

# MIXED PRODUCTS AS AN ALTERNATIVE

## Kieselguhr-free precoat filtration

*Since decades, precoat filtration has been the most frequently applied method of beer filtration worldwide. By a good and reliable clarifying effect and a high hourly output it provides the user with a gentle and careful filtration technique. Not least, these results can be traced back to the use of kieselguhr. But because of kieselguhr being criticised out of different reasons over the last years, more and more alternatives are introduced onto the market now.*

**K**ieselguhr (diatomaceous earth) has outstanding filtration properties due to its very special structure. It forms a compact filter cake which is resistant towards pressure surges and thus assures stable filtration.

Kieselguhr dust contains crystalline constituents which are respirable and are irritant to the lung (affecting the alveoli) and thus may lead to diseases of the respiratory system. Based on a study by the IARC (International Agency on Research of Cancer; a workgroup of the WHO-World Human Organisation), kieselguhr was classified as hazardous to health in 1997 and its use has always been criticised since then.

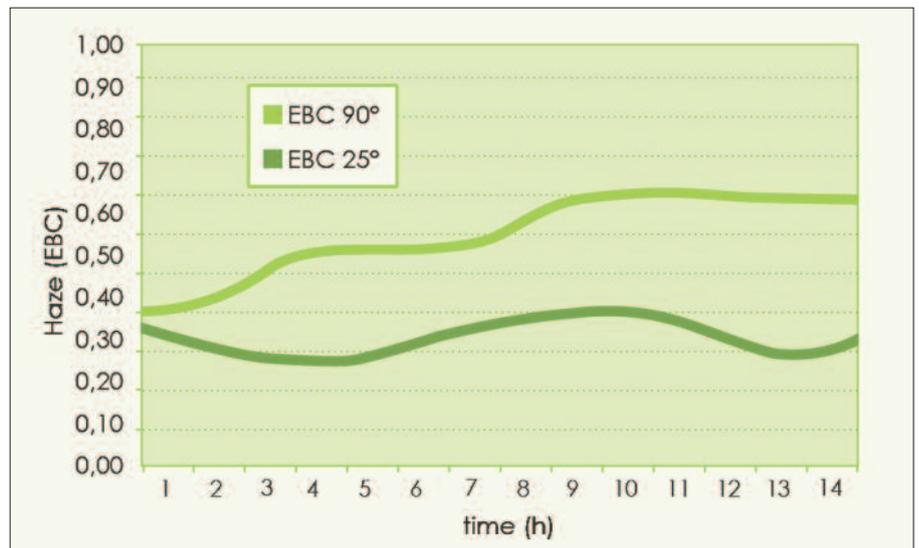


Fig. 2: Course of turbidity during kieselguhr filtration

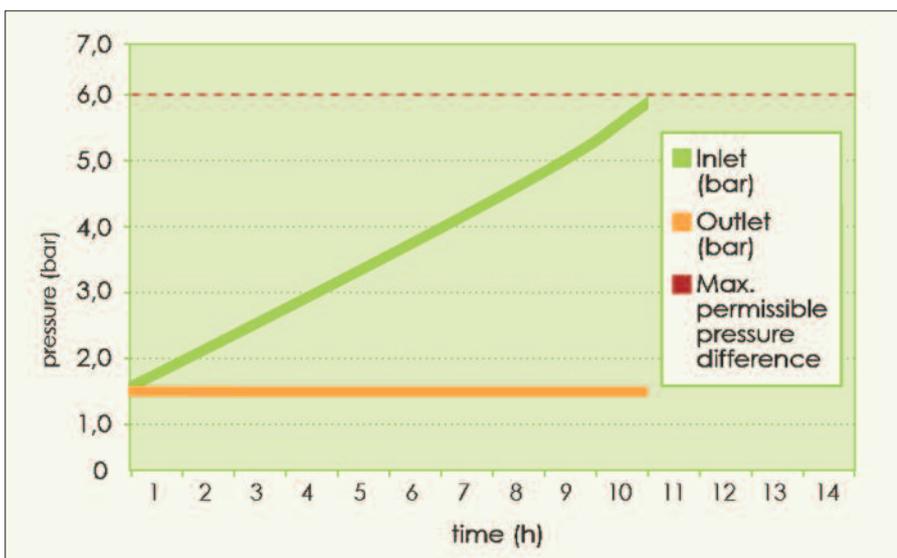


Fig. 1: Course of a kieselguhr filtration

## Disposal of kieselguhr

By changes in the German Regulation on Fertilisers (see Federal Law Gazette I page 2482, last revision of 5<sup>th</sup> December 2012), the use of kieselguhr is questioned anew. After the brewery and fruit juice associations objected, this “new” regulation on fertilisers was reviewed once again.

