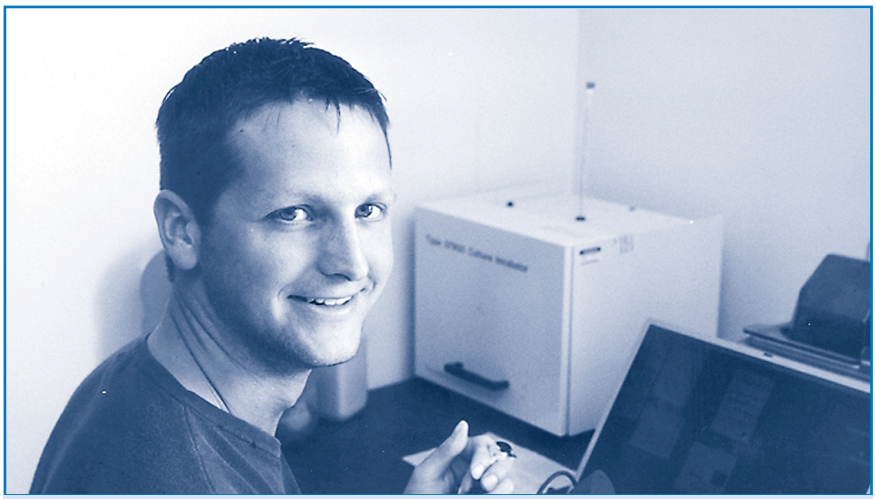


Kevin McGraw reduces the size of the goldfinch feathers in the Retsch MM 200 in order to be able to subsequently analyse the carotinoids. The distribution and intensity of the individual coloured pigments are analysed with a liquid chromatograph.

"These pigments are very strongly fixed in the keratin of the feathers, so that the male can retain the glowing yellow plumage throughout a whole Summer," says McGraw. "And this was the reason why the Retsch MM 200 Mixer Mill played an important role in the analysis of the various pigments in the bird plumage".

Traditionally thermochemical methods have been used to try to isolate these pigments from the feathers. However, Kevin McGraw cannot exclude the possibility that, in such processes, the carotinoid structures, which are both sensitive to heat and acids, could be damaged. "With the mixer mill we were able to obtain minute particles of the coloured feathers in a very gentle way and at room temperature. This allowed us to release the pigments from the protein matrix. The pigments were then bound in an organic solvent and could be analysed in a modern liquid chromatograph" as McGraw says about the analytical method he used.

This analytical method was described for the first time in 1995 by Dr. Riccardo Stradi, a professor for physical and chemical methods in organic chemistry at the University in Milan. Dr. Stradi also used the Retsch MM 200 and was able to characterize numerous combinations of the pigments of the yellow, red and orange feathers of finches, woodpeckers and other small and colourful birds.



For Kevin McGraw from the Department of Neurobiology and Behaviour at Cornell University in Ithaca, New York, it is clear why the most colourful of the goldfinches are preferred by the females. It is an unmistakable indication of a healthy diet.

"Today we are using this method for the analysis of carotinoids in the plumage of numerous male American Goldfinches from New York State. And it has actually shown," says McGraw about the results of his studies, "that some carotinoids in the food have a very advantageous effect for a maximum brilliance and intensity of colour of the male plumage. And with the aid of the MM 200 of Retsch, which has been very useful in further series of studies, we will hopefully discover even more of the secrets which lie behind the mating games of the colourful songbirds in our university garden."

Mixer Mill MM 200
Reference no. 3

MM 200 AND MM 301 –

POWERFUL ENOUGH FOR ANY TYPE OF MATERIAL

No matter whether goldfinch feather, bone substance from teeth or synthetic materials, minerals and chemicals – the Retsch Mixer mills MM 200 and MM 301 are time-proven allrounders for sample preparation. They are used for fine and ultrafine size reduction of hard, medium hard and brittle samples as well as for soft, elastic or fibrous ones. These mixer mills reduce particle size, mix, or homogenize.

