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Bleaching of Vegetable Oil using Organic Acid Activated Fuller's Earth (Bentonite Clay)

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Abstract - Vegetable oil is one of the basic food items which is consumed by almost every human being in this universe. Therefore quality of vegetable oil should be good enough so that it accounts for healthy life. In vegetable oil manufacturing there are four major steps involved which are neutralization, degumming, bleaching and deodorization. Among these steps bleaching is the very important and critical step because it ensures the good color and odor of vegetable oil. The famous method of bleaching in Pakistan is adsorption by inorganic acid activated fuller's earth (bentonite clay). Treatment with inorganic acid (Sulfuric acid and hydrochloric acid) activated bentonite clay is very efficient and shows satisfactory results. But there is a major disadvantage associated with its use. Fumes of hydrochloric acid or sulfuric acid are very dangerous for both the equipment and labor involved in manufacturing of vegetable oil. Therefore the safety of the labor and equipment is compromised. The major purpose of this research work is to give the alternative method for activation procedure of bentonite clay and this method should be the safest method for both the labor and equipment used in vegetable oil industry.

Keywords: *bentonite clay; surface activation; organic acids; adsorption; fourier transform infrared spectroscopy (ft-ir).*

GIJRE-C Classification : *FOR Code: 030599*



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Bleaching Of Vegetable Oil Using Organic Acid Activated

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Bleaching Of Vegetable Oil Using Organic Acid Activated:

Bleaching of Vegetable Oil Using Organic Acid Activated Fuller's Earth Khan Atif, Javed Hassan, 2015-08-26

Specific properties of bentonite clay have made them a valuable material in different process industries. Easy availability, low price, and their effectiveness are the major factors which made fuller's earth an adsorbent in cooking oil manufacturing industry. Textural characteristics of fuller's earth play an important role in its performance. These characteristics can be modified by treatment with organic acids, which is the safest method for enhancing the properties of fuller's earth. Major motivation of this research is to increase the adsorption capacity of fuller's earth by modification in its properties by organic acid treatment. Organic acid treatment assures the safety of equipment and safety of the labor as well. Four organic acids are used, which are recommended best for activation. These acids are acetic acid, phosphoric acid, citric acid, and oxalic acid. Clay is treated with all of these four acids, and the acid which generates more active sites in clay is the best recommended acid for activation.

Edible Oil Processing from a Patent Perspective Albert J. Dijkstra, 2012-09-28. Patent literature has always been a mine of information, but until recently it was difficult to access. Now with the Internet, access to all patent documents is almost instantaneous and free. However, interpreting the technical information provided by patent literature requires a certain skill. This monograph aims to provide that skill by explaining patent jargon and providing background information on patenting. Patents dealing with edible oil processing are used to explain various aspects of patenting. To make the explanations less impersonal, some have been larded with personal remarks and experiences. Accordingly, this monograph is intended for scientists and engineers dealing with edible oils and fats who want to extend their sources of technical information. Hopefully, it will inspire them to innovate, help them to avoid duplication, and provide them with some amusement.

Use of Domestic Minerals for Vegetable Oil Bleaching Yasemin Erten, İzmir Yüksek Teknoloji Enstitüsü, 2004. In this thesis, acid activation and characterization studies were conducted for different clay samples, and bleaching capacity of the selected acid-activated clay samples for sunflower oil were determined. The samples selected for this study were naturally occurring clays from Ankara and Eskişehir regions. The acid-activated zeolite was also used for the purpose to compare its bleaching performance with commercial bleaching clay Tonsil and the acid-activated clays. The clay minerals were activated with hydrochloric acid (HCl) at three acid concentrations (1 N, 3 N, 5 N), activation times (1 h, 2 h, 3 h), and different dry clay:acid ratios. The clay samples from the Ankara and Eskişehir regions were defined as montmorillonite according to X-ray diffraction (XRD). XRD results proved that acid activation caused structural changes in the treated montmorillonites; montmorillonite peaks gradually disappeared and yielded to an amorphous montmorillonite structure. The TGA results showed a significant weight loss between 30 °C and 200 °C (15% for the Ankara clay and 12% for the Eskişehir clay). This was most probably due to the removal of free and hydrogen-bonded water molecules. Maximum surface area was obtained for the acid-activated Ankara clay treated with 1 N HCl for 3 hours. It was determined to be 849.1 m²/g. Also, maximum surface area was 269.7 m²/g.