The first prohibition to apply kieselguhr on crop areas was withdrawn and the special require-

*Volker Müller, Thomas Jung,  
Ralf Otto*

Erbslöh Geisenheim AG, Geisenheim  
([www.erbsloeh.com](http://www.erbsloeh.com))

ments were added (see chart 1). In how far these requirements can be observed without increased expenditure has yet to be clarified.

## Alternative technologies

The possibility exists to replace kieselguhr by new, or also by their combinations, as well as by their combinations. Hereby, especially crossflow filters, separators and sheet filters are employed.

The only way to avoid costly investments in new plants and equipment, is to use alternative filter aids. At the current level of development, perlite, cellulose and synthetic materials as single components do not provide the required properties to be able to replace kieselguhr in technical, economical and qualitative respect.

## Filter aid mixed products

By the combination of different filter aids also their specific advantages and qualities can be ideally combined and harmonised which enables to match a filter aid from different components to fulfil the high requirements of beer filtration in the future. For this purpose, the Erbslöh Geisenheim AG has developed two filter aid mixed products which are specially applied during beer filtration for the first (product 1) and for the second (product 2) precoating.

### Solution approach

The advantage of filter cellulose is that by targeted milling and

fibrillation of selected fibres its structure can be modified in a way that it forms a voluminous and strongly branched spacial texture. Into this structure perlite of different fineness is embedded, which determines density and compactness of the filter cake formed.

After all, it is the principle of filter sheet production which is applied.

Product filtration is designed accordingly: A first precoat of the filter cake with the new mixed product VarioFluxx® PreCoat 1 forms a well structured and stable "filter layer" which reliably retains haze particles and microorganisms. The second precoating with VarioFluxx® PreCoat 2 forms a fine clarification layer for a, in a targeted way, increased haze reduction. The continuous dosage is without exception conducted with special perlite, the fineness of which matches beer-specific requirements.

The aim is the formation of a well structured filter cake in the first and second precoating to obtain an optimal filtration effect. Both precoatings determine the clarification degree and assure a reliable and reproducible filtration. The continuous addition merely keeps the filter cake above the precoat layers open by the perlite particles forming a drainage structure between the haze particles.

### Filtrate quality

The filtration results show a comparable clarification effect to kieselguhr and often even an improved head retention of the filtrated beers. The filtration course is stable and provides

**Chart 1: Restrictions/conditions for the application of kieselguhr in accordance with the German Regulation on Fertilisers**

Requirements/conditions	Interpretation
– Particles of crystalline silicic acid with diameter $< 50 \mu\text{m} \leq 0.1 \%$	The cristobalite concentrations of the individual kieselguhr types can vary significantly. This minimum content <b>cannot</b> be reliably kept by computation.
– Kieselguhr portion in filtration residue $\leq 75 \%$	In the individual case, product losses must be accepted by this regulation, respectively, alternatives must be found.
– Sieve passage: $\leq 0.10 \text{ mm max. } 0.2 \%$ $\leq 0.05 \text{ mm max. } 0.1 \%$ $\leq 0.01 \text{ mm max. } 0.005 \%$	With the classical kieselguhr mixture, in filtration these parameters are hard to keep.

# BREWING AND BEVERAGE INDUSTRY INTERNATIONAL

Founder  
Werner Sachon (1920 – 2005)

Editor-in-Chief  
Dipl.-Volksw. Wolfgang Burkart

Editor  
Thomas Eisler -313  
Dipl.-Ing. f. Lebensmitteltechnologie  
eisler@sachon.de

Schloss Mindelburg  
D-87719 Mindelheim  
Telephone +49 (0) 82 61/999-0  
Fax +49 (0) 82 61/999-391  
(Advertising dept)  
Fax +49 (0) 82 61/999-395  
(Editorial office)

www.sachon.de  
info@sachon.de

The magazine and all individual contributions and figures included are copyrighted material. On receipt of the manuscript, the publishing house reserves the right to publication as well as the rights to translation, placing of copyrights, electronic storage in databases, production of off-prints, photocopies and microcopies. Any utilisation that violates the copyright law is inadmissible without the publishers' prior approval. Any contributions and information sent to the publishing house without request implicate the anytime revocable agreement to publish the contributions and information in databases maintained by the publishing house or any third party cooperating with the publishing house. Publishing house and editorship do not assume any responsibility for the contributions marked with name or signature.



