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AGRICOLA (NAL) Database Search

Lamb, J.F.S., Jung, H.J.G., Sheaffer, C.C., Samac, D.A. Alfalfa Leaf Protein and Stem Cell Wall Polysaccharide Yields under Hay and Biomass Management Systems. Crop science. 2007 July-Aug, v. 47, no. 4; p. 1407-1415.
http://dx.doi.org/10.2135/cropsci2006.10.0665
ABSTRACT: Alfalfa (Medicago sativa L.) has been proposed as a biofuel feedstock in which the stems would be processed to produce ethanol and the leaves sold separately as a livestock feed. Our objectives were to evaluate the effects of management strategy on leaf crude protein (CP), and stem carbohydrate concentrations and yields of alfalfa germplasms differing in genetic background. Two hay-type and two biomass-type alfalfas were established at 450 plants m-2 and harvested at early bud (hay management system) and at 180 plants m-2 and harvested at green pod (biomass management system) in three environments. The biomass-type alfalfas under the biomass management had lower leaf CP, higher stem cell wall polysaccharide, and higher stem lignin concentrations, comparable leaf CP yield, and 37% greater stem cell wall polysaccharide yields compared to the hay-type alfalfas under the hay management treatment. The impact of altered stem cell wall composition and increased stem dry matter yield of a biomass-type alfalfa under the biomass system compared to a hay-type alfalfa under the hay system increased the theoretical potential ethanol yield by 99%.
CALL NUMBER: DNAL 64.8 C883
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ARS national research programs for bioenergy and biobased products. Agricultural research.
http://www.ars.usda.gov/is/AR/archive/apr07/research0407.htm
CALL NUMBER: DNAL 1.98 Ag84
DESCRIPTORS: Agricultural Research Service ; research programs ; biobased products ; bioenergy ; renewable energy sources ; United States
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Sanderson, M.A., Martin, N.P., Adler, P. Biomass, energy, and industrial uses of forages. Forages: the science of grassland agriculture / under the editorial authorship of Robert F. Barnes ... [et al.] ; with 94 contributing authors. Ames, Iowa: Blackwell, c2007.
CALL NUMBER: DNAL SB193 .F65 2007
DESCRIPTORS: forage crops ; forage production ; crop yield ; cultivars ; genetic variation ; energy resources ; biofuels ; energy conversion ; nonfood products ; industrial applications ; literature reviews ; United States ; Europe
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Peabody, E. Breaking down walls. Agricultural research. 2007 Apr., v. 55, no. 4: p. 4-7.
http://www.ars.usda.gov/is/AR/archive/apr07/walls0407.htm
CALL NUMBER: DNAL 1.98 Ag84
DESCRIPTORS: cell wall components ; cell walls ; biofuels ; lignin ; cellulose ; hemicellulose ; lignification ; low input agriculture ; grasses ; alfalfa ; Medicago sativa ; biomass ; Panicum virgatum ; Cynodon dactylon ; Paspalum notatum ; Pennisetum purpureum ; Pennisetum glaucum
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Dailey, Oliver D. Jr., Prevost, Nicolette Conversion of Methyl Oleate to Branched-Chain Derivatives. Journal of the American Oil Chemists' Society. Berlin/Heidelberg: Springer-Verlag, 2007 June, v. 84, no. 6: p. 565-571.
http://hdl.handle.net/10113/2927
http://dx.doi.org/10.1007/s11746-007-1077-x
ABSTRACT: Studies were conducted in the synthetic conversion of oleic acid to mid-chain branched fatty acids. Methyl oleate was brominated in the allylic positions. Reaction of the allylic bromides with lithium dimethylcuprate gave primarily the desired branched-chain derivatives (93% of product mixture). The product had a significantly lower crystallization temperature in comparison with methyl oleate. Reaction of the allylic bromides with lithium di-n-butylcuprate or lithium di-sec-butylcuprate also gave branched-chain derivatives, but in this instance there was the

complication of attack on the ester functionality in the fashion of a Grignard reagent. Details of the syntheses and the properties of the products (with emphasis on low-temperature properties) are discussed.
CALL NUMBER: DNAL 307.8 J82
DESCRIPTORS: vegetable oil ; oleic acid ; methylation ; branched chain fatty acids ; bromination ; chemical analysis ; chemical structure ; spectral analysis ; biodiesel

