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METHOD OF MAKING AND APPLYING A FILTERING MATERIAL

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For clarifying colloidal juices—for instance, raw sugar solutions—use is made of what is called filtering accessories. These are fine-grained or pulverulent substances of a large surface, such as kieselguhr, wood meal, peat or lignite dust, which are stirred up with the solutions to be treated at heat, followed by a filtration process. The colloids contained in the solution—and particularly the substances causing turbidity and the mucins—settle on the surface of the filtering accessory; hereby the grain interval of the filter bed will be contracted but to a slight extent, so that the fluid to be treated is allowed to pass through the filter bed at a high filtration rate. Thus it is the object of the filtering accessory not only to free the solution from substances causing turbidity but also to accelerate the filtration which otherwise—for instance, in the case of filtration through cloths—will soon come to a standstill because the mostly mucous colloids choke the pores of the filtering area.

Experience has shown that with this mode of operation the fineness of grinding the filtering accessory is of particular importance. In this respect blast-sifted kieselguhr has proved superior to any other filtering accessories by its uniform and great fineness of grinding—up to 90% of portions smaller than .04 mm—what applies particularly to comparison with the carbonizable filtering accessories referred to above. Particular trouble is encountered in applying the latter substances also by reason of the alkalinity of the solutions, as occurring as a rule in the sugar industry and having a dissolving effect on the humic and lignin solutions respectively of these filtering accessories, so that discolorations take place in the case of thus treated juices.

It has been found that a carbonaceous filter material equivalent to kieselguhr can be produced by distilling carbonizable substances having a great fineness of grinding at temperatures in excess of 450° C. Here it is of importance to accomplish the grinding prior to the low-temperature carbonization; if proceeding in the converse sequence, it will be impossible to obtain a product possessing high-grade clarifying and filtering properties from the resulting lumpy carbonization product even by selective grinding. This effect achieved by grinding the crude substance is the more surprising since it had to be presumed that pulverulent material would agglomerate or stick together at the time of low-temperature carbonization, i. e., the original grain structure of the finely ground initial material would change to disadvantage.

To obtain, at the same time, a good clarifying effect and high filtering capacity, the material to be ground must contain a high percentage of fine constituents, a minimum content of 60% of portions smaller than .06 mm having proved particularly satisfactory.

The low-temperature carbonization also destroys all alkali-soluble compositions, so that the material distilled at low temperature fails to give off organic substances any longer, which are likely to exercise a discolouring effect on the solutions to be treated. Even in the case of very high alkalinity—pH 13–14—the solutions treated with the new filtering material remain perfectly clear and do not change colour.

The superior clarifying and filtering capacity of the product made by the new process, e. g., from finely ground lignite as compared with low-temperature coke made from lignite of equal grade and ground subsequently appears most distinctly when applied to a colloidal beet sugar solution. While the new product yields the same clarifying effect—ascertained by measurement of turbidity—as kieselguhr, the ground lignite low-temperature coke gives only half the clarifying capacity. Still more striking is the difference in the filtration rate—as a proof of the filtration capacity expressed in hours of passing time required for one charge of 20 hectolitres per sq. m.—this time is 3 hours for the new product and 25 hours for the ground low-temperature coke (while kieselguhr as standard filtering accessory requires 5 hours of passing time).

All substances that can be distilled at low temperature, i. e., especially wood, peat and lignite, lend themselves to the manufacture of the filtering material. Particularly satisfactory filtering capacity is shown by the products distilled at low temperature and made from porous raw materials, the weight of which is less than 400 grams per litre; for instance, a younger, lighter peat affords a better filtering material than does an older, heavier peat.

If it is intended to employ the filtering accessories obtained by the new process in such refining processes where at the same time a discoloration is to be obtained, such an additional effect can be achieved by admixture of bleaching agents or decolorants, such as, e. g., active carbon. The same object will be obtained in many instances by admixing gel forming substances which are known to cause precipitations in aqueous solutions. Additions of this kind are, e. g., aluminum sulphate, phosphates, carbonates and also aluminium powder. These mixtures show specific refining effects in the case of colloidal solutions—e. g., raw cane sugar—since a high clarifying effect is due to the gels formed by the action on these solutions, so that particularly brilliant juices will be obtained by using these mixtures of filtering accessories and gel-formers.

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