Publication and Production  
VERLAG W. SACHON GMBH + CO  
Schloss Mindelburg  
D-87719 Mindelheim

Ownership according to Bavarian Press Law  
Publisher  
© Ernestine Sachon  
HRA 16639 München  
HRB 85685 München

Managing Director  
Dipl.-Volksw. Wolfgang Burkart  
Telephone -310

Advertising Services  
Sabine Berchtenbreiter  
Telephone -338  
berchtenbreiter@sachon.de

Advertising Administration, Coordination  
Ilona Nelson  
Telephone -335  
nelson@sachon.de

Distribution Manager  
Werner Scharpf  
Art Director  
Ulrich Manlig  
Print  
Holzmann Druck GmbH & Co. KG  
Gewerbestraße 2, D-86825 Bad Wörishofen

Subscription Rate  
EUR 42,- per year + postage + VAT  
(where applicable)

Note according to § 26 (1) of the Federal German Data Protection Laws  
Addresses of recipients of the periodical are recorded in a computer address file.  
The publishing company's competent court is optionally either Mindelheim or Munich.

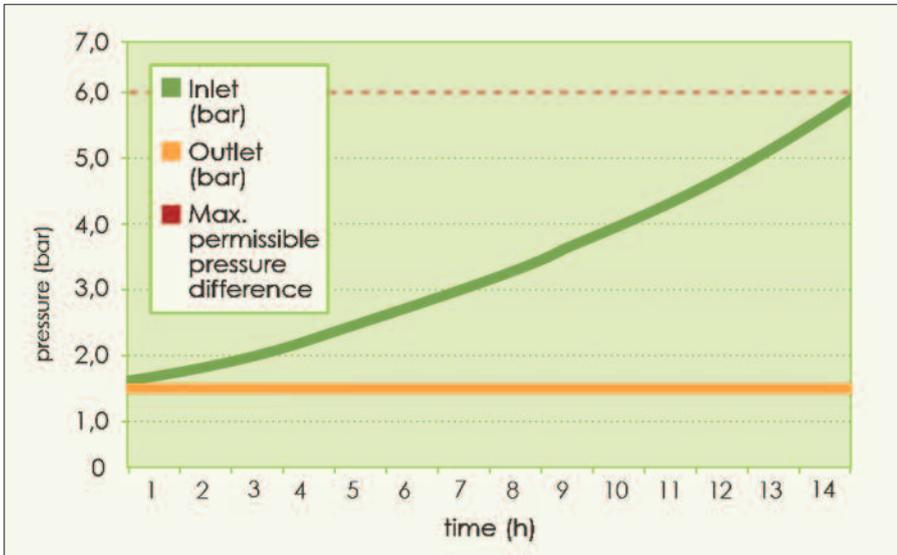


Fig. 3: Course of precoat filtration with the new mixed products VarioFlux® PreCoat 1+2

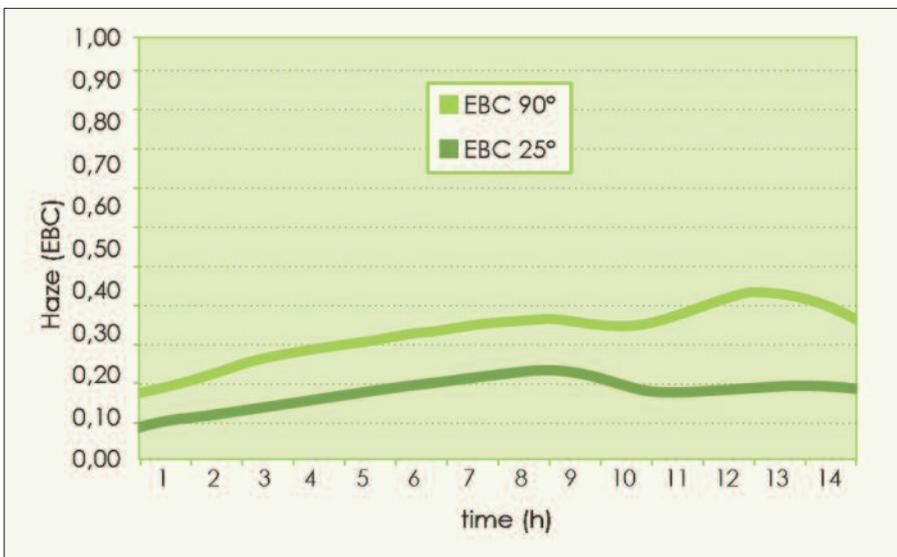


Fig. 4: Course of turbidity of precoat filtration with the new mixed products VarioFlux® PreCoat 1+2

