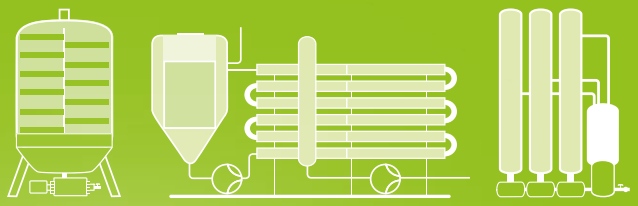
Activated carbon applications



ERBSLÖH

Progress is our future

Activated carbons

Activated carbons offered by Erbslöh are available as highly active powdered charcoals (product name Ercarbon, Akticol) and as largely dust-free granulates (product name Granucol®). These activated carbons are specially selected for the requirements of juice treatment, yet, in principal they can also be used in other beverage sectors, above all, in the fruit wine and brewing industry. Activated carbon specialties offered by Erbslöh Geisenheim were selected through their effectiveness tested in typical beverage applications with constantly monitored highest purity standards.

Higher stability of semi-finished juice products

Activated carbons have a direct impact on the stability of turbidity especially with pome fruit juices. In the beverage industry a lot of special product developments require semi-finished products of particular stability. Fruit schorle, malt & fruit beverages and exotic fruit drinks are important examples for this. The consequent reduction of reactive polyphenols adjusts the required stability and colour standards.

Overview on activated carbon applications and matching product types

General activated carbon applications in fruit juice		
Method	**Application aim**	**Product recommendation**
A	Decolouration of brown colour pigments	Akticol FA
B	Improved stability (particularly with pome fruit juices)	Ercarbon FA
C	Extremely light fruit juice concentrates with especially long shelf life	Akticol FA and Ercarbon SH
D	Treatment agent for crossflow plants	Akticol FA-UF; Blancobent UF
E	Stabilisation of lowest patulin and ochratoxin A* standards	Ercarbon SH
F	Adsorption of pesticides	Ercarbon SH
G	Reduction of HMF	Ercarbon SH
H	Sensory improvement	Ercarbon SH

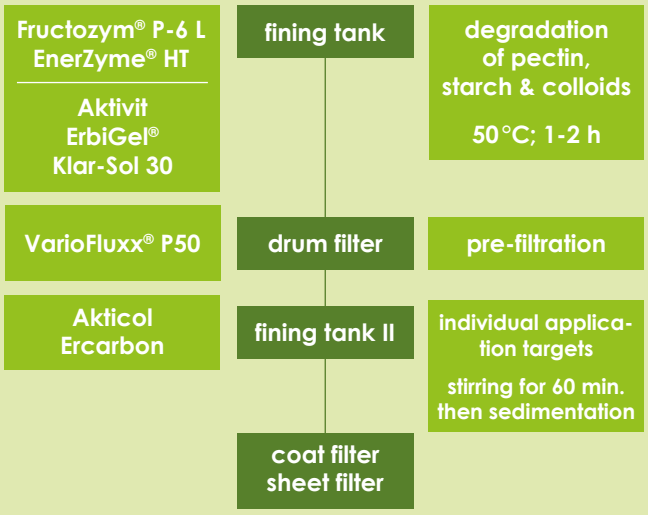
*According to EU Regulation 1881/2006, the reduction of patulin and ochratoxin A is no longer admissible as of 1st March 2007

The required dosage depends very much on the nature of the beverage and on the present or aimed at

parameters. Particularly important is the choice of the appropriate activated carbon type for the individual application. Benefit from our service and call us!
Our technical experts answer your questions and provide you with knowledge and solution-oriented service.

Performance of an activated carbon treatment

An activated carbon treatment in clarified juice is always more efficient than in cloudy juice. The reason for this is that the substances which are to be removed are partly bound to suspended matter which is separated during clarification. In addition, coarse particles prevent the permeability of the fine charcoal pores and thus the problem-causing substances escape the adsorption effect. The best results can therefore be achieved, when treatment is conducted in the filtrate. Already a treatment of the sediment-reduced, drawn off fining supernatant is advantageous.



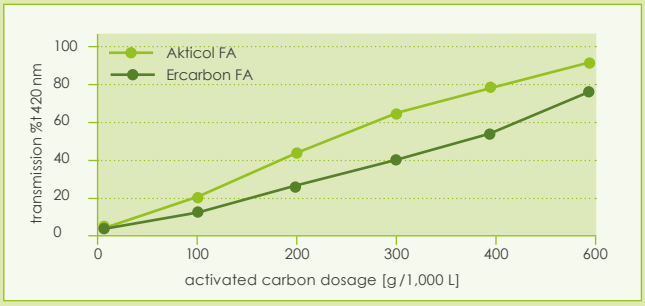
More common is the carbon application before juice clarification to save one filtration step. Activated carbon needs a sufficient reaction time before adding other fining agents. Especially bentonite and gelatin cause a clogging of carbon pores.

