Global Scientific Review
A Peer Reviewed, Open Access, International Journal
www.scienticreview.com
Volume 8, October 2022 ISSN (E): 2795-4951

Researching Of Oil Extraction Process from Pumpkin Seeds Using Non-Conventional Method of Energy Exposure

Djurayev Kh.F.
Doctor of Technical Sciences, professor, Bukhara engineering-technological institute, Bukhara city, Uzbekistan, djuraev_xf@mail.ru
O`ktamova Sh.H.
Assistant, Bukhara engineering-technological institute, Bukhara city, Uzbekistan, oktamovashoxsanam45@gmail.com

Annotation. Pumpkin seed oil is taken from pumpkin seeds either through a cold pressing or through pressing the seeds using heat (hot pressing). Pumpkins can contain up to 100 seeds, which can be further processed with or without their shells. Pretreated seeds are fed into a press. Pressing can efficiently remove the oil both in the cold press process and also from roasted pumpkin seeds. Products from this process include pumpkin seed oil and high quality pumpkin seed press cakes. In Styria, a very specific process is used. First the seeds are washed, then dried at approx. 50°C, ground and mixed with water and salt into slurry, and then roasted so that the water evaporates. The roasting process separates the protein and oil contained in the seeds. Finally, the slurry is fed into a press. Pumpkin seed oil also purportedly has a beneficial impact on prostate adenoma in its initial states, an effect which nevertheless has not yet been proven, along with several other healing powers attributed to this oil. It is also supposed to have a detoxifying effect and decrease blood pressure, thereby helping prevent heart and circulatory problems

Keywords: A method for extracting, processing, separation, energy efficiency, extraction technique.

Introduction. The resulting oil needs to be left for several days, however, in order for the suspended particles to settle. Pumpkin seeds are comprised of around 45-53% fat (with a beneficially high portion being omega-6 fatty acids and only a small portion being saturated fatty acids); around 32-38% protein, about 3-5% carbohydrates, and 2-4% raw fibers. Additional mineral substances (such as potassium, magnesium, calcium and phosphorus), many trace elements (like iron, zinc, manganese, copper and selenium), important vitamins (such as Vitamin A, B and E), carotenoids, selenium and chlorophyll are also contained in the oil. The fatty acids in pumpkin seed oil are distributed into around 15% saturated fatty acids, about 30% simple unsaturated fatty acids (chiefly oleic acid), and around 51% polyunsaturated fatty acids (mostly linoleic acid) [1]. In cool and dark storage conditions, pumpkin seed oil will stay fresh for 9 to 12 months. Owing to the selenium and Vitamin E contained within pumpkin seed oil, it has an antioxidant effect and protects the body from free radicals. It also helps reduce cholesterol, thanks to its high portion of linoleic acid and phytosterols. In addition, it has anti-inflammatory qualities and serves as a supplementary therapy for rheumatoid arthritis [5]. The high percentage of polyunsaturated fatty acids has a vasodilatory effect; and supports the immune system.

Volume 8, October 2022 ISSN (E): 2795-4951

A method for extracting pumpkin seed oil using a water-enzyme method pertains to the vegetable oil extraction technology, including: using pumpkin seed powders with the particle diameter between 0.3mm to 1.5mm after screening, performing buffering liquid enzymolysis under the enzymolysis condition of 15000-30000U of complex enzyme dosage, 1 to 7 of the solution pH value, 2-8h of extraction time.