for the acid activated Eskişehir clay treated with 5 N HCl for 1 hour. Then the surface area of the acid activated clays decreased sharply with the acid activation. The chemical compositions of the solutions and clays after acid activation were determined using ICP and EDX analysis respectively. According to the results, the dissolution amount of CaO, Na₂O, MgO, K₂O, Fe₂O₃ and Al₂O₃ increased along with increasing acid concentration and treatment time. The SiO₂ content and the SiO₂/Al₂O₃ ratio increased as a result of dissolving of aluminium ions. This ratio increased from 6.0 to 7.5 for the acid activated Eskişehir clay and from 2.7 to 3.9 for acid activated Ankara clay. Acid activated clays were tested for the assessment of their bleaching efficiency for sunflower oil in the laboratory. Bleaching tests were carried out with earths prepared at different acid activation conditions such as acid concentration and activation times. The absorbance value was measured at 455 nm and found to be 0.429 for the neutralized sunflower oil. Peroxide value and free fatty acid content of the neutralized oil were found to be 16.8 meq/kg and 0.07 % respectively. The oil bleached with the acid activated Ankara clay had a peroxide value of 46.2 meq/kg first which decreased to 22.4 meq/kg and the free fatty acid content was observed to be around 0.08 %. For acid activated Eskişehir clay peroxide value of the bleached oil initially increased up to 31.2 meq/kg then decreased under the peroxide value of neutralized oil 16.8 meq/kg and free fatty acid content of bleached oil approximately was around 0.09 %. The bleaching parameters which were used for testing were 1 % earth concentration and 30 minutes contact time at 100 °C bleaching temperature. At these selected parameters acid activated Eskişehir clay (5 N 1h HCl treatment), Ankara clay (1 N 3h HCl treatment) and zeolite (2 N 6h HNO₃ treatment) were compared with the commercial bleaching clay Tonsil. The smallest value of absorbance and bleaching efficiency were found to be 0.084 and 80 % respectively with the Eskişehir clay and these values were determined to be 0.083 and 81 % with the Tonsil under the same conditions. The absorbance value and bleaching efficiency of the bleached oil with acid activated Ankara clay were determined to be 0.114 and 73 % respectively using the selected bleaching parameters. Bleaching performance of Ankara clay was found to be lower when compared with the result of Eskişehir clay. At the selected bleaching point, results of Lovibond red and yellow color of bleached oil indicated that the Eskişehir clay and Tonsil were close to each other in bleaching efficiency. Red color 0.8 and 1.1, yellow color 20 and 20 for Tonsil and Eskişehir clay respectively. Zeolite did not reach the required bleaching performance. The bleaching efficiency was 25 % with raw zeolite and it hardly increased to 46 % with the acid activated zeolite. In addition, red and yellow color values were higher than the other clays, red color 2.6, yellow color 30. As a result, Eskişehir clay gave a better bleaching performance compared to Ankara clay and Zeolite. Maximum bleaching efficiency was achieved after 30 minutes of contact time with 1 % earth concentration at 100 °C bleaching temperature following 5 N 1h HCl treatment for Eskişehir clay.

Control techniques for volatile organic emissions from stationary sources United States. Environmental Protection Agency. Emission Standards and Engineering Division, 1978

Mineral Deposits at the Beginning of the 21st Century A. Piestrzynski, 2022-05-02

The Joint 6th Biennial SGA SEG Meeting was held in Krakow in August 2001. This volume contains 274 extended abstracts.

grouped thematically under 18 session titles covering topics such as lead zinc deposits metamorphism affecting mineral deposits and the environmental aspects of mining