Colour reduction with Akticol FA

Preferably used is the type Akticol FA treating the pre-clarified beverage, for instance fruit juice, after fining or filtration. By the application of gelatin, already a part of the deep-coloured phenolic oxidation products is precipitated with the fining, through adsorption of further colour molecules Akticol FA produces the desired light-coloured juices and concentrates.

Improved stability with Ercarbon FA

Various modern beverage concepts require semi-finished products of particular stability. In these cases, as the first step, a consequent reduction, above all, of the natural polyphenols must be carried through. And then, very often colour reduction alone is not the aim of an activated carbon treatment. This is the case when diluted fruit beverages like nectars and fruit schorle with the colour intensity of apple juice are prepared from the halfware. For such applications Ercarbon FA is preferred, since its effect is primarily stabilising, which means, compared to the strongly decolouring carbon type Akticol FA, the same amount applied is less effective on colour along with a greater stabilising effect!



Colour stabilisation with Akticol FA and Ercarbon SH

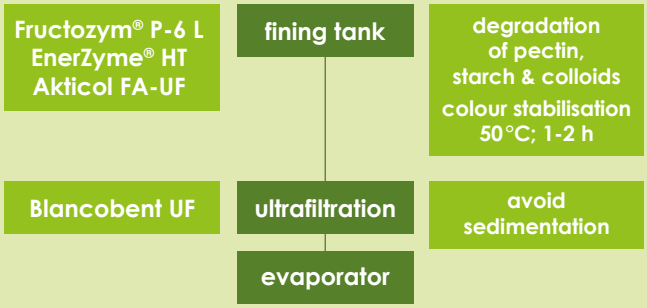
Dependent on storage conditions the depth of colour of stored fruit juices and concentrates changes. Very often, the defined quality demands are no longer fulfilled after a certain storage period. Optimised carbon treatment prevents this post browning effect to a large extent. A decolouring charcoal type is then applied in combination with a stabilising activated carbon. By the strongly decolouring type Akticol FA the colour is adjusted practically as desired during this application. By the type Ercarbon SH the phenolic precursors for a later oxidation are adsorbed early enough. The inevitable post browning effect is minimised in this way.

Clarified lime and lemon juices, for instance, show a significant browning effect after evaporation to full concentrate. In most cases, this effect is prevented by an application of Ercarbon SH.

Juice stabilisation in cross-flow filtration systems

Activated carbon particles > 45 µm have a damaging abrasive effect. Therefore crossflow filter systems should not regularly run with juices which normally carry activated carbon. Due to a special grinding process, Akticol FA-UF practically no longer contains such particles. Furthermore also the clogging of the membrane pores by very fine dust portions is a well-known and problematic phenomenon, since these particles are hardly removable by cleaning measures. Also this particle fraction was minimised in the Akticol FA-UF to an insignificant extent by adjusted screening processes.

Preferably Akticol FA-UF is applied during the depectinisation process with a stirrer in operation. After that the juice is directly introduced into the filtration plant, taking care that the activated carbon has not started to settle.



Reduction of HMF, patulin and ochratoxin A

Unsuitable recooling and storage conditions are the main reason for HMF (hydroxymethyl furfurol) in fruit juice production. Vis-à-vis HMF Ercarbon SH has a particularly high adsorption potential. In this way it is possible to stabilise HMF values at an unproblematic level.

Patulin and ochratoxin A are both products of the secondary metabolism of moulds. In principle, both substances do quite frequently occur in industrial fruit products, as for instance, in dried fruits or in fruit juices. For grape juice the limiting ochratoxin A value is 2 ppb. The allowed patulin content in fruit juices – primarily concerned are pome fruit juices – is up to 50 ppb. The application of Ercarbon SH enables manufacturers to stabilise these undesirable compounds present at the lowest level.

Adsorption of pesticides

At present, above all, the marketing chains selling baby food are taking special notice of residues derived from plant protection products. With Ercarbon SH a multitude of agricultural pesticides is efficiently treated. Due to the great number of possible substance types, the exact application must be found out by carrying out pretests prior to the activated carbon treatment.

Sensory improvement with Ercarbon SH or Granucol® GE

In single cases, fruit juices and above all fruit wines show undesirable sensory characteristics. By the use of Erbslöh activated carbons – especially the type Ercarbon SH – selective improvement is possible. The type Ercarbon SH primarily has an effect on aroma, while under www.erbsloeh.com above all for fruit wine producers an important choice of selectively acting products for targeted taste harmonisation and taste profile development is available. Ercarbon SH shows a particular effect against mousiness in wine and fruit wine. The right carbon choice is one of the keys to produce neutral alcohol bases for flavoured fruit wines and longdrinks.

Summary

Activated carbon is the first choice to obtain defined quality parameters in fruit juices and other beverages. Carbon type and application must be well considered in terms of:

- effectiveness
- purity
- selective effect
- production safety