Figure1. Appearance of pumpkin seeds

The invention has advantages of high oil yield, good lipid quality, simple process equipment, low consumption, less machining programs, and capability of being easy for the industrial production use. But only have the small part pumpkin to be used to make dry fruit roasted seeds and nuts and health beverages, major part exports to areas such as Eastern Europe, Japan, the resources development and utilization deficiency, and the extraction and application technology of pumpkin seed oil is the difficult problem of restriction pumpkin industrialized developing always.Pumpkin seed oil is rich in unrighted acid, natural complex, phytosterol, the contour bioactive ingredients of linoleic acid, and wherein unsaturated fatty acid content is higher, and oleic acid on average contains 16.59%, and linoleic acid on average contains 39.53%. Utilize pumpkin seed oil effectively to remove interior free, have effect anti-ageing, antitumor, that prevent cardio-cerebrovascular diseases [2]. At present perfect not enough for the extractive technique of pumpkin seed oil, majority also adopts methods such as tradition squeezing, organic solvent lixiviate, not only wasted time and energy but also recovery rate not high, also exist to be difficult to problems such as separation, purity be low [3]. How to seek a safety, efficient, save time, labor-saving pumpkin seed oil extraction process is the problem that the present invention will solve. The tradition squeezing process is its characteristics with high temperature high-moisture steaming stir-fry, the squeezing of high temperature low moisture, pigment dissolves in the oil under higher temperature, moisture in a large number in the oilseeds cell, the material embryo steams at high temperature local burnt the paste is taken place when frying, produce a large amount of melanin, deepened the color and luster of crude oil, cause difficulty to refining, albumen destruction is more in the cake of squeezing back, has reduced the nutritive value of oil cake; Though the ultrasonic extraction method grease can extract greases a large amount of in the oil plant, grease obtained nutrient composition content is relatively low; Supercritical liquid extraction technique,

operating pressure is big, and the extraction time is long, and to the requirement height of equipment, energy consumption is big, and output is low, the production cost height.