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Moser, Bryan R., Sharma, Brajendra K., Doll, Kenneth M., Erhan, Sevim Z. Diesters from Oleic Acid: Synthesis, Low Temperature Properties, and Oxidation Stability. Journal of the American Oil Chemists' Society. Berlin/Heidelberg: Springer-Verlag, 2007 July, v. 84, no. 7: p. 675-680.
http://hdl.handle.net/10113/2800
http://dx.doi.org/10.1007/s11746-007-1083-z
ABSTRACT: Several diesters were prepared from commercially available oleic acid and common organic acids. The key step in the three step synthesis of oleo chemical diesters entails a ring opening esterification of alkyl 9,10-epoxyoctadecanoates (alkyl: propyl, isopropyl, octyl, 2-ethylhexyl) using propionic and octanoic acids without the need for either solvent or catalyst. Each synthetic diester was evaluated for both low temperature operability and oxidation stability through measurement of cloud point, pour point, oxidation onset temperature, and signal maximum temperature. It was discovered that increasing chain length of the mid-chain ester and branching in the end-chain ester had a positive influence on the low temperature properties of diesters. Improved oxidation stability is achieved when the chain length of the mid-chain ester is decreased. Additionally, the mid-chain ester plays a larger role in oxidation stability than the end-chain ester. These products may prove useful in the search for bio-based industrial materials, such as lubricants, surfactants, and fuel additives.
CALL NUMBER: DNAL 307.8 J82
DESCRIPTORS: vegetable oil ; soybean oil ; esters ; oleic acid ; oxidation ; structure-activity relationships ; biodiesel

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Follett, R.F. Economic and societal benefits of soil carbon management: cropland and grazing land systems
Soil carbon management: economic, environmental and societal benefits / edited by J.M. Kimble ... [et al.]. Boca Raton, FL: CRC Press, c2007. p. 99-128.,
http://hdl.handle.net/10113/3655
CALL NUMBER: DNAL S592.6.C35 S64 2007
DESCRIPTORS: oil organic carbon ; pastures ; rangelands ; agricultural land ; carbon sequestration ; grazing ; land use ; history ; economic impact ; social benefit ; crop yield ; crop production ; crop residues ; biofuels ; cover crops ; cattle manure ; literature reviews ; United States

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Baker, A., Zahniser, S. Ethanol Reshapes the Corn Market. Amber waves: the economics of food, farming, natural resources, and rural America. 2007 May
http://www.ers.usda.gov/AmberWaves/May07SpecialIssue/Features/Ethanol.htm
CALL NUMBER: DNAL aHD1751 .A52
DESCRIPTORS: agricultural policy ; Zea mays ; corn ; crop production ; ethanol ; biofuels ; commodity prices ; commodity exchange ; cellulose ; energy costs ; renewable energy sources ; distillers grains ; new technology ; research and development ; United States

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Moser, B.R., Haas, M.J., Winkler, J.K., Jackson, M.A., Erhan, S.Z., List, G.R. Evaluation of partially hydrogenated methyl esters of soybean oil as biodiesel. European journal of lipid science and technology. 2007 Jan., v. 109, issue 1: p. 17-24.
http://hdl.handle.net/10113/3240 ; http://dx.doi.org/10.1002/ejlt.200600215
ABSTRACT: Biodiesel, an alternative fuel derived from vegetable oils or animal fats, continues to undergo rapid worldwide growth. Specifications mandating biodiesel quality, most notably in Europe (EN 14214) and the USA (ASTM D6751), have emerged that limit feedstock choice in the production of biodiesel fuel. For instance, EN 14214 contains a specification for iodine value (IV; 120 g I?/100 g maximum) that eliminates soybean oil as a potential feedstock, as it generally has an IV >120. Therefore, partially hydrogenated soybean oil methyl esters (PHSME; IV = 116) were evaluated as biodiesel by measuring a number of fuel properties, such as oxidative stability, low-temperature performance, lubricity, kinematic viscosity, and specific gravity. Compared to soybean oil methyl esters (SME), PHSME were found to have superior oxidative stability, similar specific gravity, but inferior low-temperature performance, kinematic viscosity, and lubricity. The kinematic viscosity and lubricity of PHSME, however, were within the prescribed US and European limits. There is no universal value for low-temperature performance in biodiesel specifications, but PHSME have superior cold flow behavior when compared to other alternative feedstock fuels, such as palm oil, tallow and grease methyl esters. The production of PHSME from refined soybean oil would increase biodiesel production costs by US$ 0.04/L (US$ 0.15/gal) in comparison to SME. In summary, PHSME are

