Crude Cotton Oil Filtration

The Effect on Cottonseed Oil Refiners of Advanced Mill Practice

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FOR many years intelligent cotton oil refiners have wished that crushing mills would filter their crude oil and thereby remove from it all meal and suspended matter. They knew that this would largely do away with souring of the oil during shipment, as well as with tank bottoms in the tankcars received, both of which lead to claims, litigation, ill feeling and cleanup operations which have no proper place in vegetable oil production and refining.

Progressive refiners have long recognized that better crude oil, as pure as possible, means better shortening, cooking and salad oil, and therefore a wider distribution for their products in all fields, yet the industry, as a whole, offered no inducements to the crude miller to improve his oil until last season, and it so happened that the benefits of filtration were at an absolute minimum last season, owing to an unprecedented run of seed of excellent quality.

Advantages Conceded

We have yet to talk with any technically trained man connected with the industry in any way and familiar with its problems, who will deny the advantages of filtration to the crude miller and to the refiner.

Yet there is such a paucity of technically trained men connected with crude cotton oil milling and the habits of years are so difficult to overcome, that there is great apathy evidenced toward the idea of filtration. Many mill men apparently believe that the idea is useless, and strangely enough, many otherwise well informed refinery men are still under the impression that filtration is desirable but impractical.

To induce the crude oil miller to filter his oil, you must show him direct, tangible, day to day profits resulting therefrom. We personally are convinced, after handling 120 tank cars of oil made during the last crush, that straight filtration is desirable and indirectly profitable even if no purely adsorptive activated carbon were used. But, we have proven that the use of such an adsorptive carbon goes further than straight filtration, and yields these desired immediate profits with the certainty that is needed to induce the oil miller to filter, and we have set forth these facts in articles published in OIL & FAT INDUSTRIES and the *Cotton Oil Press*. We are directly responsible for those filtering installations which have been made in crude mills, and we take pride in them as a progressive contribution to this great industry.

Refiner Gains with Miller

There exists, however, in some quarters, a belief that the benefits of such filtration are limited to the crude mills at the expense of the refiner, and we wish to correct this impression by showing that the refiner actually gains just as much as does the crude oil miller.

This article, therefore, is direct-

ed to the refiner, and it is not our purpose to discuss the benefits of straight filtration of crude oil, because, as we understand it, this is not questioned by any refiner, and meets with his full approval, nor is it our purpose to explain the advantages of filtration to the crude mill, because such explanation has already been fully set forth in the August issue of the *Cotton Oil Press*, page 39. We shall simply explain here the advantages accruing to the refiner that result from the use of activated carbon in the filtration of crude oil.

Carbon Aids Filtration

A purely adsorptive, activated carbon has been extensively used for the last twenty years in the purification of syrups, oils, acids, glycerine, alkaloids, chemicals; in fact, there is hardly a branch of chemical industry where it is not regarded as a standard medium for purification. Its use involves filtration and, as a result, wherever filtration is one of the means necessary to the manufacture of any product, the addition of the carbon involves no increase in the cost of handling, helps filtration, and insures a far more complete purification than is possible with either straight filtration or filtration with a filter-aid, alone.

Let us concede that filtered crude oil is in every way desirable to the refiner. Experience has shown that straight filtration of crude is impossible owing to the slimy nature of the suspended matter to be removed, and it is necessary to use some sort of filter-aid, usually a variety of diatomaceous earth. Then since filtration is accepted why not use carbon to get further purification than is possible with straight filtration, involving as it does no extra expense outside of the negligible cost of the carbon.

Every refiner knows that in all crude cotton oil there exist certain colloids which cannot be removed by ordinary filtration, or filtration plus an inert filtering material. He also knows that during the refining operation these colloids are the direct cause of the emulsification of 5 percent to 15 percent of good, edible oil into the soap stock, according to the class of oil treated.

We want every refiner to know that the only action of activated carbon on crude oil is to adsorb and remove from the oil as much of these colloids as possible.

Refiners think of carbon as the most powerful of decolorizing agents because, in their refineries, at 160-220°F., it acts as such upon refined oil. But, if they were to try it at 90°F. to 100°F., (the temperatures used in crude oil filtration), they would find that its bleaching power was practically nil, and it is even less effective in this respect on crude oil.

Proof positive that this statement is true, is found in the fact that test after test has been run in both factory and laboratory upon refined oil produced from carbon filtered crude against refined oil from the same crude unfiltered, and the refined oil produced from carbon filtered crude invariably shows bleachability equal to or greater than that produced from unfiltered crude. For example, if a 7.6 red refined oil from unfiltered crude oil bleached down to 2.5 red, then a 7.6 red refined oil from carbon filtered crude will bleach down to 2.5 red, or better. We invite all refiners to make such tests in their own laboratories to prove to themselves that *carbon does not bleach crude oil!*

It is true that the refined oil from a carbon filtered crude does

have a distinctly lower refining loss than could be obtained from the same oil unfiltered, but this is due to exactly the same reasons that make good seed give a better oil than bad seed, i.e., less impurities in the oil.

It is also true that the refined oil from a carbon filtered crude will, *after refining*, give a lighter colored refined oil, but this is not due to the fact that the carbon has bleached the crude oil, but because it has removed from the crude oil some of those impurities which even the refining operation will not remove.

It is entirely wrong to refer to carbon filtration as a "partial" refining, or to insinuate that it interferes in any way with the legitimate province of the refiner. The carbon simply does for crude oil what it has done for other products during the last twenty years; it purifies the oil by extracting from it those extraneous and objectionable impurities that impair its value, both to the miller and the refiner.

This purification, moreover, results in the following desirable benefits to the refiner:

1. By elimination of moisture and impurities, it stabilizes the crude oil, so that it will not sour or decompose in transit. Thus, we may confidently expect perfect agreement in the sampling and analysis of the crude as loaded and at destination.

2. Such purified, sweet crude is certain to produce very much better finished products from the refinery, for, regardless of how good the refining equipment may be, it is certain that the best finished products are to be expected *only when the best grade of crude oil is used in the refinery!*

3. It is an unwritten law in the refinery, that crude cotton oil must be refined *immediately* upon receipt, the same day, if possible, and since deliveries generally pile up at the end of the month, due to a milling period which condenses the year's refining operations into a few months, it means that a refinery must be of large enough capacity to refine the entire season's crude in a short time. Even so, this large capacity often becomes inadequate at first of the month delivery periods, when it is often necessary to operate night and day in a feverish scramble to clear the track to avoid demurrage, and to refine the crude promptly. Such over-production periods are always costly from a labor standpoint and mean higher refining losses, through lack of proper settling time, spills, and lack of personal direction by the refiner in charge. Carbon filtered crude oil may be stored with safety and refined when convenient, with no danger of deterioration. Thus, the hectic, crowded periods of first of the month "refining sprees" become a thing of the past, and refinery operations may be spread over the entire year, increasing the capacity of every refinery.

4. Refiners all know that carbon has a distinct deodorizing effect on oils and that by using it on the crude, it will tend to remove from the oil as early as possible, a large part of the impurities that would give trouble in the deodorizers later.

Summing up, we really feel that the general adoption of activated carbon in the filtration of crude oil will not only benefit the crude oil miller but will lead to large economies in refining.