extraction from natural sources, although chemical synthesis is the cheapest, it may require toxic catalysts or conditions for production and the compounds generated are labelled artificial.

Due to the heightened risk of consumption of food products synthesized chemically, researchers are constantly investigating different techniques needed in the production of flavours through biotechnological methods as the natural method is expensive, vigorous, time-consuming and dependent on several conditions such as the low concentration of the compound of interest, plant disease, and climatic condition.

The synthesis of flavour through biotechnological transformation (biotransformation) led to the development of bioflavor. The biotechnological methods used to produce bioflavor can be classified into three as shown in the figure below.

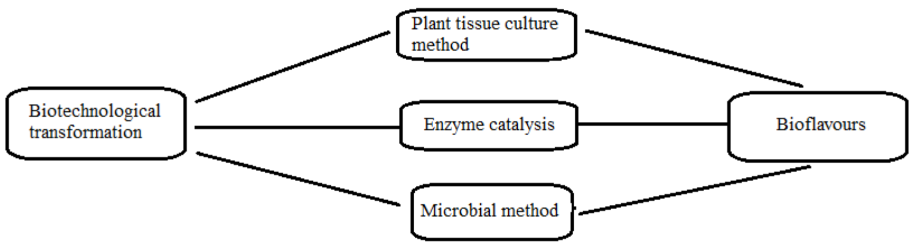

Figure 1. Paths to produce bioflavor

This review evaluates different literature materials on Bioflavor indexed in different scientific databases between 1990–2020 highlighting the development in bioflavor over the years, prospect and its economic benefits as compared to its chemical counterpart. Conclusively, bioflavor offers a more consistent product that can be incorporated into food without the fear of toxicological or carcinogenic effects when used in proper amount.

** The research work was partly supported by RFBR grant 18-29-12129mk.*

УДК 664.9

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THE POTENTIAL IMPACT OF THE MICROWAVE TREATMENT ON THE BIOTECHNOLOGICAL ASPECTS OF DAIRY PRODUCTS*

Keywords: dairy foods, properties, innovative technologies, microwave treatment, shelf life, safety.

Milk and dairy products are considered the most popular global food due to its high nutritional composition and bioavailability. However, safety and quality of milk and dairy products are still major problems that result in fast spoilage and that minimize its wide consumption. Therefore, thermal treatments such as pasteurization and sterilization were studied to kill the pathogenic bacteria and extend the shelf life [1].

Due to the drawbacks of conventional thermal treatment, non-traditional technologies that minimize the deterioration of the final products were applied such as microwave (MW) system. Surprisingly, the numbers of experimental data on MW systems are still limited. Accordingly, there is a demand to understand the potential effect of this technology particularly on the technological aspects of dairy products.

Basically, MWs can rapidly and deeply penetrate the dairy products, generate heat and subsequently exhibit better organoleptic and nutritional properties. Hence, the significant importance of the MW technology allowed the large industrial application in pre-cooking, cooking, heating, thawing and sterilizing, especially in dairy products. This resulted in potential enhancement of the shelf life, inactivating pathogens and improving the sensorial attributes [2].

There are group of factors affect the influence of MWs on the dairy foods such as operating conditions (temperature and frequency) and type of product (composition, physical structure). Yet, MW plays an important role in food dairy food safety and quality. Recent studies highlighted the ability of MW heating to eliminate/inactivate pathogens, inactivate toxins and enzymes in dairy products. Besides, it showed potential benefits in food packaging, pasteurization of ready-to-eat meals.

It has been reported the effect of MW on the chemical properties of dairy products such as lactose content, lipid profile, amino acid content and milk allergens. All these provided data had focused on the impact of MW on the milk. This opened a novel research opportunity in the area of processed dairy products such as yoghurt, cheese, butter and other fermented milk [3].

Despite the beneficial role provided to the dairy products, MW still face a drawback of non-uniformity in heat distribution. A combination of conventional and MW heating was proposed to overcome this problem.

In conclusion, although the studies about the impact of MW treatment on dairy products are scarce, this technology is still promising for a future commercial use. Further investigation about the safety of MW on the processed dairy products, manufacturing cost, post-treatment physiochemical and microbiological parameters are still required.

References

1. *Mishra V. K., Ramchandran V. //* Emerging Dairy Processing Technologies: Opportunities for the Dairy Industry / eds. by *N. Datta, P. M. Tomasula.* 2015. P. 33–70.
2. *Iuliana C., Rodica C., Sorina R. et al. //* Romanian Reports in Physics. 2015. Vol. 67, № 2. P. 423–430.
3. *Martins C. P., Cavalcanti R. N., Couto S. M. et al. //* Comprehensive Reviews in Food Science and Food Safety. 2019. Vol. 18, № 1. P. 67–83.

** The research work was partly supported by RFBR grant 18-29-12129mk.*

УДК 665.9

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DEVELOPMENT OF ENZYMATIC HYDROLYSIS CARBON OIL*

Keywords: castor oil, ricinoleic acid, sebacic acid, lipase, enzymatic hydrolysis.

Castor oil, obtained from castor oil seeds, is a non-drying liquid oil and contains up to 85 % ricinoleic acid, and modern selective castor bean varieties make it possible to obtain oil with a ricinoleic acid content of up to 95 %. The main world producers of castor oil are India and China [1]. The share of these countries was 356 thousand tons of castor oil seeds out of 646 thousand tons of world collection. The cultivation of this culture is not only associated with high labor costs, but also requires the use of the most fertile lands.

Due to the high content of ricinoleic acid, castor oil is widely used in medicine and veterinary medicine, and properties such as high viscosity, oxystability and high density make it possible to use this oil in industry for various purposes. One of the most important areas in the use of castor oil is to obtain ricinoleic acid. It is of interest to medicine, since it has an effective bactericidal, anti-inflammatory and antiherpetic effect. However, the main area of its application is organic synthesis: obtaining a number of acids (sebacic, undecylenic and azelaic), heptanal, 2-octanol, surfactants and other valuable products [2].