2001. A Clay Odyssey E. Domínguez, G. Mas, F. Cravero, 2003-08-08
The meeting was organized by a local university committee and 205 delegates from 35 countries took part European participation was low due to the economic crisis experienced by national air lines During the conference the AIPEA medals were awarded to Gerhard Lagaly and Tom Pinnavaia This volume of the Conference Proceedings contains 85 out of a total of 235 oral presentations and posters presented at the following symposia Teaching Clay Mineralogy Clays in Hydrothermal Deposits Clays in Ceramics Clays in Petroleum Exploration and Production Clay Barriers and Waste Management as well as in the following general sessions of the Conference Clays in Geology Clay Minerals and Environment Soil Mineralogy Methods Crystal Chemistry Structure and Synthesis and Clays in Industry

Proceedings of the World Conference on Oilseed Technology and Utilization Thomas H. Applewhite, 1993 Discusses current topics related to the technology and utilization of oilseeds and their products such as managing an enterprise in a market economy political and environmental challenges of the 1990s achieving total quality nutrition oilseed harvesting and oil meal separation processing of vegetable oils processing vegetable protein products oilseeds in animal feeds etc

Journal of Bioscience and Bioengineering, 2004

The Complete Book on Spices & Condiments (with Cultivation, Processing & Uses) 2nd Revised Edition NIIR Board of Consultants & Engineers, 2006-04-01 The term spices and condiments applies to such natural plant or vegetable products and mixtures thereof used in whole or ground form mainly for imparting flavor aroma and piquancy to foods and also for seasoning of foods beverages like soups The great mystery and beauty of spices is their use blending and ability to change and enhance the character of food Spices and condiments have a special significance in various ways in human life because of its specific flavours taste and aroma Spices and condiments play an important role in the national economies of several spice producing importing and exporting countries India is one of the major spice producing and exporting countries Most of the spices and herbs have active principles in them and development of these through pharmacological and preclinical and clinical screening would mean expansion of considerable opportunities for successful commercialization of the product Spices can be used to create these health promoting products The active components in the spices phthalides polyacetylenes phenolic acids flavanoids coumarines triterpenoids sesquiterpenes and monoterpenes are powerful tools for promoting physical and emotional wellness India has been playing a major role in producing and exporting various perennial spices like cardamoms pepper vanilla clove nutmeg and cinnamon over a wide range of suitable climatic situations To produce good quality spice products attention is required not only during cultivation but also at the time of harvesting processing and storing Not as large as in the days when next to gold spices were considered most worth the risk of life and money The trade is still extensive and the oriental demand is as large as ever Some of the fundamentals of the book are definition of spices and condiments nomenclature or classification of spices and condiments Indian central spices and cashew nut committee origin

properties and uses of spices forms functions and applications of spices trends in the world of spices yield and nutrient uptake by some spice crops grown in sodic soil tissue culture and in vitro conservation of spices in vitro responses of piper species on activated charcoal supplemented media soil agro climatic planning for sustainable spices production potentials of biotechnology in the improvement of spice crops medicinal applications of spices and herbs medicinal properties and uses of seed spices effect of soil solarization on chillies spice oil and oleoresin from fresh dry spices etc The present book contains cultivation processing and uses of various spices and condiments which are well known for their multiple uses in every house all over world The book is an invaluable resource for new entrepreneurs agriculturists agriculture universities and technocrats TAGS How to Process Spice Ground and Processed Spices Spice Processing Plant Spice Processing Machine Spice Processing Spices Small Scale Industry Spices Business Plan Spice Machinery Plant How to Start Home Based Spice Business in India How to Start Spices Business Starting Spice Business Start Spice Business in India Spices Business Plan in India Masala Business Plan Masala Business Profitable How to Start Spices Processing Business Small Scale Spice Processing Cultivation of Spices in India Spice Growing Spices Farming Profitable Spices to Grow Growing Spices How to Grow Spices Spice Cultivation Spices and Condiments Cultivation of Spices Cultivation of Spice Crops Spices Grown in India Condiments Spices Spices and Condiments Cultivation Spices and Condiments Processing Condiment Processing Business Condiments Industry Tissue Culture and In Vitro Conservation of Spices In Vitro Propagation of Black Pepper Water Management of Spice Crops Spices in Ayurveda Medicinal Applications of Spices and Herbs Bulbous Spices Dehydration of Onion Tissue Culture of Garlic Garlic Cultivation Commercial Forms of Dehydrated Garlic Garlic Powder Garlic Salt Oil of Garlic Garlic Oleoresin Tissue Culture of Celery Seed Celery Cultivation Tissue Culture of Coriander Coriander Cultivation Coriander Herb Oil Coriander Oleoresin Aromatic Tree Spices Acidulant Tree Spices Harvesting of Fruits Balm or Lemon Balm Curry Leaf Cultivation Curry Leaf Vanilla Production Plan By Tissue Culture Technique Processed Products Spice Blends Seasonings and Condiments Tissue Culture of Spices Conservation of Spices Production of Secondary Metabolites Soil Agro Climatic Planning for Sustainable Spices Production Microrrhizome Production in Turmeric Enhancement of Genetic Variability in Chilli Indian Spice Extraction Technology Spice Oil and Oleoresin From Fresh Dry Spices Preparation of Bulbs Preparation of Onion Seed Preparation of Onion Powder Preparation of Onion Salt Onion Cultivation Garlic Crop Management Curing Packaging and Storage Oil of Garlic Garlic Oleoresin Garlic Oil as an Adhesive Garlic In Medicine Processed Products from Celery Leaves Stalks Celery Seed Oil Celery Seed Oleoresin Fennel Seed Grading Process of Cloves Packing of Cloves Packaging of Clove Oil Packaging of Clove Oleoresin Clove Bud Oil Clove Stem Oil Clove Leaf Oil Pimenta Berry Oil Manufacturing Process Manufacturing Process of Pimento Oleoresin Oil Manufacturing Alcoholic Beverages Dehydrated Curry Leaves Vanilla Oleoresin Vanilla Powder Vanilla Absolute and Vanilla Tincture Npcs Niir Process Technology Books Business Consultancy Business Consultant Project Identification and Selection Preparation of Project

