

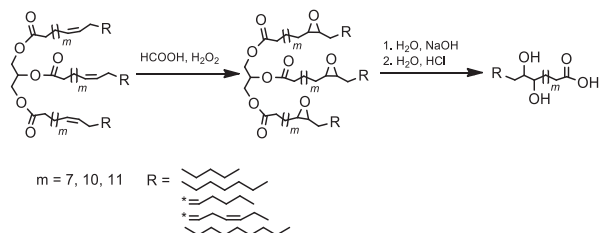
## MODIFIED FATTY ACID RAW MATERIALS IN TECHNOLOGICAL SYSTEMS

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Used edible oil was modified to produce hydroxylated fatty acids as an emulsifier-stabilizer for various functional purposes. Hydroxylated fatty acids were synthesized by epoxidation of unsaturated fatty acids or their mixture, which is part of the oil and fat raw material, followed by hydrolysis by acylglycerol grouping and oxirane rings. The general reaction scheme is as follows:



The structure of the synthesised products was determined by infrared spectroscopy. The results of these studies confirm the formation of hydroxylated fatty acids under the selected reaction conditions [1–3]. The reaction of carbonyl fragments confirms the disappearance of bands  $1745\text{ cm}^{-1}$  and  $1160\text{ cm}^{-1}$ , C=O groups of esters and the appearance of bands in the region of  $1700\text{ cm}^{-1}$ ,  $1420\text{ cm}^{-1}$  and  $1290\text{ cm}^{-1}$  corresponding to the formed acid groups. In addition, the hydroxylated products obtained are confirmed by the disappearance of the epoxide peak at  $822\text{ cm}^{-1}$  and the appearance of a broad, flat band in the range  $3250\text{--}3550\text{ cm}^{-1}$  with a maximum of  $3370\text{ cm}^{-1}$ , corresponding to -OH groups formed as a result of the opening of the epoxy ring.

In terms of physical state, the hydroxy acids of used edible oil are characterized by a saponification number of  $182.7\text{ mg KOH/g}$ , a melting point of  $74\text{ }^{\circ}\text{C}$ , an iodine number of  $0.9\text{ g I}_2/100\text{ g}$ , and an acid number of  $178.1\text{ mg KOH/g}$ . The synthesized emulsifier is well-compatible with almost all traditional petroleum and synthetic base oils. The developed thixotropic systems using hydroxylated fatty acids can be used in the workover of oil and gas wells, as well as for the development of complex greases with improved performance properties.

## References

1. Бодачівська Л.Ю. Біорозщеплювальні поверхнево-активні речовини з побічних продуктів виробництва рослинних олій у технічних системах. Питання хімії та хімічної технології. 2022. № 6. С. 3-11. DOI: <https://doi.org/10.32434/0321-4095-2022-145-6-3-11>
2. Bodachivska L.Yu. Sidestreams from the vegetable oil production as feedstock for surfactants and their derivative technical systems. Catalysis and Petrochemistry. 2021. № 31. С. 55-61. DOI: <https://doi.org/10.15407/kataliz2021.31.055>