

ANALYSIS OF OIL CLEANING PROCESSES OBTAINED ON THE BASIS OF COMBINATION OF BLACK SEDANA AND SUNFLOWER SEEDS

O'ktamova Sarvinoz Shermaxamat qizi
Toshkent kimyo texnologiya instituti tayanch doktoranti
uktamovamsr@gmail.com

Xamrakulova M. X.
Farg'ona politexnika instituti Oziq-ovqat texnologiyalari kafedراس dotsenti
Xamrakulova77@gmail.com

Abstract

: In this study, it was planned to obtain oil by cold pressing by mixing black sedan and sunflower seeds in ratios of 50:50; 70:30; 80:20. Procedures for the oil refining from this mixture by physical methods while preserving the bioactive components were studied. Black sedana seed has a pronounced bitter taste, which is an obstacle to daily use in the food industry, but heals the body and various shells due to a high richness of biologically active substances. With this in mind, it was planned to combine black sedana oil with sunflower seeds, soften the taste and smell, and obtain a functional ointment containing the active compounds of the two seeds. The reason why sunflower seeds are chosen as a side seed is because this seed oil has already become widespread as an everyday oil, it is economical to be cheap, the smell and taste are much smoother, which does a lot to promote the normalization of the taste and smell of black sedan oil, and is very rich in unsaturated fatty acids. The oil obtained by pressing both seeds together, on the one hand, increases the stability of sunflower oil at the expense of antioxidants of black sedan, while sunflower oil with tocopherol and useful fatty acids greatly contributes to increasing biological activity, as well as improving organoleptic parameters. Our study allowed us to physically purify oils of three different ratios and observe how the ratio of seeds affects the oil.

Keywords: black sedanese oil, sunflower oil, cold press, cleansing process, filtration, antioxidant, tocopherols.

Introduction

Sunflower oil is one of the most common consumer oils worldwide, and is used in food, confectionery and other industries. It oxidizes quickly, due to the fact that the oil contains omega-6, unsaturated fatty acids, changes its color at high temperatures. To stabilize the oil for heat and oxidation, it is subjected to various physical and chemical processes. Artificial antioxidants will be added. But these chemical processes and artificial additives, high-temperature cleaning steps remain a cause of the loss of active substances in it. Therefore, in subsequent years, the use of this oil in combination with other vegetable oils is proposed as an innovative approach.

Black sedana oil has long been used as a healing ointment for various diseases, but its use in the food sector is limited due to its organoleptic parameters. But its structural aspect is very rich in antioxidants and beneficial fatty acids. Along with this builan its peroxide number and acidity



number are very high. Scientific research suggests different approaches for the use of black sedan oil in the food diet and to increase sustainability. ¹

According to studies in recent years, black sedan oil is being found to be effective to extract the oil by combining it with other seeds. In this case, the percentage of bioactive substances in the oil remains larger. However, the high peroxide content and acid content of crude oil from mixed seeds causes its rapid decomposition.

Typical industrial cleaning of vegetable oils involves several complicated steps. For example, from the water, neutralizing, washing, drying, disodorization. However, if we go through such purification stages of black sedan, we can lose more than 70% of useful substances, and the amount of thymoquinone is indicated in the scientific literature for the loss of dacha by 60-90% [2]. Therefore, lubricants of functional value are treated with minimal cleaning in order to preserve as much as possible the bioactive components.

The purpose of this work is to improve the quality indicators and analyze the changes made at each stage of cleaning by the step-by-step purification of the crude oil from a mixture of black sedana and sunflower seeds.

METHODS USED IN THE STUDY

For the experiment, black sedana and sunflower seeds grown in Uzbekistan were used. Initially, the seeds were purified from various mechanical and foreign impurities. Sunflower seeds were isolated from the husk. Peeled seeds are in a ratio of 3, i.e. black sedan:50:50 in the case of sunflowers; 70:30; Shot by SEC 80:20. The scattered seeds were thoroughly crushed into it. Because to extract more oil from the seed, it is necessary to break down the cell wall. The crushed mixed seeds were put into a screw press device. In the laboratory conditions, small-scale cold-press equipment AKPJ-500 with power 220W with capacity 6 kg / h was used. This type of press separates oil by crushing the seeds at natural temperature, without preheating. During the pressing, the screws crushed the seeds, squeezing the oil. Fat in each ratio was passed through a separate press, the amount of fat obtained was measured in special containers. The amount of bud that came out of it was noted. Case studies show that combining black sedana with other oilseeds – e.g. pressing by adding oil-rich sunflower seeds – reduced the amount of oil retained in the sedan, improving the overall extraction efficiency. That is, sunflower seeds, when mixed, promote the extraction of oil from the black sedan powder into the liquid phase, so that many bioactive components unique to black sedan also pass into the oil. Due to the specific organoleptic parameters of the black sedan, and due to the presence of solid particles and waxy substances contained in the oil, the resulting oil had a dark-brown tint.

The oils obtained from the press were passed through the cleaning step. Initially, filtration procedure was conducted and poured into cans to separate the pressed oil from solid particles and other compounds remaining from the press. After being sure not to make contact with the air, the procedure of decoction was applied to thoroughly clean it from other residual substances contained in it. At the same time, the ointment was kept in a cool and dark room for 24 hours. During this time, heavy substances, phospholipids and other compounds prone to hydration sank to the bottom of the vessel. As a result of this process, the top layer of the oil is cleared. After farrowing, the upper layer of the gutter is carefully disassembled. Gradually, the filtering process made again.



