REFERENCE

American Oil Chemists' Society, 1979, AOCS Official Method Cc 8b-52, **Bleaching Test**, Revised, AOCS Press, Champaign.

American Oil Chemists' Society, 1989, AOCS Official Methods Ca 5a-40, **Official Methods and Recommended Practices of the AOCS**, 4 th ed., AOCS Press, Champaign.

American Oil Chemists' Society, 1989, AOCS Official Methods Cd 8b-90, **Official Methods and Recommended Practices of the AOCS**, 4th ed., AOCS Press, Champaign.

American Oil Chemists' Society, 1997, AOCS Official Methods Co 13d-55, **Official Methods and Recommended Practices of the AOCS**, 5nd ed., AOCS Press, Champaign.

Angel, B.R., Jones, J.P.E., and Hall, P.L., 1974, Studies of Doped Synthetic Kaolinite, **Clay Minerals,** Vol. 10, pp. 247-256.

Angove, M.J., Fernandes, M.B. and Ikhsan, J., 2001, The Sorption of Antracene onto Goethite and Kaolinite in The Presence of Some Benzene Carboxylic Acids, **Journal of Colloid and Interface Science**, Vol. 247, pp. 234-242.

Anonymous, n.d., **Fourier Transform Infrared (FTIR) spectroscopy** [Online], available: http://www.lincoln.ac.uk/fabs/Equiptment[2009, 12, 10]

Atkins, P.W., 1994, **Physical Chemistry**, 5 th ed., Oxford University Press, Oxford.

Balan, E., Allard, T., Boizot, B., Morin, G., and Muller, J. P., 1999, Structural Fe^{3+} in Natural Kaolinites: New Insights from Electron Paramagnetic Resonance Fitting at X- and Q-band Frequencies, **Clays and Clay Minerals**, Vol. 47, pp. 605-616.

Balan, E., Lazzeri, M., Saitta, A.M., Allard, T., Fuchs, Y., and Mauri, F., 2005, First-Principles Study of OH-Stretching Modes in Kaolinite, Dickite, and Nacrite, **American Mineralogist**, Vol. 90, pp. 50-60.

Baranowsky, K., Beyer, W., Billek, G., Buchold, H., Gertz, Ch., Grothues, B., Sen Gupta, A.K., Holtmeier, W., Knuth, M., Lua, J., Mukherjee K.W., Munch E.-W., Saft H., Schneider M., Tiebach R., Transfeld P., Unterbege,Ch., Weber K. and Zschau W., 2001, Technologies for Industrial Processing of Fats and Oils, **European Journal of Lipid Science and Technology**, Vol.103, pp. 505-551.

Becker, E.M., Nissen, L.R. and Skibsted, L.H., 2004, Antioxidant Evaluation Protocols: Food Quality or Health Effects, **European Food Research and Technology**, Vol. 219, pp. 561-571.

Bhattacharyya, K.G. and Gupta, S.S., 2007, Adsorption of Co (II) from Aqueous Medium on Natural and Acid Activated Kaolinite and Montmorillonite, **Separation Science and Technology**, Vol. 42, No. 15, pp. 3391-3418.

Bhattacharyya, K.G. and Gupta, S.S., 2008, Influence of Acid Activation on Adsorption of Ni (II) and Cu (II) on Kaolinite and Montmorillonite: Kinetic and Thermodynamic Study, **Chemical Engineering Journal**, Vol. 136, No.1, pp. 1-13.

Berezin, S.V., B.D., Berezin, M.B., Moryganov, A.P., Rumyantsev, S.V. and Dymnikova, N.S., 2003, Chlorophyll and Its Derivatives, Chlorins and Porphyrins, as a Promising Class of Environmentally Friendly dyes, **Russian Journal of Applied Chemistry,** Vol. 76, No. 12, pp. 1958-1961.

Birkhdolz, M., 2006, **Thin Film Analysis by X-Ray Scattering**, Wiley-VCH Verleg GmbH & Co. K, Weinheim, Germany, pp. 475.

Boris, N.D., Inna, V.L., Eugene, G.A. and Vtaliy, P.I., 2004, Application of Mechanical Treatment to Disintegration with Sulphuric Acid, **Chemistry for Sustainable Development**, Vol. 12, pp. 327-330.

Boukerroui, A. and Quali, M.S., 2002, Edible Oil Bleaching with A Bentonite Activated by Microwave Irradiation, **Annales de Chimie Science des Materiaux**, Vol. 27, pp. 73-81.

Breen, C., Watson, R., Madejova, J., Komadel, P. and Klapyta, Z.,1997, Acid-activated organoclays: Preparation, Characterization and Catalytic activity on Acid Treated Tetaalkylammonoum-Exchanged Smectites, **Langmuir,**Vol.13, pp. 6473-6479.

Brigelius-Flohe, R. and Trabet, M.G., 1999, Vitamin E: Function and Metabolism, **Journal of the Federation of American Societies for Experimental Biology**, Vol.13, pp. 1145-1155.

Brindley, G.W., Bailey, S.W., Foust, G.T., Forman, S.A. and Rich, C.I., 1968, Report of Nomenclature Committee (1966-67) of the Clay Minerals Society, **Clays and Clay Minerals**, Vol. 16, pp. 322-324.

Brindley, G.W. and Brown, G., 1980, **Crystal Structures of Clay Minerals and Their X-Ray Identification**, Mineralogical Society Monograph No. 5. Mineralogical Society, London, pp. 495.

Brindley, G.W., Cao, C.C., Harrison, J.L., Lipsicas, M. and Raythatha, R., 1986, Relation Between Structural Disorder and Other Characteristics of Kaolinites and Dickites, **Clays and Clay Minerals**, Vol. 34, pp. 239-249.

Cheshire, M.V., Goodman, B.A. and Sparling, G.P., 1985, Electron Paramagnetic Resonance Characteristics of the Humic Acids from a Podzol, **Organic Geochemistry**, Vol. 8, pp. 427-440.

Christidia, G.E. and Kosiari, S., 2003, Decolorization of Vegetable Oils: A Study of the Mechanism of Adsorption of ß – Carotene by An Activated Bentonite from Cyprus, **Clays and Clay Minerals**, Vol. 51, No.3, pp. 327-333.