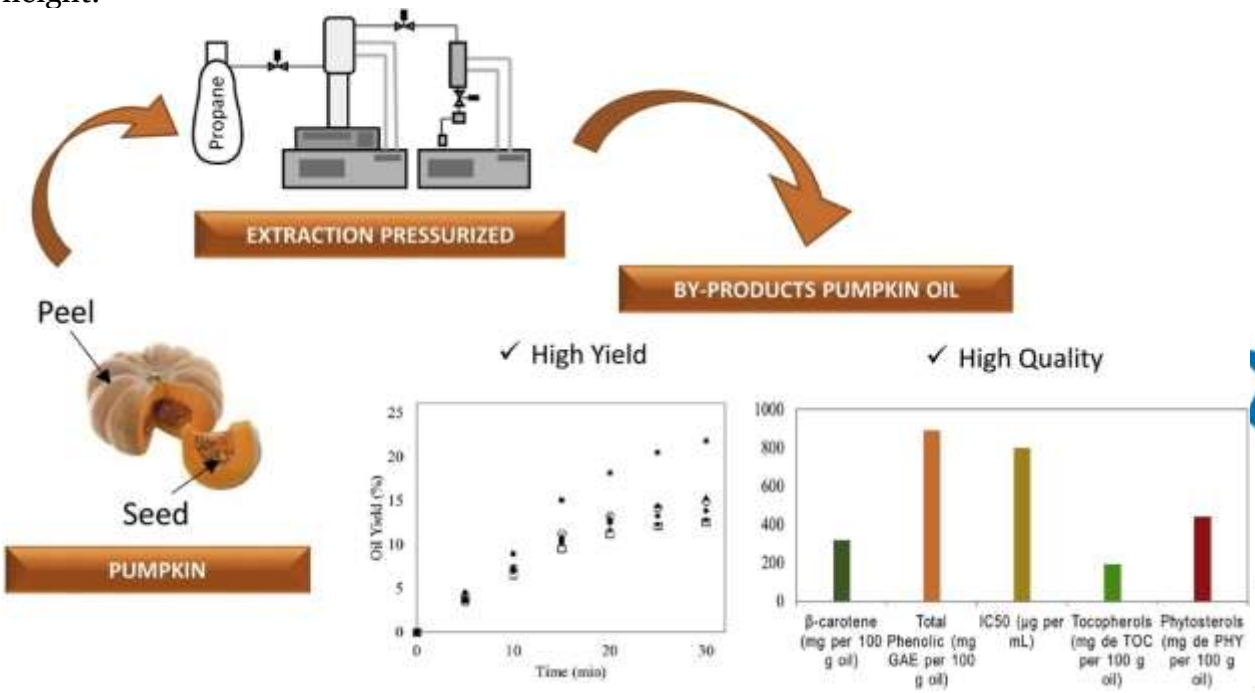

Figure2. Process of extraction of pumpkin seeds

The aqueous enzymatic method oil extracting process is to utilize water as decentralized photo, various enzymes leach grease at this aqueous phase to the degradation of oil plant cell, at non-oil component (protein and carbohydrate) the affine difference of oil and water and profit proportion difference are separated oil with non-oil component. Aqueous enzymatic method is handled the grease obtained quality height of oil plant, mild condition, and capable of reducing energy consumption, minimizing chemical reagent use amount. At present, the research of aqueous enzymatic method oil extracting process is perfect not enough, and problems such as enzymolysis optimum condition, dissolvent residual, emulsification system breakdown of emulsion also need further to research and solve [6]. The pumpkin seed oil extraction method using water enzyme nutrient composition content is abundant, and oil quality is good. Compare with water enzymolysis organic solvent extraction method, water enzymolysis water extracts pumpkin seed oil oil yield descend to some extent (less than 1%).This is because organic solvent has promoted the process of oil plant release grease, makes the easier organic facies that enters of grease, and oil content is separated more easily from albumen and aqueous phase. Adopting water enzymolysis water oil extracting process to extract grease is in order to explore the oil-producing technique of no solvent residue, even it is lower slightly to extract the grease oil yield with water, but to satisfy the health requirement, get rid of dissolvent residual hidden danger, can reduce energy consumption in addition, saving cost. At present, the breaking method of aqueous enzymatic extraction vegetable fat employing has: the centrifugation breakdown of emulsion; Heating emulsification type; Reconcile pH value breakdown of emulsion; the organic solvent extraction breakdown of emulsion [4]. The three kinds of method emulsification efficiency in back are not high, to the nutritive value of grease and security causes a hidden trouble and operation is loaded down with trivial details.

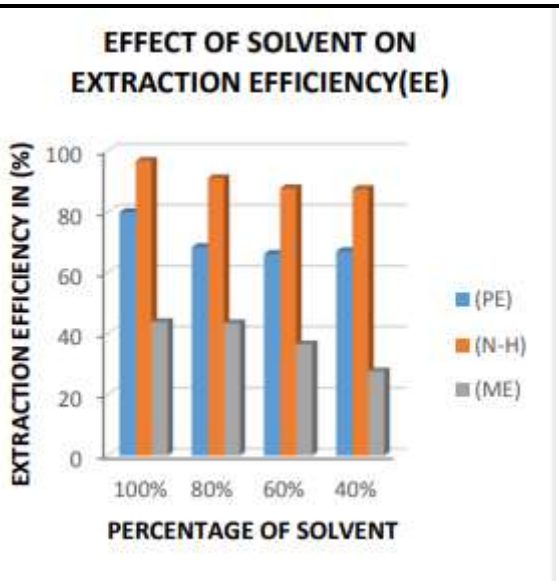

Figure 3. Extraction Efficiency

Present device is simple, and energy consumption is low, and technology is brief is easy to industrialization, and has broad application prospects. The effect of solvent levels on oil yield is shown in Figure 1. From the figure, it is clearly seen that n-hexane performed best, followed by petroleum ether and methanol at all levels of solvents. The highest value (20.917%) for oil yield was obtained for n-hexane at 60% and the least value of 5.935% oil yield was obtained for methanol at 40%.

Conclusion. Fluted pumpkin seed contains valuable edible oil of medicinal and nutritional values; however, much work has not been done with a view to getting the level of solvents that would give the best oil after solvent extraction in terms of quantity and qualities. Therefore, the main objective of this study was to use solvent extraction method to extract oil from fluted pumpkin seed. The specific objective was to investigate the effect of different levels (100%, 80%, 60% and 40%) of three solvents (petroleum ether, n-hexane and methanol) on the extraction process (oil yield, extraction efficiency, extraction loss) and quality of extracted oil (acid value, iodine value, saponification value, peroxide value, refractive index and viscosity).