The filtered oil was prepared in special containers for the next stage, namely to the cooling step. Kept in ^{refrigerators} for 12 hours at a temperature of +4 0C. During this time, the solutes, the highly soluble trigeliterides, and waxy substances passed into the crystalline state. It is filtered immediately through a thick filter paper to remove the crystals from the oil. The oil that passes through the filter becomes clear appearance.

At the final stage of cleaning, the oil, which was free from impurities and wax substances, was gently disodorized to remove the unpleasant odor. To do this, the oil was heated in a small vacuum tube for 40 minutes at a temperature of 60 0C. In the process of relatively low temperatures, some of the volatile components characteristic of the black sedan evaporated. The temperature should be under constant control. If the temperature is high, the necessary substances in the oil will be lost. The oils of the 3 differential ratios underwent disodorization became much clearer and each showed organoleptic indices corresponding to its ratio.

RESULTS FROM THE STUDY

The oil, which was mixed with black sedana and sunflower seeds, was initially opaque, dark brown, and in a state where various mixtures were present. The color was very dim, and in terms of smell, the pungent smell of black sedans prevailed, and the taste was also bitter. After filtration, the small plant particles in the oil and the residues of coarse and canola impurities from the press process are thoroughly treated. As such particles visible to the eye disappeared, the oil became much clearer. But that's not a big change. In the oil, color and odor substances, solvents are not retained by the filter.

After 12 hours of immersion, a small amount of sediment was accumulated on the bottom of the ointment, the top layer of the ointment became much clearer. When filtered again the second time, our oil became clear after the substances from the decoctioning process were cleaned. The color has become much lighter than before. Of course, the wax and pigments had not yet been completely cleaned. With this in mind, a cooling process was used. During this process, we were able to see with our eyes the pigments in the oil transition into a crystalline state. And carefully sorted out on the filter paper. We observed that our oil became more and more refined with each cleaning step and its organoleptic condition improved. And to get rid of a certain amount of odor and volatile impurities, we applied a gentle disodorization step. We took into account that if we were exposed to high temperatures, we lose the active substances in the oil and started working at a temperature of 60°C. No bioactive components were lost due to this. That's because our goal was to get a functional oil with bioactive components, not a fully refined oil. For this reason, we decided to cleanse the oil from the most harmful and unpleasant substances.

When we analyzed and observed all three oil samples, since the proportion of black sedan in the oil in the ratio of 50:50 % was less, sunflower properties prevailed after cleaning and the oil became much clearer, transparent. Our oil with a ratio of 70:30 % to a certain extent predominates the proportion of black sedan, the color is much clearer, and the smell and taste are combined with sunflower properties. The oil in the 80:20% ratio had a higher amount of black sedan, so its bitter taste and smell were noticeable.



DISCUSSION

Judging by the results obtained from the above studies, we can see that by refining the oil from black sedana and sunflower seeds, its consumption qualities are greatly improved. Early practices allowed the mechanical filtration and precipitation processes to remove from visible impurities and precipitation from the oil, while later steps allowed for the purification of substances with some degree of solubility properties. It is noteworthy that we did not neutralize the oil with alkali, which means that the free fatty acids are actually quite present in the final product as well. It turns out that our product does not fully meet the stringent norms, and if we clean it with alkali, a huge amount of phenols and pigments would be lost. It should be remembered that free fatty acids are harmless from a nutritional point of view (they are mainly oleic and linoleic acids, they are digested by enzymes secreted by the pancreas). Only they can give the oil a little bitterness to its taste and increase its tendency to oxidize in air. We believe that under the conditions of storing our end product in a sealed container and using it for a short period of time, these residual free acids do not pose a problem.

CONCLUSION

By combining black sedana and sunflower seeds the oil by cold pressing method the oil was gradually softly cleaned. The final product has a much higher clarity and a great improvement in smell and taste. Most importantly, even after this minimal processing, a large percentage of the bioactive components in our oil are retained. The losses were almost too few. This gives a functional value to the powdered oil. We compared the final purified products in all three ratios together and chose the optimal ratio. In fact, not all are very useful oils for application in various industries. As the proportion of black sedans increased, the oil became dimmer in color, and the taste and smell became bitter. The 50:50 ratio was found to be much clearer, more dietary, and could be applied to salads. But in an 80:20 ratio, the properties of black sedana prevailed, and this put a limitation on everyday use, although it can be freely applied in the fields of pharmaceuticals, medicine or cosmetology. And the most optimal ratio was found that oil in the ratio of 70:30 %. This is due to the fact that the active components of the black sedan also manifest themselves, while the characteristics and softness of the sunflower also harmonize.

Sunflower seeds were combined with the beneficial properties of black sedan, which also increased the productivity of its fattening. The optimized treatment technology of the combined lubricant serves to eliminate the disadvantages of the two oils by combining them. As a result, it is possible to obtain vegetable oil that is pleasant in smell and taste, resistant to preserving, clear and rich in useful biological compounds, for which a product is considered promising both scientifically and practically.

REFERENCES

1. Nadeem, R., Iqbal, A., Zia, M. A., Anwar, F., Shahid, S. A., Mahmood, Z. et al. Effect of cold-pressing and soxhlet extraction on the physico-chemical attributes of sunflower (*Helianthus annuus* L.) seed oil // Int. J. Chem. Biochem. Sci. 7, 41–6 (2015).
2. Ramadan, M. F. & Wahdan, K. M. M. Blending of corn oil with black cumin and coriander seed oils: Impact on functionality, stability and radical scavenging activity // Food Chem. 132, 873–879 (2012).



3. Yeganeh Mazaheri, Mohammadali Torbati Oil extraction from blends of sunflower and black cumin seeds by cold press and evaluation of its physicochemical properties //International Journal "Journal of food processing and preservation", August 2019 43(1)