Christidia, G.E., Scotte, P.W. and Dunham, A.C., 1997, Acid-Activation and Bleaching Capacity of Bentonites from the Island of Milos and Chios,Aegean,Greece, **Applied Clay Science**,Vol.12(4), pp. 329-347.

Cicero, A.F. and Gaddi, A., 2001, Rice Bran Oil and Gamma-Oryzanol in the Treatment of Hyperlipoproteinaemias and Other Conditions, **Phytotherapy Research**, Vol. 15, No. 4, pp. 277-289.

Clozel, B., Allard,T. and Muller, J.-P., 1994, Nature and Stability of Radiation-Induced Defects in Natural Kaolinites: New Results and a Reappraisal of Published Works, **Clays and Clay Minerals**, Vol. 42, pp. 657-666.

Clozel, B., Gaite,J.-M. ,and Muller,J.-P., 1995, Al-O^--Al Paramagnetic Defects in Kaolinite, **Physics and Chemistry of Minerals**, Vol. 22, pp. 351-356.

Cowan, C.J., 1976, Degumming, Refining, Bleaching, and Deodorization Theory, **Journal of the American Oil Chemists' Society**, Vol. 53, pp. 344-346.

Cullity, B.D., 1956, **Elements of X-ray diffraction**, Addison-Wesley Company, Inc. Reading, Massachusetts, pp. 514.

Cuttler, A.H., 1981, Further Studies of a Ferrous Iron Doped Synthetic Kaolin: Dosimetry of X-ray Induced Defects, **Clay Minerals**, Vol. 16, pp. 69-80.

Dunford, N.T., 2001, Health Benefits and Processing of Lipid-Based Nutritionals. **Food Technology,** Vol. 55, No. 11, pp. 28-44.

Duzgoren - Aydin, N.S., Aydin, A. and Malpas, J., 2002, Distribution of Clay Minerals along a Weathered Pyroclastic Profile, Hong Kong, **Catena**, Vol. 50, pp.17-41.

Diask, M. and Saska, M., 1994, Separation of Vitamin E and γ- Oryzanols from Rice Bran Oil by Normal-Phase Chromatography, **Journal of the American Oil Chemists' Society**, Vol. 71, pp. 1211-1217.

Dubinin, M.M., 1966, In: **Chemistry and Physics of Carbon**, Walker, P.L.Jr (Ed), Marcel Deckker, New York.

Dunford, N.T., 2001, Health Benefits and Processing of Lipid-Based Nutritionals, **Food Technology,** Vol. 55, No. 11, pp. 38-44.

Ekosse, G.-I., 2005, Fourier Transform Infrared Spectrophotometry and X-ray Powder Diffractometry as Complementary Techniques in Characterizing Clay Size Fraction of Kaolin, **Journal of Applied Sciences Environment Management**, Vol. 9, pp. 43-48.

Falaras, P., Lezou, F., Seiragakis, G. and Petrakis, D., 2000, Bleaching Properties of Alumina- Pillared Acid- Activated Montmorillonite, **Clays and Clay Minerals**, Vol. 48, No.5, pp. 549-556.

Farmer, V.C., 1974, **The Infrared Spectra of Minerals**, Mineralogical Society, London.

Farmer, V.C., 1998, Differing Effects of Particle Size and Shape in the Infrared and Raman spectra of Kaolinite, **Clay Minerals**, Vol. 33, pp. 601-604.

Farmer, V.C. and Russell, J.D., 1964, The Infrared Spectra of Layered Silicates, **Spectrochimica Acta**, Vol. 20, pp. 1149-1173.

Fletcher, A.J. **Adsorption** [Online], Available: http://personal.strath.ac.uk/ashling. fletcher/ adsorption. htm [2010,December, 24]

Fireston, D., 1999, **Physical and Chemical Characteristics of Oils, Fats and Waxes**, AOCS Press.

Foletto, E.L., Volzone, C. and Porto, L.M., 2006, Clarification of Cottonseed Oil: How Structural Properties of Treated Bentonites by Acid Affect Bleaching Efficiency, **Latin American Applied Research**, Vol. 36, No. 1, pp. 37-40

Foletto, E.L., Volzone, C. and Porto, L.M., 2006, Characterization and Bleaching Properties of Acid-Leached Montmorillonite, **Journal of Chemical Technology and Biotechnology**, Vol. 81, pp. 688-693.

Frost, R.L., Makó, É., Kristóf, J., Horváth, E. and Kloprogge, J.T., 2001a, Mechanochemical Treatment of Kaolinite, **Journal of Colloid and Interface Science**, Vol. 239, pp. 458-466.

Frost, R.L., Makó, É., Kristóf, J., Horváth, E. and Kloprogge, J.T., 2001b, Modification of Kaolinite Surfaces by Mechanochemical Treatment, **Langmuir**, Vol. 17, pp. 4731-4738.

Frost, R.L., Makó, É., Kristóf, J., and Kloprogge, J.T., 2002, Modification of Kaolinite Surfaces through Mechanichemical Treatment – a Mid-IR and Near-IR Spectroscopic Study. **Spectrochimica Acta**, Vol. 58A, pp. 2849-2859.

Frost, R.L., Horváth, E., Makó, É., Kristóf, J. and Rédey, Á., 2003, Slow Transforma tion of Mechanically Dehydroxylated Kaolinite to Kaolinite –An-Aged Mechano chemically Activated Formamide-Intercalated Kaolinite Study. **Thermochimica Acta**, Vol. 408, pp. 103-113.

Frost, R.L., Horváth, E., Makó, É. and Kristóf, J., 2004, Modification of Low and High Defect Kaolinite Surfaces: Implications for Kaolinite Mineral Processing. **Journal of Colloid and Interface Science**, Vol. 270, pp. 337-346.

Fysh, S.A., Cashion, J.D. and Clark, P.E., 1983, Mössbauer Effect Studies of Iron in Kaolin. I. Structural iron, **Clays and Clay Minerals,** Vol. 31, pp. 285-292.

Gaite, J.-M., Ermakoff, P., Allard, T. and, Muller, J.-P., 1997, Paramagnetic Fe^{3+} - a Sensitive Probe for Disorder in Kaolinite, **Clays and Clay Minerals**, Vol. 45, pp. 496-505.