within both the European and American standards for all properties measured in this study and deserve consideration as a potential biodiesel fuel.
CALL NUMBER: DNAL TP670 .F472
DESCRIPTORS: vegetable oil ; soybean oil ; esters ; hydrogenation ; biodiesel ; physicochemical properties ; oxidative stability ; chemical composition ; fatty acid composition ; gas chromatography ; spectral analysis ; viscosity ; differential scanning calorimetry
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Crooks, A. Evolving technology may generate profit from biodiesel glycerin glut. Rural cooperatives. 2007 July-Aug, v. 74, no. 4: p. 30-32, 37.
http://www.rurdev.usda.gov/rbs/pub/jul07/jul07.pdf
CALL NUMBER: DNAL aHD1491.U6R87
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McGinnis, L. Fueling America--without petroleum. Agricultural Research. 2007 Apr., v. 55, no. 4: p. 10-13.
http://www.ars.usda.gov/is/AR/archive/apr07/petro0407.htm
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Suszkiw, J., Wood, M. Genetic snapshots help brighten switchgrass's future. Agricultural research. 2007 Apr., v. 55, no. 4: p. 14-15.
http://www.ars.usda.gov/is/AR/archive/apr07/grass0407.htm
CALL NUMBER: DNAL 1.98 Ag84
DESCRIPTORS: Panicum virgatum ; bioenergy ; plant genetics ; messenger RNA ; complementary DNA ; nucleotide sequences ; sequence analysis
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Johnson, J.M.F., Sharratt, B.S., Reicosky, D.C., Lindstrom, M. Impact of High-Lignin Fermentation Byproduct on Soils with Contrasting Organic Carbon Content. Soil Science Society of America journal. 2007 July-Aug, v. 71, no. 4: p. 1151-1159.
http://hdl.handle.net/10113/1928 ; http://dx.doi.org/10.2136/sssaj2006.0172
ABSTRACT: Agricultural biomass is a potential renewable biofuel that may partially replace nonrenewable fossil fuels. Corn Stover is rich in cellulose and hemicellulose, both of which can be converted to sugars and fermented to ethanol. This fermentation process results in a high-lignin fermentation byproduct (HLFB) that could be converted to energy products or used as a soil amendment. We had two objectives: (i) to determine whether HLFB (0.1, 1.0, or 10 kg m-2) could improve soil properties in two soils with contrasting levels of soil organic carbon (SOC); and (ii) to assess the impact of HLFB on crop growth. These goals were addressed with separate experiments. In the soil experiment, two soils were amended with HLFB or ground corn (Zea mays L.) stover and then incubated in pots for 118 d. Flux of CO2 was monitored and soil properties were measured after incubation. In the plant experiment, corn and soybean [Glycine max (L.) Merr.] were grown in pots, without amendment or amended with 1.0 kg m-2 corn stover or 1.0 kg m-2 HLFB. The soil experiment indicated that the addition of 10 kg m-2 HLFB increased CO2 emission, humic acid concentration, and water-stable aggregates, and decreased bulk density (Db). No adverse impacts on crop growth were measured when HLFB was applied at a rate of 1.0 kg m-2. Much of the HLFB may be used by the energy industry, but perhaps a percentage could be returned to the field to reduce the impact of corn stover removal on soil C.
CALL NUMBER: DNAL 56.9 So3
DESCRIPTORS: lignin ; fermentation ; corn ; Zea mays ; soybeans ; Glycine max ; carbon dioxide ; gas emissions ; humic acids ; soil aggregates ; bulk density ; plant growth ; crop production ; biofuels ; soil organic carbon ; corn stover ; crop residues ; soil properties
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Jordan, D.B., Braker, J.D. Inhibition of the two-subsite ?-D-xylosidase from Selenomonas ruminantium by sugars: Competitive, noncompetitive, double binding, and slow binding modes. Archives of biochemistry and biophysics ABB. 2007 Sept., v. 465, issue 1: p. 231-246.
http://hdl.handle.net/10113/3178 ; http://dx.doi.org/10.1016/j.abb.2007.05.016
ABSTRACT: The active site of the GH43?-xylosidase from Selenomonas ruminantium comprises two subsites and a single access route for ligands. Steady-state kinetic experiments that included enzyme (E), inhibitory sugars (I and X) and substrate (S) establish examples of EI, EII, EIX, and EIS complexes. Protonation states of catalytic base (D14, pKa 5) and catalytic acid (E186, pKa 7) govern formation of inhibitor complexes and strength of binding constants: e.g., EII, EIX, and EIS occur only with the D14-E186H enzyme and d-xylose binds to D14-E186- better than to D14-E186H. Binding of two equivalents of l-arabinose to the D14-E186H enzyme is differentiated by the magnitude of equilibrium Ki values (first binds tighter) and kinetically (first binds rapidly; second binds slowly). In applications, such as saccharification of herbaceous biomass for subsequent fermentation to biofuels, the highly efficient hydrolase

