This process consists of a removal of the catalyst and heavy products (tailing), followed by a removal of the light compounds (topping) and by a final rectification of a crude transesterification reaction mixture obtained using a catalyst chosen from tetrabutyl, tetraethyl and tetra(2-ethylhexyl) titanates. This process thus exhibits the advantage of comprising only three distillation columns in the purification train for the reaction mixture.

However, the process described in the document EP 960 877 is not applicable to the manufacture of a long-chain alkyl acrylate, for example 2-octyl acrylate, by transesterification reaction of a light acrylate with 2-octanol. This is because the transesterification of the titanates, either with a light alcohol released during the reaction or with the starting 2-octanol, brings about the appearance of impurities, such as butyl acrylate or 2-ethylhexyl acrylate, in the reaction mixture or in the light ester/light alcohol azeotropic mixture and complicates the purification of the 2-octyl acrylate.

A need thus still remains to have available a process for the manufacture of 2-octyl acrylate which exhibits a productive output compatible with manufacture on the industrial scale and which results in a 2-octyl acrylate meeting the purity requirements related to its final use, in particular with regard to the possibility of using this monomer in the manufacture of latexes having a low content of volatile organic compounds.

The applicant company has sought to solve the various problems of the abovementioned processes, in particular those related to the use of 2-octanol in the transesterification reaction, in order to produce 2-octyl acrylate of very high purity with a high yield, while including the recycling of the economically upgradable products, such as the unreacted reactants and the catalyst.

The solution provided consists in using ethyl titanate in solution in 2-octanol or 2-octyl titanate as transesterification catalyst and in employing a purification train comprising a preliminary separation of the catalyst by distillation, followed by purification using at least one distillation column.

The present ~~invention~~disclosure makes it possible in addition to produce an acrylic ester comprising carbon of renewable origin related to the use of the 2-octanol, which is an alcohol derived from plant matter.

SUMMARY ~~OF THE INVENTION~~

~~A subject matter of the present invention is~~In an aspect, there is provided a process for the continuous production of 2-octyl acrylate by a transesterification reaction between a light alcohol acrylate and 2-octanol in the presence of an alkyl titanate as transesterification catalyst and at least one polymerization inhibitor, the azeotropic mixture composed of light alcohol acrylate and of light alcohol generated by the transesterification reaction being withdrawn continuously during the reaction, the reaction mixture being subjected to a purification treatment comprising at least two distillation columns, in order to obtain, on the one hand, the pure 2-octyl acrylate and, on the other hand, the unreacted 2-octanol and light alcohol acrylate compounds intended to be recycled, and also the catalyst intended to be recycled, which process is characterized in that:

- (i) the catalyst is chosen from ethyl titanate in solution in 2-octanol and 2-octyl titanate;
- (ii) a preliminary separation of the catalyst is carried out by sending, to a first distillation column (C1) under reduced pressure, the crude reaction mixture comprising the desired 2-octyl acrylate with, as light products, the unreacted 2-octanol and light alcohol acrylate and, as heavy products, the catalyst, the polymerization inhibitor or inhibitors and also heavy reaction products, and a distillation is carried out, in said first column (C1), which makes it possible to obtain:
    - o at the top, a stream composed essentially of 2-octyl acrylate and light products, comprising a minor fraction of polymerization inhibitors but devoid or substantially devoid of catalyst, and
    - o at the bottom, a stream of heavy reaction products with the catalyst, the polymerization inhibitor(s) and a minor fraction of 2-octyl acrylate, said stream being recycled to the reaction stage; then
- (iii) by distillation of the top stream from the first distillation column (C1), the unreacted 2-octanol and light alcohol acrylate compounds, a fraction comprising polymerization inhibitors and the pure 2-octyl acrylate are separated;
- (iv) the desired pure 2-octyl acrylate is recovered;
- (v) the unreacted 2-octanol and light alcohol acrylate compounds are recycled to the reaction stage;
- (vi) a fraction comprising polymerization inhibitors is sent to the column (C1) for separation of the catalyst.

According to a first embodiment of the ~~invention~~disclosure, stage (iii) of the process is carried out from the following two substages (iii1) and (iii2):

- (iii1) the top stream from the first distillation column (C1) is sent to a second distillation column (C2) under reduced pressure, in which a distillation is carried out which makes is possible to obtain:
    - at the top, a stream composed essentially of unreacted 2-octanol and light alcohol acrylate, with a minor fraction of 2-octyl acrylate; and
    - at the bottom, 2-octyl acrylate comprising traces of unreacted products and of polymerization inhibitors; then

- (iii2) the bottom stream from the second distillation column (C2) is sent to a third distillation column (C3) under reduced pressure, in which a rectification is carried out which makes it possible to separate:
    - at the top, the desired pure 2-octyl acrylate; and
    - at the bottom, the polymerization inhibitors in solution in 2-octyl acrylate.

According to a second embodiment of the ~~invention~~disclosure, stages (iii) and (iv) of the process are carried out simultaneously by sending the top stream from the first column (C1) to a second column (C2') under reduced pressure, in which a distillation is carried out which makes it possible to obtain:

- at the top, a stream composed essentially of unreacted 2-octanol and light alcohol acrylate, with a minor fraction of 2-octyl acrylate;
- at the bottom, a stream comprising the polymerization inhibitors with a fraction of 2-octyl acrylate;

and to recover the desired pure 2-octyl acrylate via a side stream.

The ~~invention~~ disclosure is now described in more detail and without implied limitation in the description which follows, with reference to the appended figures 1 and 2, which diagrammatically represent a plant which makes it possible to implement the process ~~according to the invention~~as defined above respectively according to the first embodiment described above and according to the second embodiment described above.

DETAILED DESCRIPTION

One of the objectives of the invention is to use starting materials of natural and renewable origin, that is to say biosourced.

The 2-octanol used in the process according to the invention is an alcohol of renewable origin; in particular, it can be obtained by alkaline treatment of ricinoleic acid derived from castor oil.

The light alcohol acrylate employed as starting material in the process according to the invention is obtained by direct esterification of acrylic acid, essentially