Garcia, I., Sarchez, A., Ayuso, E.A. and Blas, J.D., 1999, Sorption of Heavy Metals from Industrial Waste Water by Low-Cost Mineral Silicate, **Clay Minerals**, Vol. 34, No. 3, pp. 469-478.

Gehring, A.U., Fry, I.V., Luster, J. and Sposito, G., 1993, The chemical form of Vanadium (IV) in Kaolinite, **Clays and Clay Mineralals,** Vol. 41, pp. 662-667.

Girgis, A.Y., 2005, Reuse of Discarded Deactivated Bleaching Earths in the Bleaching of Oils, **Grasas y Aceites**, Vol. 56, pp. 34-45.

Ghosh, M., 2007, Review on Recent Trends in Rice Bran Oil Processing, **Journal American Oil Chemist Society**, Vol. 84, No. 4, pp. 315-324.

Giese, R.F., 1988, Kaolin Minerals; Structures and Stabilities, **Mineralogy and Geochemistry**, Vol. 19, No. 1, pp. 29-66.

Golding, R.M., Singhasuwich, T., and Tennant, W.C., 1977, An Analysis of the Conditions for an Isotropic g-Tensor in High-Spin d^5 Systems, **Molecular Physics,** Vol. 34, pp. 1343-1350.

Goltch, T.D., Chemtob, S.M. and Rossmam, G.R., 2007, Attenuaated Total Reflection as an In Situ Infrared Spectroscopic Method for Mineral Identification, **The 38 th Lunar and Planetary Science Conference,** pp. 1731.

Gonzalez, G.F., Ruiz Abrio, M.T. and Gonzalez R., 1991, Effect of Dry Grinding on Two Kaolins of Different Degrees of Crystallinity, **Clay Minerals**, Vol. 26, pp. 549-565.

Goodman, B.A. and Raynor, J.B., 1970, Electron Spin Resonance Of Transition Metal Complexes. **Advances in Inorganic Chemistry and Radiochemistry**, Vol. 13, pp. 135-362.

Goodman, B.A. and Hall, P.L., 1994, Electron Paramagnetic Resonance Spectroscopy, In: **Clay Mineralogy: Physical Determinative Methods**, Wilson, M.J. (Ed), Chapman & Hall, London, 173-225.

Goodman, B.A. and Newton, A.C., 2005, Effects of Drought Stress and Its Sudden Relief on Free Radical Processes in Barley. **Journal of the Science of Food and Agriculture**, Vol. 85, pp. 47-53.

Gonzalez-Pradas, E., Villafrance-Sanchez, M., Sosias-Viciana, M. and Gallego-Compo, A., 1994, Adsorption of Chlorophyll-a from Acetone Solution on Natural and Activated Bentonite, **Journal of Chemical Technology and Biotechnology**, Vol. 61, pp. 175-178.

Habile, M., Barlow, J.P., and Hole, M., 1992, Adsorptive Bleaching of Soybean Oil with Non-Montmorillonite Zambian Clays, **Journal of American Oil Chemists' Society**, Vol. 69, pp. 379-383.

Hart, R.D., Wiriyakitnateekul, W., and Gilkes, R.J., 2003, Properties of Soil Kaolins from Thailand, **Clay Minerals**, Vol. 38, No. 1, pp. 71-94.

Hepburn, H.N., Goodman, B.A., McPhail, D.B., Matthews, S. and Powell, A.A., 1986, An Evaluation of EPR Measurement of the Organic Free Radical Content of Individual Seeds in the Non-destructive Testing of Seed Viability, **Journal of Experimental Botany**, Vol. 37, No. 11, pp. 1675-1684.

Hinckley, D.N., 1963, Variability in Crystallinity Values Among the Kaolin Deposits of the Coastal Plain of Georgia and South Carolina, **Proc. 11th National Conference on Clays and Clay Minerals**, Pergamon, Oxford, pp. 229-235.

Holt, A.S. and Jacobs, E.E., 1955, Infrared Absorption Spectra of Chlorophylls and Derivatives, **Plant Physiology**, Vol. 30, pp. 553-559.

Hong, H., Sun, Z., Fu, Z. and Min, X., 2003, Adsorption of $AuCl^{-}_{4}$ by Kaolinities: Effect of pH, Temperature and Kaolinite Crystallinity, **Clays and Clay Minerals**, Vol. 51, No. 5, pp. 493-501.

Huang, D., Ou, B., Hampsch-Woodill, M., Flanagan, J. A. and Deemer, E.K., 2002, Development and Validation of Oxygen Radical Absorbance Capacity Assay for Lipophilic Antioxidations Using Randomly Methylated ß- Cyclodextrin as The Solubility Enhancer, **Journal of Agricultural and Food Chemistry**, Vol. 50, pp. 1815-1821.

Huang, J., Liu, Y., Liu, Y. and Wang, X., 2007, Effect of Attapulgite Pore Size Distribution on Soybean Oil Bleaching, **Journal of American Oil Chemists' Society,** Vol. 84, No. 7, pp. 687-692.

Hulya, N., Muserref, O. and Yuksel, S., 2007, The Effect of Sulphuric Acid Activation on the Crystallinity, Surface Area, Porosity, Surface Acidity, and Bleaching Power of a Bentonite, **Food Chemistry,** Vol.105, pp. 156-163.

Hvolby, A., 1971, Removal of Nonhydratable Phospholipids from Soybean Oil, **Journal of the American Oil Chemists' Society**, Vol. 48, pp. 503-509.

Kalyanaraman, B., Darley-Usmar, V., Struck, A., Hugg, W. and Parthasathy, S., 1995, Role of Apolipoprotein B-Derived Radical and Alpha-Tocopheroxyl Radical in Peroxidase-Dependent Oxidation of Low Density Lipoprotein, **Journal of Lipid Research,** Vol. 36, pp. 1037-1045.

Kameda, J., Saruwatari, K. and Tanaka, H., 2004, H_2 Generation During Dry Grinding of Kaolinite, **Journal of Colloid and Interface Science**, Vol. 27, No. 1, pp. 225-228.