can confront molar concentrations of sugars that diminish catalytic effectiveness by forming certain enzyme-inhibitor complexes.
CALL NUMBER: DNAL 381 Ar2
DESCRIPTORS: Selenomonas ruminantium ; xylan 1,4-beta-xylosidase ; alpha-N-arabinofuranosidase ; active sites ; enzyme kinetics ; enzyme activity ; sugars ; glycosides ; arabinose ; enzyme inhibitors
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Ash, M., Dohlman, E. International Trade, Biofuel Initiatives Reshaping the Soybean Sector. Amber waves: the economics of food, farming, natural resources, and rural America. 2007 May.
http://www.ers.usda.gov/AmberWaves/May07SpecialIssue/Findings/International.htm
CALL NUMBER: DNAL aHD1751 .A52
DESCRIPTORS: agricultural policy ; soybeans ; international trade ; trade policy ; market prices ; biofuels ; United States
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Adler, P.R., Del Grosso, S.J., Parton, W.J. Life-cycle assessment of net greenhouse-gas flux for bioenergy cropping systems. Ecological applications: a publication of the Ecological Society of America. 2007 Apr., v. 17, no. 3: p. 675-691.
http://hdl.handle.net/10113/7752
ABSTRACT: Bioenergy cropping systems could help offset greenhouse gas emissions, but quantifying that offset is complex. Bioenergy crops offset carbon dioxide emissions by converting atmospheric CO2 to organic C in crop biomass and soil, but they also emit nitrous oxide and vary in their effects on soil oxidation of methane. Growing the crops requires energy (e.g., to operate farm machinery, produce inputs such as fertilizer) and so does converting the harvested product to usable fuels (feedstock conversion efficiency). The objective of this study was to quantify all these factors to determine the net effect of several bioenergy cropping systems on greenhouse-gas (GHG) emissions. We used the DAYCENT biogeochemistry model to assess soil GHG fluxes and biomass yields for corn, soybean, alfalfa, hybrid poplar, reed canarygrass, and switchgrass as bioenergy crops in Pennsylvania, USA. DAYCENT results were combined with estimates of fossil fuels used to provide farm inputs and operate agricultural machinery and fossil-fuel offsets from biomass yields to calculate net GHG fluxes for each cropping system considered. Displaced fossil fuel was the largest GHG sink, followed by soil carbon sequestration. N2O emissions were the largest GHG source. All cropping systems considered provided net GHG sinks, even when soil C was assumed to reach a new steady state and C sequestration in soil was not counted. Hybrid poplar and switchgrass provided the largest net GHG sinks, >200 g CO2e-C·m-2·yr-1 for biomass conversion to ethanol, and >400 g CO2e-C·m-2·yr-1 for biomass gasification for electricity generation. Compared with the life cycle of gasoline and diesel, ethanol and biodiesel from corn rotations reduced GHG emissions by 40%, reed canarygrass by 85%, and switchgrass and hybrid poplar by 115%.
CALL NUMBER: DNAL QH540.E23
DESCRIPTORS: biogeochemical cycles ; biofuels ; crop production ; crop yield ; biomass ; Zea mays ; Glycine max ; Medicago sativa ; Populus ; Panicum virgatum ; Phalaris arundinacea ; crop rotation ; greenhouse gases ; gas emissions ; simulation models ; mathematical models ; gas exchange ; nitrous oxide ; cropping systems ; soil organic matter ; carbon sequestration ; Pennsylvania
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Pitman, L. Renewable fuels industry rife with opportunity for co-ops. Rural cooperatives. 2007 Jan-Feb, v. 74, no. 1: p. 18-21, 41.
http://purl.access.gpo.gov/GPO/LPS5331
CALL NUMBER: DNAL aHD1491.U6R87
DESCRIPTORS: cooperatives ; renewable energy sources ; biofuels ; United States
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Crooks, A. Shouldering the risk. Rural cooperatives. 2007 May-June, v. 74, no. 3: p. 14-18, 40.
http://www.rurdev.usda.gov/rbs/pub/may07/may07.pdf
CALL NUMBER: DNAL aHD1491.U6R87
DESCRIPTORS: cellulose ; cooperatives ; ethanol ; biofuels ; risk assessment ; risk management ; United States
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Doll, K.M., Moser, B.R., Erhan, S.Z. Surface Tension Studies of Alkyl Esters and Epoxidized Alkyl Esters Relevant to Oleochemically Based Fuel Additives. Energy & fuels. 2007 Sept., v. 21, no. 5: p. 3044-3048.
http://hdl.handle.net/10113/6165 ; http://dx.doi.org/10.1021/ef700213z
ABSTRACT: There are several reports on the synthesis of fuel additives based on oleochemical esters, and physical data on some of these compounds is lacking. Herein, we report the surface tension of several epoxidized oleochemicals and their comparable fatty esters, at temperatures between 25 and 60 °C. Surface tensions of the olefins measured at 40 °C range from 25.9 mN m-1, for isobutyl oleate, to 28.4 mN m-1 for methyl linoleate. The epoxy versions of the same compounds displayed higher surface tensions of 28.1 and 32.1 mN m-1, respectively. Branched ester compounds also

