Purification and Deodorization By Absorptive Carbons

A Discussion of Modern Methods of Bleaching as Applied to Oils and Fats

By JOHN P. HARRIS AND BERNARD N. GLICK

IN the eternal striving for production with economy and the resultant habit of classifying everything he uses, the vegetable oil refinery superintendent or chemist has come to regard activated carbons as "bleaching agents," to be used particularly on oil running high in red. As a result of this, carbons are usually tested and evaluated purely on the basis of color comparisons just as in the case with fuller's earth and acid washed clays. While the bleaching power of a carbon is important, it is the property of these products most easily achieved by the manufacturer, and a decolorizing test fails entirely to establish other properties even more valuable, especially since most carbons on the market are practically equal in their bleaching power, irrespective of price.

The process of bleaching, which involves merely a reduction in color, can be accomplished by various means. Chemical methods are of course impossible in edible oil work and even physical methods, as exemplified in the earths and carbons, vary widely in their manner of bringing about the desired result. The main difference can be described briefly by noting that one class of agents act by changing the original coloring matters to products of lighter color, but leaving them still in the oil, whereas those of the other "class" absorb the coloring matters, which are then entirely removed from the body of the oil along with the carbon, in the subsequent filtering operation.

Absorptive Carbons Remove Impurities

As would be expected bleaching agents of the first type, mostly earths and clays, are apt to introduce a foreign flavor or odor into the oil and give a bleach that is not entirely permanent. Those of the other type, comprising the carbons, sweeten the oil, render the following deodorization easier and give a lasting bleach.

Even carbons differ largely in this absorptive power, depending on the raw material used and the methods used in activating. It is possible to get a dense carbon with practically all its activating power on the surface or a light porous product with immense power of absorption, and it is easy to see that this latter type of carbon would exert not only the maximum bleaching power, but also a very marked effect as regards extracting from the oil foreign matter, such as moisture or meal, traces of soaps, resins, phosphatides, etc.

Of course this removal of impurities is tremendously beneficial to any edible vegetable oil, be it in a refined or crude state, and it amply repays the user regardless of the item of decolorizing, which

seems of prime importance to those in charge of production.

Many operators wonder why certain refineries produce a premium quality product from year to year, when their equipment varies little from other refineries. It seems almost to them as if there is some touch of magic to the other fellow's operations. They instinctively think of some secret process. "They are doing something," is a stock phrase. The consistent success of these certain refineries is not due to secret processes but to a consistent, painstaking attention to details, and to a refusal to slight the smallest item which will give them a clean, pure oil.

Deodorizing Depends on Preparation of Oil

The finest deodorizing system in the world would be wasted upon a plant that did not consistently and painstakingly bend every effort towards bringing a clean, pure oil to be deodorized and finished, and no step, however small, can afford to be slighted in producing a refined and purified oil worthy of being deodorized.

It is a moot point as to whether a really properly cleansed and purified oil can be produced for deodorization without the use of a purely absorptive activated carbon, but everyone who has tried it will admit that the use of such a carbon will greatly assist in producing a perfectly clean and purified oil.

Decolorizing by means of such a purely absorptive carbon brings about a stability of color not to be expected when using other kinds of bleaching materials. For, obviously, there will be no reversion of color in a perfectly purified oil, such as may take place in subsequent processing in case of an imperfectly treated oil, one, for instance, which still contains traces of soluble soap, phosphatides, resins, or other impurities even in very small amounts.

The treating time is substantially reduced in case of deodorizing a perfectly purified oil, but more important is the fact that no amount of treating in the deodorizer will produce satisfactory, lasting results in an imperfectly cleansed and purified oil.

Those of us who are familiar with the absorptive power of properly activated carbon upon lachrymatory and other forms of toxic gases, are not surprised at its remarkable absorption of odors. As a preparation for the deodorizing equipment it is unsurpassed.

In case of glycerine, gelatine and even strong smelling glues, it produces a very remarkable neutrality of flavor and odor.

Outstanding operators realize that the use of a purely absorptive carbon is a tangible asset in effecting a whitening and brightening not otherwise to be secured. But it is an even more important asset in the more intangible purification which leads to the production of "absolute" quality.