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Feed grade soap stocks from integrated crushing and refining

Introduction

Soap stocks destined for feed are to be tested on dioxin as part of the HACCP system (Regulation (EU) 1905/2015 amending Feed Hygiene Regulation (EC) 183/2005). A low risk of dioxin contamination of oilseeds that are used for crushing results in a similarly low risk of dioxin contamination in soap stocks. Soap stocks from integrated crushing and refining plants can hence be safely put back on the meals and expellers.

General process description of crushing of oilseeds and refining of oils

Step 1 Crushing

During crushing, oilseeds, such as soybeans, rape seeds and sunflower seeds are separated into two main streams:

1. Solid material, dry substance, like meals or expellers
2. Crude oil

Step 2 Refining

Crude oil refining entails the removal of gums (also called crude lecithins) and free fatty acids (FFA) from the oil to get a neutral taste of the edible oil while maintaining the nutritional value and ensuring the quality and stability of the product.

Degumming is the first step of refining and involves the removal of the gums/crude lecithins from the oil. In order to do this, the crude oil is treated with water or food grade acid at a temperature of around 100°C. The hydrated gums are removed at the end of this step or after neutralisation. Gums are a raw material for the production of lecithins.

FFAs are responsible for oil acidity. Two refining processes have been developed which differ principally in the way the free fatty acids are removed.

a. Chemical refining

Chemical refining is the traditional method of oil refining during which FFA are removed from the oil by means of neutralisation. During neutralisation, the oil is treated with a food grade alkali solution (caustic soda) that reacts with the FFA to form soap stocks. The soap stocks -together with the precipitated gums, if still present- are separated from the oil by centrifugation. Typically, soap stocks contain 40% water and 60% fatty matter (FFA, triglycerides). In facilities that both crush oilseeds and refine the seed oils (integrated crushing and refining),

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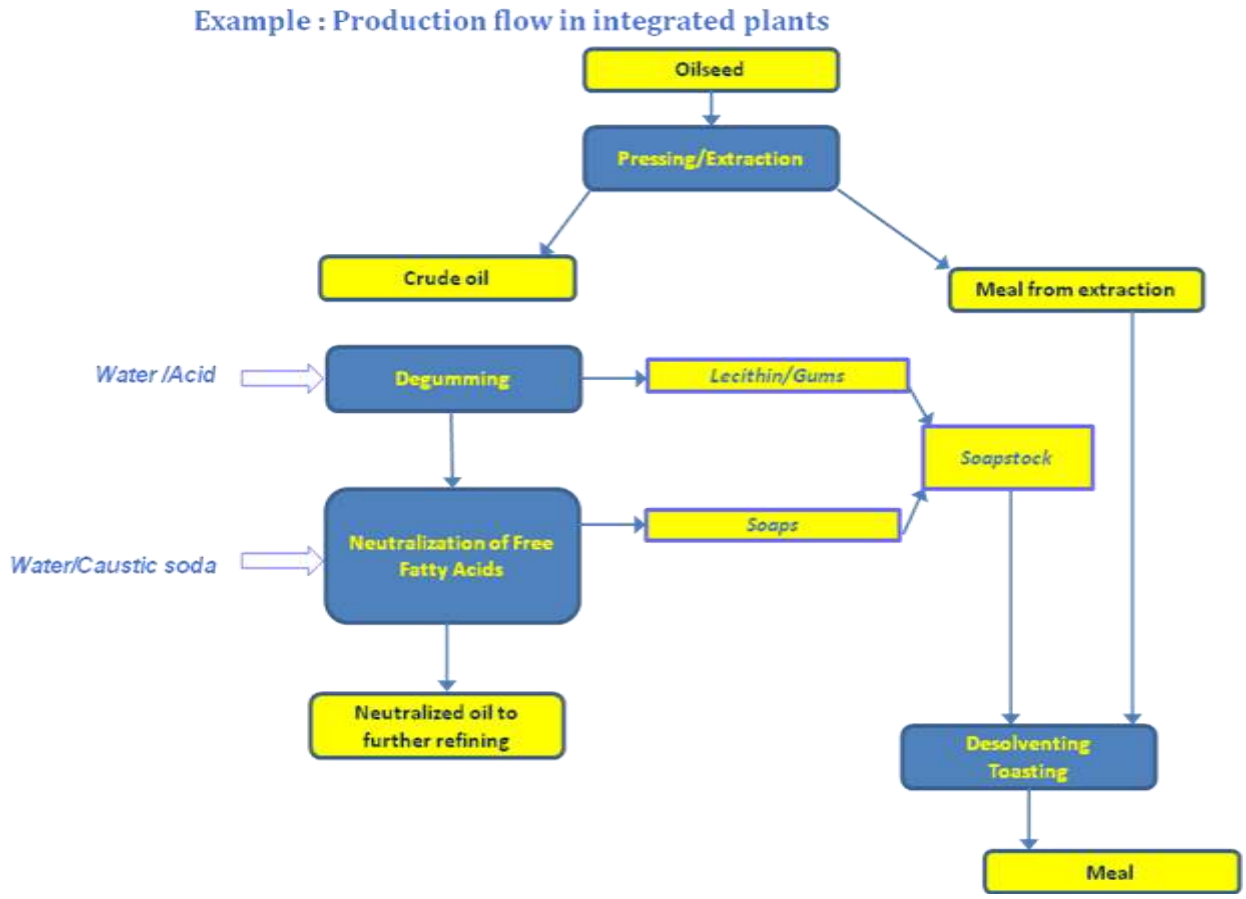
the soap and gums can be added back to the meal or expellers at inclusion levels of respectively up to 2% and 1.3% (see attached figure).



