TECHNOLOGY FOR PRODUCING VEGETABLE OIL FOR PREVENTIVE

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Abstract: The technology of obtaining vegetable oil for preventive was research. It is established that the higher pulp temperature and below it is moisture content, the higher content of biologically active substances in vegetable oil.
Keywords: Vegetable oil, bioactive substances, technology.

Introduction

Processing of oil-yielding crops receiving vegetable oil, possessing medicinal properties, is the social and technological issue of the day of fat-and-oil branch of food industry.

Matters of vegetable oil which concomitant threeatsilglicerid, namely: phospholipides, liposoluble vitamins and provitamins (tocopherolss, carotins), waxes, odorizing matters and free fatty acids add characteristic for every vegetable oil organoleptic features by which it is possible to identify the source of its obtaining.

Modern technology of vegetable oil receiving at industrial enterprises of Ukraine foresees realization of affinage with the purpose of moving away of concomitant matters which accelerate the processes of oil spoilage, because of flowing of oxidizing and hydrolysis reactions during storage of vegetable oil. After affinage realization vegetable oil becomes depersonalized, without taste, smell, almost colourless. On the stage of adsorption affinage with whitening clays liposoluble vitamins are deleted from oil and phospholpides are destroyed using hydratation by bringing of runback or acids solutions in. The refined vegetable oil impoverished for bioactive matters, which showing medicinal properties and determining prophylactic setting of food product, which they contain. Vegetable oil and oil-bearing seed contain pigments having vitamin and antioxidant properties and which are used in medicine as a general tonic mean. Pigments are soluble in oil and colour it. Tokopherol (vitamin E) and carotins (provitamin A) colour oil yellow-and-red, and chlorophyll green. Pigments absorb electromagnetic waves in visible light range in different ways, that gives the possibility to identify and to amount them.

Modern major concerns obtain vegetable oil from seed of oil-bearing cultures following the classic plan of forepressing and extracting, thus on the forepressing stage they get up to 60 % lipids from their primary content in oil-bearing raw material. The classic plan foresees cleaning of seeds from admixtures, decortication, dividing of cortical substance into fractions, crushing of the cleared kernel, wet-thermal treatment, forepressing.

Changing the technological modes of press vegetable oil obtaining it is possible to get oil with certain content of bioactive matters. A.I. Skipin [1] showed the possibility of getting high-cleared press vegetable oil by means of fiber moistening to humidity more than 10-12 %. Shortcoming of Skipin's method is the necessity of moist cake drying that draws power expenses and law quality of the dried up cake because of denaturizing of albumens, oxidization and hydrolysis of threeacetilglicerids.

High temperature of the granulated crushed of the kernel promotes lipids coalescing by spheros of exposed vegetable cages, as a result of which oily superficial films appear. Lipids viscidity diminishes and the material becomes plastic. The brought in steam condenses and is sorbed by cellulose, creating unwettable oil capillaries. Fiber temperature at the exit from a fire-pan, in which conduct wet-thermal treatment is made, is about 105 °C, that promotes evaporation of free moisture and inactivates lipasa, lipooxidasa and other enzymes of the pressed material.

Materials and Methods

The purpose of our work consisted in creation of technology for vegetable oil enriched by the bioactive matters obtaining.

In our research we reproduced moisture-temperature treatment of sunflower crushed of the kernel, by moistening material before pressing and heating it at a laboratory press during pressing. The cleared sunflower kernel was moistened by water, and then left for three hours with further chopping and pressing. Moisture content in crushed of the kernel, pomace and vegetable oil was determined by arbitrage method, dried at the 105 °C in a drying oven to permanent weight. In the received vegetable oil we measured the content of bioactive matters spectrophotometrically at absorbancy 10 % hexane solutions at wave-length of 450 nm for carotenes and 295 nm for tocopherols. As solution of comparison a clean solvent - hexane was used.

Results and Discussion

The research results of moisture-temperature influence treatment are presented in table 1.

Pressed vegetable oil, received at the temperature of pressing 110-120°C and from fiber with less content of free moisture, has greater content of bioactive matters. Obviously, concomitant threeacetilglicerids connections showing difil properties remain in pomace in the state related to moisture. Moisture in its turn is sorbed by squirrel and cellulose and remains in pomace, promoting its humidity. Probability of chemical transformations of lipids and concomitant matters is great at the high temperature conditions of material treatment and its pressing. Therefore free fat acids and free radicals of the received vegetable oil were measured using standard titrimetric methods. Data are presented in table 2.

Table 1. Influence of the modes of moisture-temperature treatment on high-quality content of bioactive connections in sunflower-seed oil

Material	Table of moisture contents, %	Absorbancy 295 nm	Absorbancy 450 nm	Material	Table of moisture contents, %	Absorbancy 295 nm	Absorbancy 450 nm
Pressing temperature 90-100 °C				Pressing temperature 110-120 °C			
without moistening				without moistening			
Crushed of the kernel	3,07±0,67			Crushed of the kernel	3,07±0,67		
Pomace	5,92±0,67			Pomace	5,47±0,67		
Oil	0,04±0,01	0,248	0,129	Oil	0,04±0,01	0,391	0,182
with moistening				with moistening			
Crushed of the kernel	7,19±0,67			Crushed of the kernel	7,19±0,67		
Pomace	10,36±0,67			Pomace	9,84±0,67		
Oil	0,12±0,01	0,115	0,103	Oil	0,11±0,01	0,193	0,120

Table 2. Content of free fat acids and free radicals in the got sunflower-seed oil

Name	Acid number, mg KOH/ g of oil	Peroxid number, mmol O2 / kg of oil
Oil, received without moistening at 90-100 °C	0,24±0,06	0,09±0,02
Oil, received without moistening at 110-120 °C	0,22±0,06	0,12±0,02
Oil, received with moistening at 90-100 °C	0,33±0,06	0,09±0,02
Oil, received with moistening at 110-120 °C	0,26±0,06	0,10±0,02

By high-quality indexes vegetable oil substantially does not differ inter se and corresponds the indices of normative documents for unrefined sunflower-seed oil that testifies the unimportant in these terms flowing of hydrolysis and oxidizing processes.

Conclusions

Researches showed that higher temperature of fiber and its lower humidity is the higher content of bioactive matters in vegetable oil, in particular carotenes and tocopherols. Technology of vegetable oil with high content of bioactive matters obtaining includes the hard modes of wet-termal treatment of fiber: pressing temperature 110-120 °C and minimum content of moisture in material.

References

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