(54) Title: METHOD FOR REMOVAL OF FAT AND OIL FROM STICKWATER BY USE OF UF-FILTER

A method for removing oil and fat from stickwater in a feed and bleed filter loop comprising a filter (2), a circulation pump (4) and circulation pipes (6, 8), wherein the stickwater is circulated through a UF-filter (2), the filter material thereof having a wetting angle for water which is less than 20 degrees.
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.
METHOD FOR REMOVAL OF OIL AND FAT FROM STICKWATER BY USE OF UF-FILTER

This invention relates to a method for removing fat and oil from stickwater by the use of a UF-filter. More particularly it concerns a method for defatting stickwater, in which the stickwater is circulated through a UF-filter which is particularly fat-repellent. By a UF-filter is meant, in this context, a screen cloth material.

In the production of fishmeal the fractions fishmeal, fish oil and stickwater are produced. The stickwater contains a portion of dry matter in the order of 10 per cent by weight, water, salt and a relatively small portion of oil and fat.

In order to increase the solids content of the stickwater, the stickwater is subjected to a concentrating process, which may comprise, according to the prior art, reducing. The reducing of stickwater is energy-demanding. Therefore, a method for concentrating stickwater by means of filtration has been developed and shows promising results.

In this method for concentrating stickwater, so-called nanofiltration is used. In nanofiltration (NF-filter) particles that are larger than 200-600 daltons are retained
in the filter. However, practical utilization of the method is prevented by the fact that a nanofilter of this kind becomes clogged with fat and oil that are present in the stickwater.

The invention has as its object to remedy the drawbacks of the prior art.

The object is realized in accordance with the invention through the features specified in the description below and in the following Claims.

With the aim of preventing subsequent processes from being affected by the stickwater's content of fat and oil, for example the process mentioned above, fat and oil are removed from the stickwater by means of so-called ultrafiltration. In ultrafiltration (UF-filter) particles that are larger than approximately 5000 daltons are retained.

According to the invention, there is used a UF-filter which is made in such a way that it attracts water but repels oil and fat in order to separate oil and fat from the stickwater. The stickwater passing through the UF-filter contains the solids portion.

This oil- and fat-repellent property is obtained by forming the UF-filter from an oleophobic material, that is to say that the wetting angle between the filter material and a drop of water is small, for example less than 20 degrees. It is of advantage for the wetting angle to be less than 10 degrees.

For example, polyacrylonitrile (PAN) can be used. This material has proved to be very oleophobic.
A filter of this kind has the property, known in itself, of being hydrophilic, that is to say that water is attracted to the filter material whereas oil and fat is repelled.

By installation of a UF-filter of this kind into a so-called feed and bleed filter loop, stickwater is fed into the filter loop and repeatedly circulated through the UF-filter, water and solids passing through the UF-filter material. The process makes the portion of fat and oil in the circulating stickwater concentrate. Stickwater having a relatively high content of fat and oil is bled from the filter loop at a rate which is controlled by the content of fat and oil present in the circulated stickwater.

The portion of fat and oil in the circulating stickwater is determined by means of, for example, density-metering.

A further advantageous feature of the invention is that dioxins are removed from the stickwater together with fat and oil. This favourable effect involves that it can be desirable to use the invention even if the subsequent process step is not adversely affected by the stickwater's content of fat and oil.

In what follows is described a non-limiting example of a preferred method which is visualized in the accompanying drawing, in which:

Figure 1 shows a principle drawing of a UF filtering plant for stickwater, arrows indicating the directions of flow of the stickwater.

In the drawing the reference numeral 1 identifies a UF filtering plant for stickwater. The UF filtering plant 1 comprises a UF-filter 2 formed of an oleophobic material and a circulation pump 4.
The circulation pump 4 is connected, at its outlet side, to the inlet of the UF-filter 2 by means of a first circulation pipeline 6, whereas a second circulation pipeline 8 is connected between the circulation outlet of the UF-filter 2 and the inlet of the circulation pump 4.

An outlet pipe 10 is connected to the filter outlet of the UF-filter 2 and extends to a subsequent process not shown.

Thus, the UF-filter 2, circulation pump 4 and circulation pipes 6 and 8 form a circulation loop.

A densimeter 12 connected to the second circulation pipeline 8, is arranged to measure the density of the circulation fluid.

A supply pipe 14 is connected via a high-pressure pump 16 to the first circulation pipe 6, and a bleed pipe 18 is connected to the second circulation pipe 8 through a bleed valve 20.

Stickwater which is to be defatted, flows in through the supply pipe 14, the high-pressure pump 16 and the first supply pipe 6 to the UF-filter 2. A portion of the stickwater flows through the filter material of the UF-filter 2 and out through the outlet pipe 10, whereas the rest of the stickwater flows out of the UF-filter through the second circulation pipeline 8 and is circulated back to the UF-filter 2 by means of the circulation pump 4 and the first circulation pipe 6.

The purified stickwater flows out through the outlet pipe 10 at a rate determined by the through-put capacity of the UF-filter material. As the water is circulated through the UF-filter, the content of oil and fat in the stickwater concentrates. When the circulating stickwater has reached a
predetermined oil and fat concentration, the densimeter 12 outputs a signal through a signal connection 22 to the bleed valve 20. The bleed valve 20 opens and stickwater with a relatively high concentration of oil and fat flows out through the bleed pipe 18.

New stickwater flows in through the supply pipe 14 and the high-pressure pump 16 at a rate controlled by the outflow rates through the outlet pipe 10 and by the bleed pipe 18.
CLAIMS

1. A method for removing fat and oil from stickwater in a feed and bleed filter loop comprising a filter (2), a circulation pump (4) and circulation pipes (6, 8), characterized in that the stickwater is circulated through a UF-filter (2), in which the filter material has a wetting angle for water which is less than 20 degrees.

2. A method in accordance with claim 1, characterized in that the stickwater is circulated through a UF-filter retaining particles that are larger than 5000 daltons.

3. Use of a UF-filter for separating oil and fat from stickwater.

4. Use of a UF-filter whose filter material has a wetting angle for water which is less than 20 degrees, for the purpose according to claim 3.

5. Use of a UF-filter whose filter material retains particles that are larger than 5000 daltons, for the purpose according to claim 3.
INTERNATIONAL SEARCH REPORT

INTERNATIONAL APPLICATION NO.
PCT/NO 2004/000273

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: C02F 1/44, B01D 61/14
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B01D, C02F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE, DK, FI, NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ, CAPLUS, INSPEC, COMPDX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<th>Relevant to claim No.</th>
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<td>US 4966733 A (TISSA FERNANDO ET AL), 30 October 1990 (30.10.1990), column 4, line 7 - line 13; column 4, line 32 - line 34</td>
<td>1-5</td>
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Further documents are listed in the continuation of Box C.

See patent family annex.

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