

POPULAR SCIENCE ABSTRACT

Polymers of triacylglycerols (TAG) are products of fats degradation during frying. Eating foods with a high content of polymers can cause a lot of health problems, including irritate gastrointestinal mucosa, decrease metabolism of non-modified TAG, contribute to glucose intolerance and increase oxidative stress in intestine, which raises risk of cancer and neurodegenerative diseases. In addition, the presence of polymers in oil increases its viscosity and rise fat content in a fried dish, as well as a worse heat transfer between the dish and heating elements. Notwithstanding, frying - due to the organoleptic attributes of obtained dishes - is one of the most popular methods of preparing meals.

There is known that synthetic antioxidants can be effective in improving TAG resistance to polymerization, but their disadvantages are low stability in high temperature and negative impact on health. Another solution is using natural protective substances. There are a lot of studies of plant extracts impact on retarding of polymerization TAG. Nevertheless, usually active substances in these extracts are polar and insoluble or slightly soluble in oil substances. Moreover, obtaining these extract is expensive, not eco-friendly, time- and energy-consuming process which demands a lot of chemicals and advanced apparatus. It decreases the practical possibilities of these extracts application in industry and gastronomy.

The main aim of the research is limiting high-temperature polymerization of TAG in refined rapeseed oil by native, lipophilic, anti-polymerization substances present in cold-pressed oils.

Refined rapeseed oil and their blends with cold-pressed oils of coriander seeds, black cumin seeds, mustard seeds and lupin seeds will be heating in thin-layer at high temperature. Based on analyses of unheated and heated blends as well as refined rapeseed oil, the impact of blends composition on retarding oil degradation, especially polymerization will be determined. Moreover, the influence of blends composition on polymers composition and the stability of anti-polymerization substances in heating blends will be researched will be investigated.

The implementation of the project can bring the following benefits:

- broadening the knowledge of TAG polymerization mechanism and activity of anti-polymerization substance,
- obtaining a new type of oils more resistant to thermal degradation,
- increase of content bioactive substances with health benefits in oils,
- reducing the morbidity of civilization diseases caused by consuming of products fried on degraded oil,
- rising of the development opportunities and competitiveness of enterprises producing food oils,
- improving the sensory features of refined rapeseed oil.