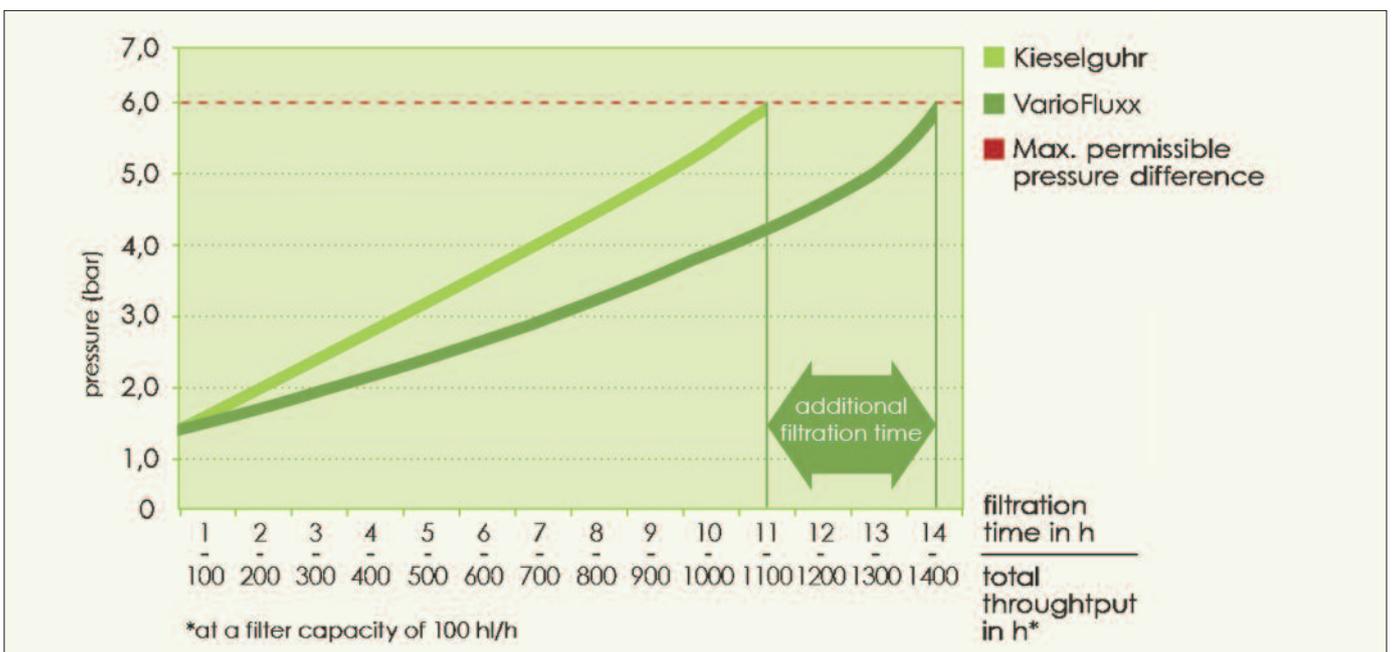


Fig. 5: Economic efficiency

reproducible and reliable results. The microbiological retention rates are also absolutely comparable. With regard to heavy metal load, the new mixed products are advantageous due to the fact that the cellulose fibres used in the mixture are very strongly extracted in the production process and are highly pure.

### Economy

The economic efficiency of the filtration with the new mixed products strongly depends on the total throughput of the filter. The costs for precoat are increased whereas the costs for the continuously added filter aids during the process are reduced. So principally, an individual break-even point for the saving of costs can be determined for every filter.

### Conclusion

Precoat filtration with the filter aid mixed products newly developed by the Erbslöh Geisenheim AG, is a genuine alternative to kieselguhr and meets the requirements of the changed Regulation on Fertilisers. In technical respect, the new mixed products can be applied on the existing filter plants without problems and without increased costs. Filtrate quality in respect of head retention and load of beer-soluble elements, as for instance heavy metals, is positively affected. Enhanced economy is obtained by an increased total filter throughput. □