had surface tensions between 27.4 and 30.2 mN m-1. Several trends and observations were elucidated. More epoxidation or unsaturation leads to higher surface tension. Epoxidation has a larger effect on surface tension than unsaturation. Linear alkyl head groups on fatty esters have similar surface tensions, but branched head groups gave slightly lower surface tensions. Soy methyl esters, or epoxy soy methyl esters, give surface tensions which are between that of their two main components. Overall, the results show that all of these compounds have surface tensions which make them suitable for use as biofuel additives.
CALL NUMBER: DNAL TP315
DESCRIPTORS: Glycine max ; soybeans ; biofuels ; renewable resources ; esters ; epoxides ; oleic acid ; surface tension ; physical properties
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Suszkiw, J. We Reap What We Sow. Agricultural research. 2007 July, v. 55, no. 6: p. 12-13.
http://hdl.handle.net/10113/2424 ; http://www.ars.usda.gov/is/AR/archive/jul07/sow0707.pdf
CALL NUMBER: DNAL 1.98 Ag84
DESCRIPTORS: agricultural research ; Agricultural Research Service ; cost benefit analysis ; corn stover ; bioenergy ; ethanol production ; renewable energy sources ; soil conservation ; agricultural management ; radiation use efficiency ; United States
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Stanturf, J. Worldwide Benefits of Short-Rotation Woody Crops. Compass: recent publications of the Southern Research Station. 2007 Mar., issue 8: p. 8-11.
http://www.srs.fs.usda.gov/compass/issue8/issue8.pdf
CALL NUMBER: DNAL aSD11 .U55
DESCRIPTORS: agroforestry ; Populus ; woody plants ; trees ; phytoremediation ; bioenergy ; biofuels ; land restoration ; soil stabilization
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Knothe, Gerhard. Analyzing biodiesel: standards and other methods. Journal of the American Oil Chemists' Society. Berlin/Heidelberg: Springer-Verlag. 2006 Oct., v. 83, no. 10: p. 823-833.
http://dx.doi.org/10.1007/s11746-006-5033-y
ABSTRACT: Biodiesel occupies a prominent position among the alternatives to conventional petrodiesel fuel owing to various technical and economic factors. It is obtained by reacting the parent vegetable oil or fat with an alcohol) transesterification) in the presence of a catalyst to give the corresponding monoalkyl esters, which are defined as biodiesel. Because of the nature of the starting material, the production process, and subsequent handling, various factors can influence biodiesel fuel quality. Fuel quality issues are commonly reflected in the contaminants or other minor components of biodiesel. This work categorizes both the restricted species in biodiesel and the physical properties prescribed by the standards, and details the standard reference methods to determine them as well as other procedures. Other aspects of biodiesel analysis, including production monitoring and assessing biodiesel/petrodiesel blends, are also addressed. The types of analyses include chromatographic, spectroscopic, physical properties-based, and wet chemical methods. The justifications for specifications in standards are also addressed.
CALL NUMBER: DNAL 307.8 J82
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Adler, P.R., Sanderson, M.A., Boateng, A.A., Weimer, P.J., Jung, H.J.G. Biomass Yield and Biofuel Quality of Switchgrass Harvested in Fall or Spring. Agronomy journal. 2006 Nov-Dec, v. 98, no. 6: p. 1518-1525.
http://hdl.handle.net/10113/3966 ; http://dx.doi.org/10.2134/agronj2005.0351
ABSTRACT: Seasonal time of switchgrass (Panicum virgatum L.) harvest affects yield and biofuel quality and balancing these two components may vary depending on conversion system. A field study compared fall and spring harvest measuring biomass yield, element concentration, carbohydrate characterization, and total synthetic gas production as indicators of biofuel quality for direct combustion, ethanol production, and gasification systems for generation of energy. Switchgrass yields decreased almost 40% (from about 7-4.4 Mg ha-1) in winters with above average snowfall when harvest was delayed over winter until spring. The moisture concentration also decreased (from about 350-70 g kg-1) only reaching low enough levels for safe storage by spring. About 10% of the yield reduction during winter resulted from decreases in tiller mass; however, almost 90% of the yield reduction was due to an increase in biomass left behind by the baler. Mineral element concentrations generally decreased with the delay in harvest until spring. Energy yield from gasification did not decrease on a unit biomass basis, whereas ethanol production was variable depending on the assessment method. When expressed on a unit area basis, energy yield decreased. Biofuel conversion systems may determine harvest timing. For direct combustion, the reduced mineral concentrations in spring-harvested biomass are desirable. For ethanol fermentation and gasification systems, however, lignocellulose yield may be more important. On conservations lands, the wildlife cover provided by switchgrass over the winter may increase the desirability of spring harvest along with the higher biofuel quality.
CALL NUMBER: DNAL 4 AM34P

DESCRIPTORS: Panicum virgatum ; crop production ; crop yield ; harvest date ; spring ; autumn ; crop quality ; overwintering ; biofuels ; ethanol production ; energy content ; energy conversion ; gasification ; Pennsylvania

