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VEGETABLE OIL REFINING

Paul D. Boone, Washington, D. C.

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10 Claims. (Cl. 260—424)

This invention relates to the refining of oils of vegetable origin. In particular it relates to the removal of the gum portion of crude glyceride oils by adding an acidifying liquid to the crude oil to bring the pH below a numerical value 7 but not far below it, and heating the mixture to coagulate the gums and passing this mixture to an agglomerating chamber; the mixture is thereafter separated in a centrifuge. Due to the weak acidity, this process is not to be confused with the carbonization of impurities by strong sulfuric acid.

There is no limitation as to the type of glyceride oils of vegetable origin which I treat and the more common types especially, such as cotton, soy, linseed, peanut, and castor oils are especially contemplated. Oils from pressing operations are characterized by the presence therein of gums and other impurities.

In refining vegetable glyceride oils it is necessary to remove the gums and mucilaginous materials, some of which according to the texts are carbohydrate and others protein materials. This has been done sometimes with physical methods. As to oils which go into food products and lubricants, it is necessary to remove the free fatty acids.

The applicant is not inferring that the gums and mucilaginous materials and other impurities are valueless because he chooses to refer to his process in such terms as "refining of glyceride oils" or "removing the gum portion of crude glyceride vegetable oils." They are by-products from the standpoint of an oil refining operation. The oils produced by the applicant's process set out herein whether soy bean, linseed, cotton seed, or other types of vegetable oil have their free fatty acids therein (term used in technical sense) but are free of gums and other impurities. Simultaneously by-products are produced whose components are chemically known in part anyway, as mentioned supra.

According to my invention by one embodiment, a vegetable oil containing gums or other impurities (disregarding the free fatty acids which are present) is de-gummed by adding sufficient acid to bring the pH below the numerical value 7 and to 3–5, passing the fluid containing the fatty oil in a continuous mode by a pipe or the like through a heater to cause the gums to be coagulated, and into an agglomeration chamber with less agitation there and then into a centrifuge. The alteration of the pH by the addition of the very small amount of acid brings about a change in the condition of the gums. Heating further alters the gums and/or mucilaginous matter.

The agglomeration chamber is preferably wide so that movement of the liquid is slowed down therein. Cold may be used to assist the drops of the dispersed liquid phase to agglomerate or come together. By this either the oil can first be mixed with water and then the acid added or the acid can be added to the water and this acidified liquid mixed with the impure oil. The amount of water may vary, but those amounts are used which are sufficient when admixed with the crude glyceride oil to produce a mixture which can be continuously centrifuged according to the aforesaid steps, yielding respectively separate streams of refined oil and an aqueous suspension of the altered gummy material which was present in the original oil.

While I have specifically described the preferred embodiment of my invention, it is to be understood that the invention is not limited to the hereinbefore described details, but may be otherwise embodied and practiced within the scope of the following claims.

I claim:

1. In a continuous process for refining a vegetable oil containing gums in which a sufficiently high temperature of the aqueous oil mixture is employed to coagulate the gums, the steps of mixing an aqueous liquid with the oil to secure a mixture having a degree of acidity substantially of the pH numerical values 3–5, cooling the advancing stream and decreasing the agitation of the liquid and then submitting the mixture to a centrifugal separation in order to continuously separate purified oil from the aqueous medium containing the impurities.

2. In a continuous process for refining a vegetable oil containing gums wherein an acidic aqueous liquid is mixed with the impure oil to secure a mixture having a degree of acidity substantially of the pH numerical values 3–5 and wherein a sufficiently high temperature of the mixture is employed to coagulate the gums, the steps of decreasing the agitation of the advancing stream from that in the prior mixing to effect agglomeration of the dispersed drops and then submitting the mixture with its coagulated impurities to a centrifugal separation in order to continuously separate purified oil from the aqueous medium containing impurities.

3. In a continuous process for refining a vegetable oil containing gums wherein an aqueous liquid is mixed with the oil to secure a mixture having a degree of acidity substantially of the pH numerical values 3–5 and wherein a sufficiently

high temperature of the mixture is employed to coagulate the gums, the steps of advancing the stream into a zone of wider cross section wherein both the forward movement and the agitation is decreased and the dispersed drops are collected together on account of the lesser agitation, and then submitting the mixture with its coagulated impurities to a centrifugal separation in order to separate purified oil from the aqueous medium containing impurities.

4. In a continuous process for refining a vegetable oil containing gums wherein an aqueous liquid is mixed with the oil to secure a mixture of acidity substantially of the pH numerical values 3–5 and wherein the mixture is in a heated condition at a sufficiently high temperature to change the physical condition of the gums, the step of cooling the advancing stream by employing a cold agency to abstract heat and then submitting the mixture with its physically altered impurities to a centrifugal separation in order to continuously separate purified oil from the aqueous medium containing the impurities.

5. In a continuous process for refining vegetable oils containing gums wherein an aqueous liquid is mixed with the impure oil to secure a mixture having a degree of acidity substantially of the pH numerical values 3–5 and wherein the mixture is heated subsequent to this, the steps of cooling the advancing mixture immediately thereafter and more completely collecting together the dispersed drops and then submitting the oil with its impurities to a centrifugal separation in order to secure simultaneously an oil free from the gums which were present originally and likewise an aqueous portion with the impurities therein.

6. In a continuous process for refining soy bean oil containing gums in which a sufficiently high temperature of the aqueous oil mixture is employed to coagulate the gums, the steps of mixing an aqueous liquid with the oil to secure a mixture having a degree of acidity substantially of the pH numerical values 3–5, cooling the advancing stream and decreasing the agitation of the liquid and then submitting the mixture to a centrifugal separation in order to continuously separate purified oil from the aqueous medium containing the impurities.

7. In a continuous process for refining soy bean oil containing gums wherein an acidic aqueous liquid is mixed with the impure oil to secure a mixture having a degree of acidity substantially of the pH numerical values 3–5 and wherein a sufficiently high temperature of the mixture is employed to coagulate the gums, the steps of decreasing the agitation of the advancing stream from that in the prior mixing to effect agglomeration of the dispersed drops and then submitting the mixture with its coagulated impurities to a centrifugal separation in order to continuously separate purified oil from the aqueous medium containing impurities.

8. In the method of removing the gums and mucilaginous components of crude vegetable oils, the steps of adding to said oil an aqueous acidifying agent thereby securing a mixture having a degree of acidity substantially of the pH numerical values 3–5 and heating to coagulate the gums and passing the resulting mixture to an agglomeration chamber which is a zone of less agitation to unite the dispersed liquid drops thereof and then separating the oil simultaneously from the aqueous portion and entrained impurities, said process being of the continuous type from the time of the addition of the acidifying agent.

9. In the process of refining vegetable glyceride oils for the removal of gums and mucilaginous bodies contained therein wherein a heated mixture is secured, the steps of mixing with the said oil as aqueous acidic solution to secure a mixture having a degree of acidity substantially of the pH numerical values 3–5, and then cooling in a continuous manner of flow the heated mixture of oil and impurities for a period of time whereby the dispersed liquid particles come together, and thereafter introducing the mixture of oil, aqueous medium and impurities to a centrifugal separator, and continuously separating the oil in a refined condition from the aqueous liquid and entrained impurities.

10. The process set out in claim 9 in which the mixture is heated to a temperature sufficiently high to coagulate the gums.

PAUL D. BOONE.