Kamga, R., Kayem G.T. and Rouxhet, P.G., 2000, Adsorption of Gossypol from Cottonseed Oil on Oxide, **Journal of Colloid and Interface Science**, Vol. 232, pp. 198-206.

Kheok, S.C. and Lim, E.E., 1982, Mechanism of Palm Oil Bleaching by Montmorillonite Clay Activated at Various Acid Concentrations, **Journal of the American Oil Chemists' Society**, Vol. 59, No. 3, pp. 129-131.

Krishna, G., 2000, Nutritional components of refinable matter in rice bran oil in relation to processing. In: **National Seminar on rice bran Oil**, 3rd June,Goa, India pp. 29-33.

Kochhar, S.P., 2001, The Composition of Frying Oils, In: **Frying-Improving Quality**, Sossell, J.B. (Ed.), Woodhead Publishing, Cambridge, England, pp. 87-114.

Krayt, H.R., 1944, Inleiding tot de Physische Chemie, In : **Principles of Soil Chemistry**, 2nd ed., Marcel Dekker, Inc., New York, pp. 362.

Kumar, P., Jasra, R.V. and Bhat, T.S.G., 1995, Evolution of Porosity and Surface Acidity in Montmorillonite Clay on Acid Activation, **Industrial and Engineering Chemical Research**, Vol. 34, pp. 1440-1448.

Lamond, T.G. and Marsh, H., 1964, The Surface Properties of Carbon - II The Effect of Capillary Condensation at Low Relative Pressure Upon the Determination of Surface Area. **Carbon**, Vol.1, No. 3. pp. 281-292.

Laranjinha, J. and Cadenas, E., 1999, Redox Cycles of Caffeic Acid, Alpha-Tocopyerol, and Ascobate: Implications for protection of Low-Density Lipoproteins Against Oxidation, **IUBMB Life**, Vol. 48, No. 1, pp. 57-65.

Levente, L.D., 2005, Chlorophyll Removal from Edible Oil, **Journal of Applied Science and Engineering**, Vol. 3, No. 2, pp. 81-88.

Lehtovuori, P. and Joela, H., 2002, Radical Cations of Vitamin E, **Physical Chemistry Chemical Physics**, Vol. 4, pp. 1928-1933.

Lloyd, B.J., Siebenmorgan, T.J. and Beers, K.W., 2000, Effects of Commercial Processing on Antioxidants in Rice Bran, **Cereal Chemists**, Vol. 77, No. 5 , pp. 551.

Lombardi, G., Russell, J.D. and Keller, W.D., 1987, Compositional and Structural Variations in the Size Fractions of a Sedimentary and a Hydrothermal Kaolin, **Clays and Clay Minerals**, Vol. 35, pp. 321-335.

Long, J.C., Sommer, F., Allen. M.D., Lu, S.-F. and Merchant, S.S., 2008, *FER1* and *FER2* encoding two ferritin complexes in *Chlamydomonas reinhardtii* chloroplasts are regulated by iron, **Genetics**, Vol. 179, pp. 137–147.

Langford, J.I. and Wilson, A.J.C., 1978, Scherrer After Sixty Years. A Survey and Some New Results in the Determination of Crystallite Size, **Journal of Applied Crystallography**, Vol. 11, pp. 102-113.

Mackenzie, R.C., 1975, The Classification of Soil Silicates and Oxides, In: **Soil Components**, Vol. 2, Inorganic Components, Gieseking, J.E. (Ed.), Springer-Verlag, New York, pp. 1-25.

Mako, E., Senkar, Z., Kristof, J. and Vagvdlgyi, V., 2006, Surface Modification of Mechanochemically Activated Kaolinites by Selective Leaching, **Journal of Colloid and Interface Science,** Vol. 294, pp. 362-370.

Maslen, E.N., Fox, A.G. and O' Keefe, M.A. 2004, X-ray Scattering, In: **International Table for Crystallography**, Prince, E (Ed), Vol. C, Kluwer Academic, Dordrecht, pp. 554.

Matthe, S.W., Madson, F.T. and Kahr, G., 1999, Sorption of Heavy-Metal Cations by Al and Zr-Hydroxy- Intercalated and Pillared Bentonite, **Clays and Clay Minerals**, Vol. 47, pp. 617-629.

McBride, M.B., Pinnavaia, T.J. and Mortland, M.M., 1975, Electron Spin Relaxation and the Mobility of Manganese (II) Exchange Sites in Smectites, **American Mineralogist**, Vol. 60, pp. 66-72.

Mitchell, J.K., 1993, **Fundamentals of Soil Behavior**, 2nd ed., John Wiley & Sons, New York, pp. 375.

Mehraban, Z. and Farzaneh, F., 2006, MCM-41 as Selective Separator of Chlorophyll-a from β-carotene and Chlorophyll-a mixture, **Microporous Mesoporous Materials,** Vol. 88. pp. 84-90.

Mendelovici, E., 2001, Selective Mechanochemical Reactions on Dry Grinding Structurally Different Silicates, **Journal of Materials Science Letters,** Vol. 20, pp. 81-83.

Meenakshi, S., Sundaram, C.S. and Sukumar, R., 2008, Enhanced Fluoride Sorption by Mechanochemically Activated Kaolinites, **Journal of Hazardous Materials,** Vol. 153, pp. 164-172.

Mestagh, M.M., Vielvoye, L. and Herbillon, A.J., 1980, Iron in Kaolinite: II. The Relationship between Kaolinite Crystallinity and Iron Content, **Clay Minerals**, Vol. 15, pp. 1-13.

Miller, J.G. and Oulton, T.D., 1970, Prototrophy in Kaolinite During Percussive Grinding, **Clays and Clay Minerals**, Vol.18, pp. 313-323.

Minjigmaa, A., Temuujin, J., Khasbaatar, D., Oyun-Erdene, G., Amgalan, J. and Mackenzie, K.J.D., 2007, Influence of Mechanical Distortion on the Solubility of Fluoropatite, **Minerals Engineering,** Vol. 20, pp. 194-196.

Mokaya, R., Jones, W., Davies, M.E. and Whittle, M.E., 1993 , Chlorophyll Adsorption by Alumina-Pillared Acid-Activated Clays, **Journal of the American Oil Chemists' Society**, Vol. 70, No. 3 , pp. 241-244.