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Blanco-Canqui, H., Lal, R., Post, W.M., Owens, L.B. Changes in Long-Term No-Till Corn Growth and Yield under Different Rates of Stover Mulch. Agronomy journal. 2006 July-Aug, v. 98, no. 4: p. 1128-1136.
http://hdl.handle.net/10113/3615 ; http://dx.doi.org/10.2134/agronj2006.0005

ABSTRACT: Removal of corn (Zea mays L.) stover for biofuel production may affect crop yields by altering soil properties. A partial stover removal may be feasible, but information on appropriate rates of removal is unavailable. We assessed the short-term impacts of stover management on long-term no-till (NT) continuous corn grown on a Rayne silt loam (fine loamy, mixed, active, mesic Typic Hapludults) at Coshocton, Hoytville clay loam (fine, illitic, mesic Mollic Epiaqualfs) at Hoytville, and Celina silt loam (fine, mixed, active, mesic Aquic Hapludalfs) at South Charleston in Ohio, and predicted corn yield from soil properties using principal component analysis (PCA). The study was conducted in 2005 on the ongoing experiments started in May 2004 under 0 (T0), 25 (T25), 50 (T50), 75 (T75), 100 (T100), and 200 (T200)% of stover corresponding to 0, 1.25, 2.50, 3.75, 5.00, and 10.00 Mg ha-1 of stover, respectively. Stover removal promoted early emergence and rapid seedling growth ($P < 0.01$). Early- emerging plants grew taller than late-emerging plants up to about 50 d, and then the heights reversed at Coshocton and were comparable at other two sites. Stover management affected corn yield only at the Coshocton site where average grain and stover yields in the T200, T100, T75, and T50 (10.8 and 10.3 Mg ha-1) were higher than those in the T0 and T25 treatments (8.5 and 6.5 Mg ha-1) ($P < 0.01$), showing that stover removal at rates as low as 50% (2.5 Mg ha-1) decreased crop yields. Soil properties explained 71% of the variability in grain yield and 33% of the variability in stover yield for the Coshocton site. Seventeen months after the start of the experiment, effects of stover management on corn yield and soil properties were site-specific.

CALL NUMBER: DNAL 4 AM34P

DESCRIPTORS: Zea mays ; corn ; no-tillage ; plant growth ; grain yield ; corn stover ; crop residue management ; long term experiments ; biofuels ; soil fertility ; principal component analysis ; seedling emergence ; seedling growth ; height ; geographical variation ; application rate ; Ohio

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Dien, B.S.,Jung, H.J.G.,Vogel, K.P., Casler, M.D., Lamb, J.F.S., Iten, L., Mitchell, R.B., Sarath, G. Chemical composition and response to dilute-acid pretreatment and enzymatic saccharification of alfalfa, reed canarygrass, and switchgrass. Biomass and bioenergy. 2006 Oct., v. 30, issue 10: p. 880-891.
http://hdl.handle.net/10113/982 ; http://dx.doi.org/10.1016/j.biombioe.2006.02.004

ABSTRACT: Alfalfa stems, reed canarygrass, and switchgrass; perennial herbaceous species that have potential as biomass energy crops in temperate regions; were evaluated for their bioconversion potential as energy crops. Each forage species was harvested at two or three maturity stages and analyzed for carbohydrates, lignin, protein, lipid, organic acids, and mineral composition. The biomass samples were also evaluated for sugar yields following pretreatment with dilute sulfuric followed by enzymatic saccharification using a commercial cellulose preparation. Total carbohydrate content of the plants varied from 518 to 655 g kg-1 dry matter (DM) and cellulose concentration from 209 to 322 g kg-1 DM. Carbohydrate and lignin contents were lower for samples from early maturity samples compared to samples from late maturity harvests. Several important trends were observed in regards to the efficiency of sugar re-covery following treatments with dilute acid and cellulase. First, a significant amount of the available carbohydrates were in the form of soluble sugars and storage carbohydrates (4.3-16.3% wt/wt). Recovery of soluble sugars following dilute acid pretreatment was problematic, especially that of fructose. Fructose was found to be extremely labile to the dilute acid pretreatments. Second, the efficiency at which available glucose was recovered was inversely correlated to maturity and lignin content. However, total glucose yields were higher for the later maturities because of higher cellulose contents compared to the earlier maturity samples. Finally, cell wall polysaccharides, as determined by the widely applied detergent fiber system were found to be inaccurate. The detergent fiber method consistently over-estimated cellulose and hemicellulose and underestimated lignin by substantial amounts.