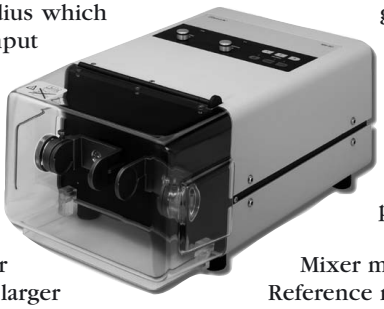
The ultimate fineness – depending on the material – can be down to 1 µm. Two samples from 0.2 to 20 ml or up to 50 ml (for MM 301) can be reduced in size in a single run. You can also process up to 20 samples for cell disruption. The grinding efficiency is very high, so that the required grinding time is extremely short.

The grinding jars of these mixer mills carry out radial oscillations in a horizontal position. This allows the grinding balls to impact on the sample alternately from different sides. The intensity can be set exactly between 3 and 30 oscillations per second. The speed control holds this value constant during the grinding process. The grinding and mixing time can be set digitally between 10 seconds and 99 minutes. All machine parameters are retained in the stand-by mode for the next process. Three memory functions allows different standard settings to be stored. This means that the highest degree of reproduction is ensured for the sample preparation process.

The Mixer Mill MM 301 additionally offers

- Larger grinding jars,
- Grinding jars with screw-cap closures,
- A completely new and safe locking system, and
- A larger oscillation radius which increases the energy input by approx. 30%.

The secure location and the defined positioning of the grinding jars improve the handling when clamping and removing the jars. With the MM 301 larger amounts of sample and larger sample feed sizes can be reduced in size in an even shorter time. The screw-cap closures are ideally suitable for loss-free wet grinding. The centering and locking of the grinding jars together with the precision drive and the memory function set new standards for the reproducibility of grinding, mixing and disruption processes.



Mixer mill MM 200
Reference number 3

Mixer mill MM 301
Reference number 4

	MM 200	MM 301
Sample volume max	2 x 10 ml	2 x 20 ml
Feed grain size max	6 mm	8 mm
Final finesse up to	< 10 µm	< 5 µm
normal grinding times	Ø 2 minutes	Ø 2 minutes
Wet grinding	Grinding jars 25 ml, specialty steel	All grinding jars
Cell disruption with Eppendorf vials (more options on request)	• Adapter rack for 5 vials up to 2 ml • Adapter rack for 10 vials up to 0,4 ml	• Adapter rack for 5 vials up to 2 ml • Adapter rack for 10 vials up to 0,4 ml • Adapter rack for 10 vials up to 2 ml
Clamping device	Basic	Comfort
Automatic centering	No	Yes
Memory keys	Yes	Yes
Re-set lock	Yes	Yes
Digital pre-selection of the milling duration	Yes	Yes
Tandem grinding containers	Yes	Yes

GAMBRO MEDIZINTECHNIK –

RESPONSIBILITY TAKEN SERIOUSLY

Gambro is a worldwide leading company in the clinical technology sector. For patients suffering from renal insufficiency its blood-washing systems provide hope for surviving the time before a transplantation. For many people "Gambro" simply means - alive! This responsibility is taken very seriously. This also applies to the research field in which, for example, completely new blood-washing methods are being developed. Gambro is successfully using the Ultra Centrifugal Mill ZM 100 of Retsch for preparing polymer materials. However, in order to prevent affected patients from having unrealistic hopes of new solutions at such an early stage, Dr. Storr shows his responsibility by being reticent about releasing details of his work. It is nevertheless fascinating to learn that he has been able to use the ZM 100 to grind a polymer to a particle size of less than 100 µm.

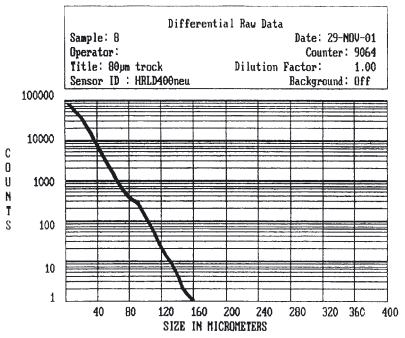
For chronic kidney patients there are basically only three alternative treatment methods: transplantation, hemodialysis or peritoneal dialysis. In hemodialysis the uric toxins are removed from the blood by filters or membranes located outside the body. In peritoneal dialysis, also known as abdominal dialysis, the transfer takes place by using special liquids inside the patient's abdomen. In both these methods convective or diffusive substance exchange forms the basis for this kidney replacement function. Gambro provides all the necessary products and apparatus for this therapeutic method. These consist of complete dialysis systems with filters, membranes, tubings, catheters, control electronics or special peristaltic pumps for the careful transport of the blood.