Mokaya, R., Jones, W., Davies, M.E. and Whittle, M.E., 1994, The Mechanism of Chlorophyll Adsorption on Acid-Activated Clays, **Journal of Solid State Chemistry**, Vol. 111, No.1, pp. 157-163.

Moreau, R.A., Whitaker, B.D. and Hicks, K.B., 2002, Phytosterols, Phytostenols and Their Conjugates in Foods : Structural Diversity, Quantitative Analysis, and Health-Promoting Uses, **Progress in Lipid Research**, Vol. 41, No. 6, pp. 457-500.

Nicolosi, R.J., Ausman, L.M. and Hegsted, D.M., 1991, Rice Bran Oil Lowers Serum Total and Low Density Lipoprotein Cholesterol and apo B levels in Non-human Primate, **Atheroscience**, Vol. 88, pp. 133-142.

Noyan, H., Onal, M. and Sankaya, Y., 2007, The Effect of Sulphuric Acid Activation on the Crystallinity, Surface Area, Porosity, Surface Acidity, and Bleaching Power of a Bentonite, **Food Chemistry**, Vol. 105, pp. 156-163.

Nuntiya, A. and Prasanphan, S., 2006, The Rheological Behavior of Kaolin Suspensions, **Chiang Mai Journal of Science,** Vol. 33, pp. 271-281.

O'Day, P.A., Parks, G.A. and Brown Jr, G.E., 1994, Molecular Structure and Binding Sites of Cobalt (II) Surface Complexes on Kaolinite from X-Ray Adsorption Spectroscopy, **Clays and Clay Minerals**, Vol. 43, pp. 337-355.

Okada, K., Shimai, A., Takei, T., Hayashi, S., Yasumori, A. and MacKenzie, K.J.D., 1998, **Preparation of Microporous Silica from Metakaolinite by Selective Leaching** Method, **Microporous and Mesoporous Materials**, Vol. 21, pp. 289-296.

Orthoefer, F.T., 1996, Rice Bran Oil: Health Lipid Source, **Food Technology**, Vol. 50, pp. 62-64.

Ozard, S. **The Physics of Computed Tomography** [Online], Available: http: // web2.uwinsor.ca/.../ctphysics.html[2011,2, 10].

Park, E.Y. and Ming, H., 2004, Oxidation of Rapeseed Oil in Waste Activated Bleaching Earth and Its Effect on Riboflavin Production in Culture of *Ashbya Gossypii*, **Journal of Bioscience and Bioengineering**, Vol. 97, pp. 59-64.

Pascual, E.C., Goodman, B.A. and Yeretzian, C., 2002, Characterization of Free Radicals by Electron Paramagnetic Resonance Spectroscopy, **Journal of Agricultural and Food Chemistry**, Vol. 50, pp. 6114-6122.

Proctor, A. and Synder, H.E., 1988, Adsorption of Lutein from Soybean Oil on Silicic acid: II Kinetics, **Journal of American Oil Chemists' Society**, Vol. 65, pp. 761-763.

Proctor, A. and Palaniappan, S. 1990, Adsorption of Soy Oil Free Fatty Acids by Rice Hull Ash, **Journal of the American Oil Chemists' Society**, Vol. 67, pp. 15-17.

Proctor, A. and Toro-Vazquez, J.F., 1996, The Frundlich Isotherm in Studying Adsorption in Oil Processing, **Journal American Oil Chemist Society**, Vol. 73, pp. 1627-1633.

Rocha, J., 1999, Single- and Triple-Quantum ^{27}Al MAS NMR Study of the Thermal Transformation of Kaolinite, **The Journal of Physical Chemistry B**, Vol.103, pp. 9801-9804.

Rukmini, C. and Raghuram, T.C., 1991, Nutritional and Biochemical Aspects of the Hypolipdemic Action of Rice Bran Oil : A review, **Journal of the American College of Nutrition,** Vol. 10, pp. 593-601.

Sabah, E., 2007, Decolorization of Vegetable Oils: Chlorophyll-a Adsorption by Acid-Activated Sepiolite, **Journal of Colloid and Interface Science**, Vol. 310, pp. 1-7.

Sabah, E., Cinar, M. and Celik, M.S., 2007, Decolorization of Vegetable Oils: Adsorption Mechanism of ß-Carotene on Acid-Activated Sepiolite, **Food Chemistry**, Vol. 27, pp. 1661-1168.

Sánchez-Soto, P.J., Jiménez de Haro, M.C., Pérez-Maqueda, L.A., Varona I. and Pérez-Rodríguez J.L., 2000, Effects of Dry Grinding on the Structural Changes of Kaolinite Powders, **Journal of the American Ceramic Society**, Vol. 83, pp. 1649-1657.

Sarier, N. and Guler, C., 1988, ß-Carotene Adsorption on Acid-Activated Montmorillonite, **Journal of American Oil Chemists' Society**, Vol. 65, pp. 776-779.

Schweitzer, J., **What is a SEM?** [Online], Available: http://www.purdue.edu/rem/rs/sem.htm[2011,03,20]

Shankar, R., **What is XRF?** [Online], Available: http://aviabi2001.blogspot.com/2009/02/what-is-xrf.htm[2009, 12, 24]

Srasra, E., Bergaya, F., Van Damme, H., Ariguib, N.K., 1989, Surface Properties of an Activated Bentonite: Decolorization of Rape Seed Oil, **Applied Clay Science**, Vol. 4, pp. 411-421.

Sarkar, D., Essington, M.E. and Misra, K.C., 2000, Adsorption of Mercury (II) by Kaolinite, **Soil Science Society of American Journal**, Vol. 64, pp. 1968-1975.

Sayre, R.M. and Saunders, R.M., 1990, Rice Bran and Rice Bran Oil, **Lipid Technology**, Vol. 2, pp. 72-76.

Schrader, R., 1970, **Silikattechnik 21**, pp. 196.

Sengupta, P., Saikia, N.J., Bharali, D.J., Saikia, P.C. and Borthakur, P.C., 2006, ESR Investigation of Deferration Treatment of Iron-Rich Kaolinite Clay from Deopani, Assam, India, **Current Science,** Vol. 91, pp. 86-90.