CALL NUMBER: DNAL TP360

DESCRIPTORS: crop residues ; stems ; Medicago sativa ; Phalaris arundinacea ; Panicum virgatum ; biomass ; cell wall components ; cellulose ; polysaccharides ; acid treatment ; sulfuric acid ; enzymatic treatment ; cellulases ; saccharification ; sugars ; glucose ; monosaccharides ; yields

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Thompson, S.A. Co-op rendering operation yields biodiesel & more. Rural cooperatives. 2006 Mar-Apr, v. 73, no. 2: p. 21-22.
http://purl.access.gpo.gov/GPO/LPS5331

CALL NUMBER: DNAL aHD1491.U6R87

DESCRIPTORS: cooperatives ; rendering ; biofuels ; business management ; Minnesota

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Blanco-Canqui, H., Lal, R., Post, W.M., Izaurralde, R.C., Owens, L.B. Corn stover impacts on near-surface soil properties of no-till corn in Ohio. Soil Science Society of America journal. 2006 Jan-Feb, v. 70, no.: p. 266-278.
http://hdl.handle.net/10113/4136
ABSTRACT: Corn (Zea mays L.) stover is a primary biofuel feedstock and its expanded use could help reduce reliance on fossil fuels and net CO2 emissions. Excessive stover removal may, however, negatively impact near-surfacesoil properties within a short period after removal. We assessed changes in soil crust strength, bulk density(rho(b)), and water content over a 1-yr period followinga systematic removal or addition of stover from three no-till soils under corn in Ohio. Soils from ongoing experiments at the North Appalachian Experimental Watershed (NAEW), Western Agricultural Experiment Station (WAES), and Northwestern Agricultural Experiment Station (NWAES) of Ohio Agricultural Research and Development Center (OARDC) were studied. Six stover treatments of 0 (T0), 25 (T25), 50 (T50), 75 (T75), 100(T100), and 200 (T200)% were imposed on 3 by 3 m plots corresponding to 0, 1.25, 2.50, 3.75, 5.00, and 10.00 Mgha(-1) of stover, respectively. Cone index (CI), shear strength (SHEAR), rho(b), and volumetric water content(theta(v)) were measured monthly from June throughDecember 2004 and in May 2005. Effects of stover removal on increasing CI and SHEAR were soil-specific. Stover removal consistently increased rho(b) and decreased theta(v) across soils ($P < 0.01$). Compared with the normal stover treatment (T100), doubling the amount ofstover (T200) did not significantly affect soilproperties except theta(v) where, after 1 yr, T200increased theta(v) by 1.3 to 1.6 times compared withT100 across all sites ($P < 0.05$). After 1 yr, complete stover removal (T0) increased CI by 1.4 times and SHEAR by 1.3 times at NAEW compared with T100 and T75, but CIincreases at other sites were nonsignificant. At NWAES,T0 increased SHEAR by 26% compared with T100 ($P < 0.05$).The T0 decreased theta(v) by two to four times except in winter months and increased rho(b) by about 10% compared with T100 ($P < 0.05$). In a short-term test, stover removal resulted in increased soil crust strength and reduced soil water content.
CALL NUMBER: DNAL 56.9 So3
DESCRIPTORS: Zea mays ; corn stover ; silt loam soils ; clay loam soils ; soil crusts ; bulk density ; soil water content ; no-tillage ; Ohio
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Nichols, N.N. ; Lopez, M.J. ; Dien, B.S. ; Bothast, R.J. Culture containing biomass acid hydrolysate and Coniochaeta ligniaria fungus. United States Department of Agriculture patents. 2006 June 27, no. US 7,067,303 B1; 11 p.
http://hdl.handle.net/10113/6942
ABSTRACT: Agricultural biomass hydrolysate is detoxified by culturingin the presence of the fungus Coniochaeta ligniaria (teleomorph) or its Lecythophora (anamorph) state. This organism is capable of significantly depleting the toxicant levels of furans, particularly furfural and5-hydroxymethylfurfural. A new strain of the fungus hasbeen isolated and deposited in the Agricultural Research Culture Collection (NRRL) in Peoria, Ill., as Accession No. NRRL 30616. The detoxified agricultural biomass hydrolysate is useful as a substrate for industrial fermentation processes, especially in saccharification treatments for bioethanol production.
CALL NUMBER: DNAL aT223.V4A4
DESCRIPTORS: waste utilization ; plant residues ; hydrolysis ; hydrolysates ; decontamination ; furans ; biodegradation ; fungi ; ethanol production ; cellulolytic microorganisms ; biomass ; biofuels ; patents ; USDA ; United States
SUBJECT: Coniochaeta ligniaria ; Lecythophora ; AgSpace
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Schmer, M.R. ; Vogel, K.P. ; Mitchell, R.B. ; Moser, L.E. ; Eskridge, K.M. ; Perrin, R.K. Establishment stand thresholds for switchgrass grown as a bioenergy crop. Crop science. 2006 Jan-Feb, v. 46, no. 1; p. 157-161.
http://hdl.handle.net/10113/3534
ABSTRACT: Switchgrass (Panicum virgatum L.) is a warm-season (C4)perennial grass and a potential bioenergy crop. On-farm switchgrass field scale trials, which were initiated to obtain economic production information for switchgrass grown as a bioenergy crop in the northern Plains, provided information on establishment year stands and post-establishment year yields and stands both within and across fields and were used to determine if a stand threshold exists for switchgrass grown as a biomass energy crop. Switchgrass was seeded in 10 cropland fields, ranging in size from 3 to 9.5 ha, in Nebraska,South Dakota, and North Dakota in 2000 and 2001. The fields were selected to be representative of their region and eligible for the Conservation Reserve Program (CRP). Twelve sites within each field were geo-referenced, and switchgrass stand frequency was measured at each sample site. Biomass yields were estimated in late summer at the same within-field sites using a clipped quadrat. Fields with low initial switchgrass stand frequencies showed a linear relationship between initial switchgrass stands and second year stands and biomass yields. Results from the10 field, three-state study indicated that establishment year stand frequency level of 40% or greater, determined by a frequency grid, can be considered an establishment year stand threshold for establishment success and subsequent post-planting year biomass yields for switchgrass. An establishment year stand frequency of25% would be adequate for a switchgrass conservation planting in which no harvests would be planned for several years.
1022647867