In order to be able to help patients more effectively, research and development occupies a central position at Gambro. The focal point of research at the German subsidiary is membranes and devices. Dr. Markus Storr, team leader in the central Gambro research division, is concerned with innovative approaches for alternative forms of therapy for blood purification: "We are not only working on the optimisation of membrane methods, but also on completely new and different types of methods for removing the toxic components from a patient's blood."

Recently Dr. Storr has started to use a Retsch Ultra Centrifugal Mill ZM 100 in his research work. "In our projects we frequently have the task of reducing the size of a wide range of materials and adsorbents. In this way we can obtain a considerably larger active surface and can include these particles in structures developed by us in a better way." One of the materials whose size is to be reduced in a defined way is distantly based on polystyrene. Dr. Storr had been searching for a suitable method of reducing the particle size of this material from its original size of about 1 mm to a particle size below 100 µm. "All the specialists from whom I requested a solution to the problem of reducing the particle size of this polymer substance gave me no hope. It is either very difficult or completely impossible to reduce the particle size of this substance to less than 100 µm."

An Internet search led Dr. Storr to Retsch. "Our first inquiry to Retsch immediately resulted in an appointment for a demonstration, during which we could comprehensively test the Ultra Centrifugal Mill ZM 100. Even after the first trials we could see that we would obtain very good results with the ZM 100. We experimented with different grinding tools and mesh sizes of ring sieves in the ZM 100 and quickly recognized that this mill was ideally suited to our requirements. Today we pretreat test material to make it relatively brittle and easy to grind. With the ZM 100 we have actually been successful in reducing this polymer to particle sizes of less than 100 µm. In parallel we have also sent this material to different institutes and companies and requested them to reduce its size to less than 100 µm. None of the results was comparable with the results which we achieved with the Ultra Centrifugal Mill ZM 100", said Dr. Storr.

Ultra Centrifugal Mill ZM 100
Reference number 5



Many experts thought that it was difficult or even impossible to reduce a polymer to obtain a particle size spectrum whose maximum was below 100 µm. With the Retsch Ultra Centrifugal Mill this was possible, as can be seen from this diagram from the Gambro research division.

"WE ARE HERE TO HELP YOU"

For more than 35 years Gambro has been a globally operating clinical technology company. Both with its products and technologies as well as in the services it provides, Gambro is focused on blood technology components. Dialysis products, the operation of dialysis clinics and equipping with the necessary technology – throughout the whole world – is Gambro's core business.

The experience with blood and kidney functions is based on the invention of the first plate dialyser by Professor Nils Alwall. Shortly after, in 1964, Gambro was founded when the industrialist Holger Crafoord dedicated himself to the development and marketing of this life-saving invention.

Research and development are important pillars of the company. This is why a global research network with laboratories in Sweden, Germany, France, Italy, Japan and the USA is constantly working on method optimisation and new methods with a high personnel and financial investment. In this way Gambro has, for example, developed a new method for purifying conserved blood with vitamin B2 and light. This has resulted in a patent for this unique pathogen inactivation technology. This represents a milestone in the provision of human beings with risk-free blood.

Gambro has a current turnover of about 2.7 billion US dollars. More than 20 400 employees in over 40 countries work according to the company motto – "We are here to help you".

Dr. Markus Storr, team leader in the central Gambro research division, who is concerned with innovative approaches for alternative forms of therapy for blood purification.

SIMPLE, QUICK, UNIVERSAL AND SAFE

The Ultra Centrifugal Mill ZM 100 is used for the rapid fine size reduction of soft to medium-hard and fibrous materials. The rotor-ring sieve system makes rapid size reduction possible. A short grinding time and material-protective preparation are the striking advantages which result.

A new type of cassette principle increases sample throughput and simplifies cleaning. The plug-on rotor makes it easier to exchange the grinding tools. Rotors and sieves made of stainless steel, titanium or with a tungsten carbide coating ensure neutral sample preparation. Rotor and sieve are selected according to the necessary ultimate degree of fineness. The particle feed size can exceed 10 mm and the ultimate fineness – depending on the material properties – can be as low as 40 µm. A large range of accessories with feeding and collecting systems in different versions allows optimal adaptation to the particular task.