Shin, T.S., Godber, J.S., Martin, D.E. and Wells, J.H., 1997, Hydrolytic Stability and Changes in E Vitamins and Oryzanol of Extruded Rice Bran During Storage, **Journal of Food Science**, Vol. 62, pp. 704-708.

Sposito, G., 1980, Freundlich Equation for Ion Exchange Reactions in Soils, **Soil Science Society of American Journal**, Vol. 44, pp. 652-654.

Sticher, H. and Bach, R., 1966, Fundamentals in the Chemical Weathering of Silicates, **Soil Fertilizer,** Vol. 29, pp. 321-325.

Sugano, M. and Tsuji, E., 1996, Rice Bran Oil and Human Health, **Biomedical and Environmental Science**, Vol. 9, pp. 242-245.

Sugiyama, K., Filio, J.M., Saito, F. and Waseda, Y., 1994, Structural Change of Kaolinite and Pyrophyllite Induced by Grinding, **Mineralogical Journal**, Vol. 17, pp. 28-41.

Suraj, G., Iyer, C.S.P. and Lalithambika, M., 1998, Adsorption of Cadmium and Copper by Modified Kaolinites, **Applied Clay Science**, Vol. 13, pp. 293-306.

Swapp, S., **Scanning Electron Microscopy (SEM)** [Online], Available: http:// serc. carleton.edu/research_education/geochemsheets/technique/SEM.html[2009, 12, 24]

Tahira, R., Ata-Ur-,R. and Muhammad, A.B.,2007, Characterization of Rice Bran Oil, **Journal of Agricultural Research**, Vol. 45, pp. 225-230.

Tarber, M.G. and Packer, L.,1995, Vitamin E Beyond Antioxidant Function, **The American Journal of Clinical Nutrition**, Vol. 62, pp. 1501-1509.

Tan, K.H., 1993, **Principle of Soil Chemistry**, 2nd ed., Marcel Dekker, Inc., New York, pp. 362.

Temuujin, J., Burmaa, G. and Amgalan, J., 2001, Preparation of Porous Silica from Mechanically Activated Kaolinite, **Journal of Porous Material**, Vol. 8, pp. 233-238.

Temuujin, J., Okada, K., Jadambaa, T.S., Mackenzie, K. J. D., and Amarsanaa, J., 2002, Effect of Grinding on the Preparation of Porous Material from Talc by Selective Leaching, **Journal of Materials Science Letters**, Vol. 21, pp. 1607-1609.

Temuujin, J.,Okada, K., Jadambaa, T.S. MacKenzie, K.J. D., 2003, Effect of Grinding on the Leaching Behavior of Pyrophyllite, **Journal of the European Ceramic Society**, Vol. 23, pp. 1277-1282.

Temuujin, J., Jadambaa, Ts., Burmaa, G., Erdenechinmeg, Sh., Amarsanaa, J and Mackenzie, K.J.D., 2004 , Characterization of Acid Activated Montmorillonite Clay from Tuulant (Mongolia), **Ceramics International**, Vol. 30, pp. 251-255.

Temuujin, J., Burmaa, G. and Amgalan, J., 2006, Characterization of Nanoporous Materials Prepared from Montmorillonite Clay and Its Application to the Decolorization of Mare's Milk Oil, **Journal of Porous Materials**, Vol. 13, pp. 49-53.

Tong, J., Wu, Z., Sun, X., Xu, X. and Li, C., 2008, Adsorption Kinetics of β-Carotene and Chlorophyll onto Acid-activated Bentonite in Model Oil, **Chinese Journal of Chemical Engineering,** Vol.16, pp. 270-276.

Ugarla, M. and Kula, I., 2007, The Removal of Colour, Carotene and Acidity from Crude Olive Oil by Using Sepiolite, **International Journal of Food Science and Technology**, Vol. 42, pp. 359-365.

van der Marel, H.W. and Krohmer, P. 1969, O-H Stretching Vibrations in Kaolinite and Related Minerals, **Contribution to Mineralogy and Petrology**, Vol. 22, pp. 73-82.

Velde, B., 1992, **Introduction to Clay Minerals: Chemistry, Original Uses and Environmemtal Significance**. Chapman & Hall, London, pp. 198.

Vicenti, M.A.,1996, Characterization, Surface Area, and Porosity Analyses of the Solids Obtained by Acid Leaching of a Saponite, **Langmuir,** Vol. 12, pp. 566-572.

Wadsworth, J., 1992, Rice, In: **Encyclopedia of Food Science and Technology**, Hui, Y.H. (ed.) Vol. IV, John Wiley & Sons, Inc., New York, pp. 264-279.

Weeks, R.A., 1956, Paramagnetic Resonance of Lattice Defects in Quartz, **Journal of Applied Physics**, Vol. 27, pp. 1376-1381.

Weigl, J.W. and Livingston, R., 1953, Infrared spectra of chlorophyll and related compounds, **Journal of American Chemistry Society,** Vol. 75, pp. 2173-2176.

Wikipedia, **X-Ray Fluorescence** [Online], Available: http://en.wikipedia.org/wiki/ X-ray-fluorescence[2009,11,12]

Woumfo, D.J., Kamga, R., Figueras, F. and Njopwouo, D., 2007, Acid Activation and Bleaching Capacity of Some Cameroonian Smectite Soil Clays, **Applied Clay Science**, Vol. 37, pp. 149-156.

Wypych, F. and Satyanarayana, K.G., 2004, **Clay Surfaces: Fundamental and Applications**, Elsevier Academic Press, Amsterdam, pp. 553.

Xu, Z. and Godber, J.S., 2001, Antioxidant Activities of Major Components of Gamma-Oryzanol from Rice Bran Oil Using a Linoleic Model, **Journal of The American Oil Chemists' Society**, Vol. 70, pp. 645-649.