Soap stocks can also be sold to the market as "soap stocks" and can also be acidulated into acid oils.

b. Physical refining

Physical refining removes the FFAs by distillation, as the boiling point of the FFA is lower than that of the triglyceride oil. FFA from physical refining are referred to as fatty acid distillates. Stand-alone refineries often apply physical refining to crude tropical oils such as palm oil, palm kernel oil and coconut oil. Integrated crushing and refining plants may also apply physical refining to seed oils such as rape seed, sunflower and soybean oil. Physical refining does not involve soap stock production.

Integrated crushing refining plants

The production of gums and soaps stocks in integrated crushing refining is a process of continuously removing the gums and free fatty acids from the oils and continuously dosing these as gums or soap stocks to the meal or expellers. The components in the soap stocks are part of the natural composition of seeds or beans. This means that only natural components separated from the seeds and beans –complemented with sodium from caustic soda- are returned back into the crushing process. Whether integrated crushing refining plants add soap stocks back to the meal or expellers is determined by the design of the facility. It is not subject to daily management decisions.

Soap stocks sold as feed material

If a stand-alone refinery is buying crude oil from the market to refine it, the soap stocks produced are collected in intermediate storage tanks and can be sold as feed material to the compound feed industry as such or after acidulation of these into acid oil.

Safety of soap stocks

Soap stocks originating from integrated crushing and refining plants are safe. In the long history of analyzing these products, industry has never experienced any concentration of hydrophobic contaminants from the crude oil into the soap stocks. The materials used during refining (acids, hydroxide solutions) and the process conditions applied are neither known to be a risk for the formation of such hydrophobic contaminants. This can be proven by data. Soap stocks, sold on the market as single feed material and derived from the same production process meet to the same safety criteria.

Conclusion

In integrated crushing and refining plants soap stocks, together with the gums may be fed back to the meals or expellers at inclusion levels of up to 2%. These components are naturally present in the oilseeds and are safe as there is no concentration of hydrophobic contaminants during their production process. The feeding back of soap stocks and gums in integrated crushing refining is determined by plant design and does not involve daily management decisions.

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