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Bleaching Of Vegetable Oil Using Organic Acid Activated: Bestsellers in 2023 The year 2023 has witnessed a remarkable surge in literary brilliance, with numerous engrossing novels enthraling the hearts of readers worldwide. Lets delve into the realm of bestselling books, exploring the captivating narratives that have charmed audiences this year. The Must-Read : Colleen Hoover's "It Ends with Us" This heartfelt tale of love, loss, and resilience has captivated readers with its raw and emotional exploration of domestic abuse. Hoover masterfully weaves a story of hope and healing, reminding us that even in the darkest of times, the human spirit can triumph. Bleaching Of Vegetable Oil Using Organic Acid Activated : Taylor Jenkins Reids "The Seven Husbands of Evelyn Hugo" This captivating historical fiction novel unravels the life of Evelyn Hugo, a Hollywood icon who defies expectations and societal norms to pursue her dreams. Reids compelling storytelling and compelling characters transport readers to a bygone era, immersing them in a world of glamour, ambition, and self-discovery. Discover the Magic : Delia Owens "Where the Crawdads Sing" This captivating coming-of-age story follows Kya Clark, a young woman who grows up alone in the marshes of North Carolina. Owens crafts a tale of resilience, survival, and the transformative power of nature, entrancing readers with its evocative prose and mesmerizing setting. These top-selling novels represent just a fraction of the literary treasures that have emerged in 2023. Whether you seek tales of romance, adventure, or personal growth, the world of literature offers an abundance of captivating stories waiting to be discovered. The novel begins with Richard Papen, a bright but troubled young man, arriving at Hampden College. Richard is immediately drawn to the group of students who call themselves the Classics Club. The club is led by Henry Winter, a brilliant and charismatic young man. Henry is obsessed with Greek mythology and philosophy, and he quickly draws Richard into his world. The other members of the Classics Club are equally as fascinating. Bunny Corcoran is a wealthy and spoiled young man who is always looking for a good time. Charles Tavis is a quiet and reserved young man who is deeply in love with Henry. Camilla Macaulay is a beautiful and intelligent young woman who is drawn to the power and danger of the Classics Club. The students are all deeply in love with Morrow, and they are willing to do anything to please him. Morrow is a complex and mysterious figure, and he seems to be manipulating the students for his own purposes. As the students become more involved with Morrow, they begin to commit increasingly dangerous acts. The Secret History is an exceptional and suspenseful novel that will keep you guessing until the very end. The novel is a cautionary tale about the dangers of obsession and the power of evil.

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