However, it has been found that this is not the case if the feed oil has a high N content. A feed with high N content, and with a carbonyl content between <0.5-1.13 mmol/g, may cause plugging in a reactor at an operating temperature of 300ºC.

The present technology provides the discovery of a new problem – that for feeds with low carbonyl numbers, such as above the detection limit, but below 1.13 mmol/g, but high concentrations of nitrogen, plugging of the reactor is a risk. It is an object to provide a stable renewable crude, and a process for the formation thereof, that can be further hydroprocessed using more traditional hydroprocessing conditions.

SUMMARY

It has been found by the present inventor(s) that plugging of a hydroprocessing reactor by a feed with high N content, yet low carbonyl content, can be reduced, and even avoided, if the feed is first stabilised.

So, the present disclosure relates to a process for hydrotreating a nitrogen rich liquid oil stream by, in a continuous operation in a fixed bed reactor, reacting the nitrogen rich liquid oil stream with hydrogen in the presence of catalyst at a temperature of 80-250°C, a pressure of 10-200 barg, a liquid hourly space velocity (LHSV) of 0.1 - 6 h^{-1}, thereby forming a stabilized liquid oil stream.

In one aspect, the present disclosure relates to a process for hydrotreating a nitrogen rich liquid oil stream, comprising at least 0.5 wt% nitrogen and a carbonyl content from 0.5 mmol/g to 1.13 mmol/g by, in a continuous operation in a fixed bed reactor, reacting the nitrogen rich liquid oil stream with hydrogen in the presence of catalyst at a temperature of 80-250°C, a total pressure of 10-200 barg, a liquid hourly space velocity (LHSV) of 0.1 - 6 h^{-1}, thereby forming a stabilized liquid oil stream.

DETAILED DISCLOSURE

The unit "barg" denotes pressure above atmospheric (atmospheric pressure: about 1 bar).

A process is provided for hydrotreating a nitrogen rich liquid oil stream, comprising at least 0.5 wt% nitrogen and a carbonyl content from 0.5 mmol/g to 1.13 mmol/g by, in a continuous operation in a fixed bed reactor, reacting the nitrogen rich liquid oil stream with hydrogen in the presence of catalyst at a temperature of 80-250°C, a pressure of 10-200

barg, a liquid hourly space velocity (LHSV) of 0.1 - 6 h^{-1}, thereby forming a stabilized liquid oil stream. The combination of features recited above, enables stabilization of the liquid oil.

In preferred embodiments, the temperature is in the range 180 - 220°C, e.g. 190-200°C. In another embodiment, the pressure is 80-175 barg, e.g. 150 barg. In another embodiment LHSV is 0.2- 4.0 h^{-1}, such as 0.2-0.2 h^{-1}, or 0.8-1.0 h^{-1}, e.g. 0.9 h^{-1}.