Appendix A

Table A-1 Surface charge of modified kaolin GKS 2

Volume 0.1 M HNO_3 (ml)	pH	$[H]^+$ (10^{-pH})	$[OH]^-$ $10^{-14}/[H]^+$	C_a/C_b(mol/l)	Q(mol/g dry wt.)
0.25	3.37	4.2658E-4	2.3443E-11	4.9750E-4	.00035
0.50	3.13	7.4130E-4	1.3489E-19	9.9009E-4	.00124
0.75	2.98	1.0471E-3	9.5499E-12	1.4778E-3	.00215
1.00	2.77	1.6982E-3	5.8893E-12	1.9607E-3	.00131
1.50	2.66	2.1878E-3	4.5708E-12	2.9126E-3	.00362
1.75	2.53	2.9512E-3	3.3884E-12	3.3816E-3	.00216
2.00	2.51	3.0902E-3	3.2359E-12	3.8462E-3	.00378
2.50	2.33	4.6773E-3	2.1379E-12	4.7619E-3	.00032
3.50	2.22	6.0259E-3	1.6596E-12	6.5420E-3	.00258
4.50	2.16	6.9180E-3	1.4454E-12	8.2569E-3	.00669
5.50	2.04	9.120E-3	1.0965E-12	9.9099E-3	.00399

Volume 0.1 M NaOH (ml)	pH	$[H]^+$ (10^{-pH})	$[OH]^-$ $10^{-14}/[H]^+$	C_a/C_b(mol/l)	Q(mol/g dry wt.)
0.25	4.77	1.6982E-5	5.8884E-10	4.9750E-4	-0.00257
0.50	5.21	6.1659E-6	1.6218E-19	9.0099E-4	-0.00454
0.75	8.11	7.7625E-9	1.2882E-6	1.4778E-3	-0.00738
1.00	9.32	4.7863E-10	2.0893E-5	1.9607E-3	-0.00960
1.25	9.54	2.8840E-10	3.4670E-5	2.4390E-3	-0.01202
1.50	9.64	2.2909E-10	4.3652E-5	2.9126E-3	-0.00143
2.00	10.03	9.3325E-11	10.7152E-4	3.7736E-3	-0.01350

Table A-2 Surface charge of modified kaolin GKO 0.7

Volume 0.1 M HNO_3 (ml)	pH	$[H]^+$ (10^{-pH})	$[OH]^-$ $10^{-14}/[H]^+$	C_a/C_b(mol/l)	Q(mol/g dry wt.)
0.25	3.46	3.3113E-11	3.0199E-4	4.9750E-4	.00002
0.50	3.07	8.3176E-4	1.2028E-19	9.9009E-4	.00079
0.75	2.87	1.3182E-3	7.5858E-12	1.4778E-3	.00080
1.00	2.75	1.7378E-3	5.7544E-12	1.9608E-3	.00111
1.25	2.69	2.0417E-3	4.8979E-12	2.4390E-3	.00199
1.50	2.55	2.8184E-3	3.5481E-12	2.9126E-3	.00471
1.75	2.48	3.2359E-3	3.0902E-12	3.3816E-3	.00728
2.00	2.43	3.8019E-3	2.6303E-12	3.8462E-3	.00222
3.00	2.29	5.1286E-3	1.9498E-12	5.6604E-3	.00259
4.00	2.15	7.0794E-3	1.4250E-12	7.4074E-3	.00264
5.00	2.08	8.3176E-3	1.20226E-12	9.0909E-3	.00387

Volume 0.1 M NaOH (ml)	pH	$[H]^+$ (10^{-pH})	$[OH]^-$ $10^{-14}/[H]^+$	C_a/C_b(mol/l)	Q(mol/g dry wt.)
0.25	8.08	8.3176E-9	1.2023E-6	4.9751E-4	-0.00049
0.50	8.90	1.3804E-9	7.2440E-6	9.0099E-4	-0.00491
0.75	9.19	6.4565E-10	1.5488E-5	1.4778E-3	-0.00731
1.00	9.32	4.7863E-10	2.0893E-5	1.9607E-3	-0.00980
1.25	9.46	3.4674E-10	2.8840E-5	2.4390E-3	-0.01200
1.50	9.56	2.8184E-10	3.5481E-5	2.9126E-3	-0.00144
1.75	9.63	2.3988E-10	4.1687E-5	3.3816E-3	-0.01669
2.00	9.71	1.9953E-10	5.0119E-5	3.8462E-3	-0.01898
2.25	9.82	1.5488E-10	6.4565E-5	4.3062E-3	-0.02120
2.75	9.84	1.4125E-10	7.0795E-5	5.2132E-3	-0.02570
3.75	10.10	7.5858E-10	1.3183E-4	6.9767E-3	-0.03420

Table A-3 Influence of contact time for bleaching process (2%(w/w) UGKS 2 and UGKS 3.7 at 90°C)

Time	Absorbance 410 nm			
(min)	Experiment 1	Experiment 2	Experiment 3	Average ±SD
UGKS 2				
0	0.902	0.902	0.902	0.902±0.000
15	0.749	0.758	0.752	0.753±0.004
30	0.513	0.516	0.504	0.511±0.006
60	0.520	0.514	0.511	0.515±0.004
120	0.518	0.515	0.509	0.514±0.005
UGKS 3.7				
0	0.902	0.902	0.902	0.902±0.000
15	0.617	0.613	0.609	0.613±0.004
30	0.418	0.410	0.414	0.414±0.006
60	0.408	0.412	0.416	0.412±0.004
120	0.412	0.419	0.423	0.418±0.004

Table A-4 Results of bleaching experiments with 2% (w/w) modified kaolin for 30 minutes at 90°C

Sample	Absorbance 410 nm			
	Experiment 1	Experiment 2	Experiment 3	Average ± SD
Acid activation				
(unground samples treated with sulphuric acid at 90°C for 4 h and pH suspension 3.4)				
UGKS 2.0	0.520	0.511	0.504	0.512±0.009
UGKS 3.0	0.427	0.432	0.421	0.426±0.006
UGKS 3.7	0.419	0.408	0.417	0.414±0.006
UGKS 5.0	0.367	0.372	0.350	0.363±0.011
Grinding and acid activation				
(ground 1 h follow treated with sulphuric acid or oxalic acid at 90°C for 4 h and pH suspension 3.4)				
Sulphuric acid leaching				
GKS 1.7	0.259	0.243	0.257	0.253±0.009
GKS 2.0	0.190	0.183	0.179	0.184±0.006
GKS 2.3	0.188	0.197	0.185	0.190±0.006
GKS 2.6	0.223	0.215	0.219	0.219±0.004
GKS 3.0	0.254	0.266	0.260	0.260±0.006
GKS 3.7	0.308	0.316	0.316	0.314±0.005
Oxalic acid leaching				
GKO 0.5	0.250	0.236	0.248	0.245±0.007
GKO 0.7	0.201	0.198	0.204	0.195±0.003
GKS 0.9	0.229	0.212	0.225	0.222±0.008
CBC	0.165	0.157	0.167	0.163±0.005