References

1. Akoroda, M. O. and Adejoro, M.A. Patterns of vegetative and sexual development of Telfairia occidentalis. Tropical Agriculture Volume 67 (3), (1990) 243-247.
2. Orzolek M.D., Elkener, T.E, Lamont,W.J.Jnr., Kime, L.F and Haper, J.K. Agricultural Alternatives: Pumpkin Production.. Penn States College of Agricultural Sciences, USA (2012).
3. Nwabanne, J.T Kinetics and Thermodynamics Study of Oil Extraction from Fluted Pumpkin Seed International Journal of Multidisciplinary Sciences and Engineering, Volume 3. No.6, (2012), Pp 11 – 15.
4. Muibat O.B., Temitope L.A., Deborah O.A. and Abdulkabir O.O. Physicochemical Properties and Fatty Acids Profile of Seed Oil of Telfairia occidentalis Hook, F. International Journal of Basic and Applied sciences Volume 11 No.6, (2011) Pp 10-13.

5. Kh.F.Djuraev, Yodgorova M., Usmonov A., Mizomov M.S. Experimental study of the extraction process of coniferous plants, IOP Conf. Series: Earth and Environmental Science 839 (2021) 042019
6. Djurayev Kh.F., M.S.Mizomov, Analyzing Moisture at the Drying Process of Spice Plants, Texas Journal of Agriculture and Biological Sciences ISSN NO: 2771-8840, 84-88 pages, https://zienjournals.com/
7. Isayev S. X., Qodirov Z. Z., Oripov I. O., & Bobirova M. B. (2022). EFFECTS OF RESOURCE-EFFICIENT IRRIGATION TECHNOLOGIES IN IRRIGATION OF SUNFLOWERS ON LAND HYDROGEOLOGICAL CONDITIONS. British Journal of Global Ecology and Sustainable Development, 4, 95–100. Retrieved from https://journalzone.org/index.php/bjgesd/article/view/55
8. Egamberdiyev, M. S., Oripov, I. U., Hakimov, S., Akmalov, M. G., Gadoyev, A. U., & Asadov, H. B. (2022). Hydrolysis during hydration of anhydrous calcium sulfosilicate. Eurasian Journal of Engineering and Technology, 4, 76-81.
9. Egamberdiev, M. S., Oripov, I. U., & Sh, T. S. (2022). Development of a Method for Measuring the Layered Moisture State of Concrete and Various Bases. Eurasian Journal of Engineering and Technology, 4, 82-84.
10. Qodirov, Z. Z., Oripov, I. A., Tagiyev, A., Shomurodova, G., & Bobirova, M. (2022). WATER-SAVING IRRIGATION TECHNOLOGIES IN SOYBEAN IRRIGATION, EFFECT OF SOYBEAN ON GROWTH AND DEVELOPMENT. European Journal of Interdisciplinary Research and Development, 3, 79-84.
11. THE IMPORTANCE AND PROSPECTS OF DRIP IRRIGATION OF COTTON IN UZBEKISTAN
12. Z Kodirov, I Oripov, SH Avezov, M Kurbonov - Инновационные исследования в науке, 2022
13. THE IMPORTANCE AND PROSPECTS OF DRIP IRRIGATION OF COTTON IN UZBEKISTAN
14. Z Kodirov, I Oripov, SH Avezov, M Kurbonov - Инновационные исследования в науке, 2022
15. THE IMPORTANCE AND PROSPECTS OF DRIP IRRIGATION OF COTTON IN UZBEKISTAN
16. Z Kodirov, I Oripov, SH Avezov, M Kurbonov - Инновационные исследования в науке, 2022
17. THE IMPORTANCE AND PROSPECTS OF DRIP IRRIGATION OF COTTON IN UZBEKISTAN
18. Z Kodirov, I Oripov, SH Avezov, M Kurbonov - Инновационные исследования в науке, 2022