Operation via a keypad and display field is easy. A microprocessor-controlled security and diagnosis system automatically carries out safety checks and controls the lid locking system.

ACHEMA

ACHEMA 2003 – WORLDWIDE FORUM FOR THE PROCESS INDUSTRIES

The 27th ACHEMA will be held in Frankfurt am Main from 19 to 24 May 2003. This international trade fair and congress for chemical technology, environmental protection and biotechnology is the leading event for all branches of the chemical industry. Nowhere else can experts and decision makers find a comparable range of specific equipment, technologies and problem solutions for the chemical and petrochemical industry, for the pharmaceutical and food industries and their related branches. No other event provides similar future-oriented competence for the process industries throughout the world. ACHEMA 2003 is again expected to send out a global message with its knock-on effects to all branches of the chemical industry. And Retsch is, of course, present in Hall 5.1 Stand B 40/C 44 with numerous new developments!

ACHEMA 2003 is expected to attract about 4000 exhibitors and approx. 200.000 visitors from all around the world. Despite the current unsatisfactory economic situation, the demand for ACHEMA 2003 is at an unchanging high level. The strongest exhibitor participation can be found in the laboratory and analytical techniques sectors, among others.

With the new Hall 3 and the new forum, ACHEMA 2003 presents itself in a further enhanced form and in extended surroundings. This has meant that the exhibition groups have had to be rearranged as follows:

- Research and innovation
- Laboratory and analytical techniques
- Engineering
- Mechanical processes
- Thermal processes
- Pumps, compressors, valves and fittings
- Pharmaceutical, packaging and storing techniques
- Instrumentation, control and automation techniques
- Materials technology and materials testing
- Biotechnology forum

The latest information about ACHEMA, which is also regularly updated, can be found on the internet under www.achema.de.

The Retsch stand can be found in Hall 5.1 Stand number B 40/C 44. We will be presenting our latest developments on a stand area of more than 90 m². We can already whet your appetite today with, for example, three completely new laboratory mills. You will find more details just before ACHEMA 2003 in an extra edition of "the sample".

SHOWS 2003

YOU WILL FIND RETSCH AT THE FOLLOWING SHOWS: WE WILL BE PRESENT AND WOULD BE GLAD TO ASSIST YOU.

09. - 14. March 2003
PITTCON
Orlando, USA

08. - 10. April 2003
EUROPEAN COATINGS SHOW
Nuremberg, Germany

19. - 24. May 2003
ACHEMA
Frankfurt, Germany

16. - 20. September 2003
CERAMITEC
Munich, Germany

13. - 16. October 2003
BCEIA
Beijing, China

26. - 30. October 2003
AAPS (American Association of Pharmaceutical Scientists)
Salt Lake City, USA

NEW SALES COORINATOR AT RETSCH

Since 1 October 2002 Stefan Heesen has been a member of the Retsch Marketing Division. In his function as sales coordinator he is primarily responsible for looking after international laboratory suppliers, field service in Germany, internal coordination between the marketing divisions and other higher marketing tasks. After his business management studies, Mr. Heesen started his career in the German subsidiary of an English company where he was an assistant to the management for more than 6 years and helped in building up the marketing activities for a contactless temperature measurement system in Germany, Austria and Switzerland. He then worked as a deputy marketing manager for 3 years with a manufacturer of electrotechnical products, where he was able to extend his experience of marketing investment goods that required providing the customers with explanations and gain further knowledge for his new position with Retsch.

MOBILE APPLICATION CONSULTATION 2003

THE RETSCH BUS ON TOUR

With our Retsch-Bus, the mobile laboratory, we offer you the possibility of an individual, specific and free of charge application consultation.

Just ask for information on our crushers, sieving machines, mills, sample dividers, feeders, cleaning and drying devices.

Please contact us for detailed information about dates and places.

E-Mail: info@retsch.de

SCHEDULE:

March
Week 10 Italy
Week 11 Austria / Slovenia
Week 12 Hungary
Week 13 Romania

April
Week 14 Bulgaria
Week 15 Czech Republic
Week 17 Germany
Week 18 Great Britain

Mai
Week 19 Norway
Week 20 Norway / Sweden
Week 22 Sweden

June
Week 23 Finland
Week 24 Denmark
Week 25 Belgium
Week 26 Germany

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