

61. Production technology of sugar glycerides (food additive E474)

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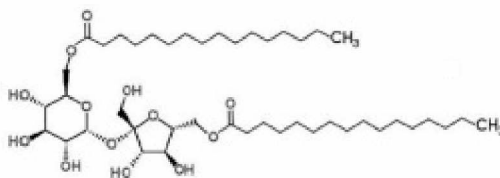
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Introduction. Sugar glycerides are products of re-esterification reaction between fats and carbohydrates. They are able to stabilize and emulsify food products, keep their viscosity and improve their consistency. Sugar glycerides are used in the production of food coatings.

Materials and methods. Sugar, palm fat, dimethylformamide, potassium carbonate, ethanol, methods of organic synthesis, literature. An analytical review of the literature was conducted, experience was learned with the technology of obtaining of sugar glycerides - food additive E474 and its properties.

Results. Sugar glycerides are complex mixtures of reaction products between fats and sucrose. The chemical composition and the consistency of the additive E474 depends on the selected starting compounds, their ratios, and the conditions of the reaction. If saturated fat is used, the resulting sugar glycerides are of semi-solid consistency, that is convenient to transport and dose of the additive obtained. Sugar glycerides, obtained by the esterification of sugars with different types of edible fats or oils, consist of mono- and di-esters of sucrose and edible fatty acids with mono-, di- and triglycerides. Sugar glyceride stability to high temperatures depends on the sugar content in this additive.

Sugar glycerides can be obtained in laboratory by esterification reaction between sucrose and edible fats or oils, for instance palm oil, in any polar organic solvent or without the use of solvent. Besides the target sugar glyceride, some by-product are also identified. They are different products of sugar decomposition, potassium salts of fatty acids, contaminations of solvent. Sugar glyceride, to be permitted for use in food industry, must be carefully purified of contaminations. One of the industrial methods to obtain sugar glycerides is reaction between sucrose and solid fats under heating in dimethylformamide solution in presence of potassium carbonate.



Sucrose dipalmitate

The final product is isolated by evaporation of the solvent and subsequent twice extraction of the reaction mixture with hot ethanol. The sugar glycerides crystallize when the alcohol extract is cooled. Although sugar glycerides are considered as one of the most available food additives, there is no any final conclusion concerning to safety of its use. Effect of the additive E474 on the human body has not been studied finally yet, so sugar glycerides are temporarily excluded from permitted additives list in many countries.

Conclusion. Sugar glycerides are perspective emulsifying additive for use in various food production. However, their production requires careful selection of starting reagents, solvents, catalysts and process parameters, since all these factors affect chemical composition of product, that in turn influence their emulsifying properties and human health safety.