Note: all data are mean of triplicate

Table A-5 Influence of pH suspension to the bleaching efficiency of (2% (w/w) modified kaolin for 30 minutes at 90°C)

Sample	Absorbance 410 nm			
	Experiment 1	Experiment 2	Experiment 3	Average ± SD
GKS 2(pH 2.0)	0.178	0.168	0.173	0.173±0.005
GKS 2(pH 2.5)	0.173	0.182	0.170	0.175±0.006
GKS 2(pH 3.0)	0.171	0.177	0.183	0.177±0.006
GKS 2(pH 3.5)	0.196	0.189	0.185	0.190±0.005
GKO 0.7(pH 2.0)	0.179	0.186	0.181	0.182±0.004
GKO 0.7(pH 2.5)	0.186	0.190	0.176	0.184±0.007
GKO 0.7(pH 3.0)	0.195	0.188	0.193	0.192±0.004
GKO 0.7(pH 3.5)	0.191	0.196	0.201	0.196±0.005

Note: all data are mean of triplicate

Table A-6 Freundlich isotherm of GKS 2 adsorption process at 60°C

Mass *(g)*	*V (g)*	*Ce (mg/kg)*	*X (mg/g)*	log *Ce*	log *X*
0.1	9.90	4.222	0.6265	0.6255	-0.2031
0.15	9.85	3.019	0.4945	0.4798	-0.3058
0.20	9.80	2.417	0.3985	0.3833	-0.3996
0.25	9.75	1.878	0.3382	0.2736	-0.4708
0.30	9.70	1.550	0.2910	0.1903	-0.5361

Note: all data are mean of triplicate

Table A-7 Freundlich isotherm of GKS 2 adsorption process at 75°C

Mass *(g)*	*V (g)*	*Ce (mg/kg)*	*X (mg/g)*	log *Ce*	log *X*
0.10	9.90	3.802	0.6682	0.5798	-0.1751
0.15	9.85	2.550	0.5253	0.4065	-0.2796
0.20	9.80	2.012	0.4185	0.3031	-0.3783
0.25	9.75	1.663	0.3467	0.2201	-0.4500
0.30	9.70	1.281	0.2997	0.1072	-0.5233

Note: all data are mean of triplicate

Table A-8 Freundlich isotherm of GKS 2 adsorption process at 90°C

Mass *(g)*	*V (g)*	*Ce (mg/kg)*	*X (mg/g)*	log *Ce*	log *X*
0.10	9.90	3.352	0.7128	0.5250	-0.1470
0.15	9.85	2.401	0.5352	0.3802	-0.2715
0.20	9.80	1.803	0.4307	0.2553	-0.3658
0.25	9.75	1.420	0.3560	0.1523	-0.4486
0.30	9.70	1.080	0.3062	0.0334	-0.5140

Note: all data are mean of triplicate

Table A-9 Langmuir isotherm of GKS 2 adsorption process at 60°C

Mass *(g)*	*V (g)*	*Ce (mg/kg)*	*X (mg/g)*	$\frac{Ce}{X}$
0.1	9.90	4.222	0.6265	6.7390
0.15	9.85	3.019	0.4945	6.1046
0.20	9.80	2.417	0.3985	6.0652
0.25	9.75	1.878	0.3382	5.5517
0.30	9.70	1.550	0.2910	5.3265

Note: all data are mean of triplicate

Table A-10 Langmuir isotherm of GKS 2 adsorption process at 75°C

Mass (g)	V (g)	Ce (mg/kg)	X (mg/g)	$\frac{Ce}{X}$
0.1	9.90	3.802	0.6682	5.6869
0.15	9.85	2.550	0.5253	4.8544
0.20	9.80	2.012	0.4185	4.8028
0.25	9.75	2.012	0.3467	4.7800
0.30	9.70	1.281	0.2997	4.2709

Note: all data are mean of triplicate

Table A-11 Langmuir isotherm of GKS 2 adsorption process at 90°C

Mass (g)	V (g)	Ce (mg/kg)	X (mg/g)	$\frac{Ce}{X}$
0.1	9.90	3.352	0.7128	4.6990
0.15	9.85	2.401	0.5352	4.4843
0.20	9.80	1.803	0.4307	4.0864
0.25	9.75	1.420	0.3560	3.9888
0.30	9.70	1.080	0.3062	0.3062

Note: all data are mean of triplicate

Table A-12 Bulk density determination

Sample	dried weight (g)	volume (cm^3)	bulk density (g/ cm^3)
Natural kaolin			
1	5.6501	50.00	0.1130
2	5.6153	50.00	0.1123
3	5.6003	50.00	0.1120
4	5.6255	50.00	0.1125
5	5.6050	50.00	0.1121
		Average bulk density ± SD	
		0.1124 ± 0.004	
Modified kaolin (GKS 2)			
1	17.6481	50.00	0.3529
2	17.1403	50.00	0.3428
3	17.1251	50.00	0.3425
4	16.4892	50.00	0.3298
5	16.8324	50.00	0.3366
		Average bulk density ± SD	
		0.3428 ± 0.008	

Table A-13 Free moisture determination

	weight (g)	dried weight (g)	% moisture
natural kaolin	10.0302	8.5044	15.2118
GKS 2	10.0156	9.5411	5.0047

Note: all data are mean of triplicate

Table A-14 Lost on ignition (LOI) determination

	dried weight (g)	fried weight (g)	% LOI
natural kaolin	10.0216	8.2825	17.3535
GKS 2	10.0156	8.7251	21.8848

Note: all data are mean of triplicate

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