CALL NUMBER: DNAL 64.8 C883
DESCRIPTORS: Panicum virgatum ; biofuels ; grasses ; plant establishment ; plant density ; crop yield ; biomass ; plant adaptation ; Nebraska ; South Dakota ; North Dakota
SUBJECT: establishment year ; stand frequency ; establishment stand threshold ; AgSpace

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Zhan, X. ; Wang, D. ; Bean, S.R. ; Mo, X. ; Sun, X.S. ; Boyle, D. Ethanol production from supercritical-fluid-extrusion cooked sorghum. Industrial crops and products. 2006 May, v. 23, issue 3; p. 304-310.
http://hdl.handle.net/10113/4339 ; http://dx.doi.org/10.1016/j.indcrop.2005.09.001
ABSTRACT: Sorghum (Sorghum bicolor (L.) Moench) is a starch-rich grain similar to maize (Zea mays L.), but sorghum has been underutilized for biobased products and bioenergy. This study was designed to investigate the effects of supercritical-fluid-extrusion (SCFX) of sorghum onethanol production. Morphology, chemical composition,and thermal properties of extruded sorghum were characterized. Analysis of extruded sorghum showed increased measurable starch content, free sugar content, and high levels of gelatinized starch. SCFX cooked and non-extruded sorghum were further liquefied, saccharified, and fermented to ethanol by using Saccharomyces cervisiae. The ethanol yield increased as sorghum concentration increased from 20 to 40% for both extruded and non-extruded sorghum. Ethanol yields
CALL NUMBER: DNAL SB13.I52
DESCRIPTORS: grain sorghum ; ethanol production ; fuel production ; ethanol ; supercritical fluid extraction ; cooking ; biofuels ; extrusion ; chemical composition ; thermal properties ; starch ; sugar content ; starch gels ; alcoholic fermentation ; Saccharomyces cerevisiae ; processing technology
SUBJECT: supercritical fluid extrusion ; AgSpace

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Baker, A. ; Zahniser, S. Ethanol reshapes the corn market. Amber waves: the economics of food, farming, natural resources, and rural America. 2006 Apr., v. 4, no. 2; p. 30-35.
http://purl.access.gpo.gov/GPO/LPS27344
CALL NUMBER: DNAL aHD1751 .A52
DESCRIPTORS: Zea mays ; corn ; crop production ; ethanol ; biofuels ; commodity prices ; commodity exchange ; cellulose ; energy costs ; renewable energy sources ; distillers grains ; new technology ; research and development

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Campbell, D. A farm-supply co-op view of ethanol. Rural cooperatives. 2006 Sept-Oct, v. 73, no. 5; p. 8-9.
http://purl.access.gpo.gov/GPO/LPS5331
CALL NUMBER: DNAL aHD1491.U6R87
DESCRIPTORS: ethanol ; cooperatives ; corn ; biofuels ; Missouri

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Campbell, D. Fuel farming. Rural cooperatives. 2006 Sept-Oct, v. 73, no. 5; p. 4-7, 39.
http://purl.access.gpo.gov/GPO/LPS5331
CALL NUMBER: DNAL aHD1491.U6R87
DESCRIPTORS: ethanol ; corn ; ethanol production ; Missouri
SUBJECT: energy crops ; Internet resource

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Ash, M. ; Dohlman, E. International trade, biofuel initiatives reshaping the soybean sector.
Amber waves: the economics of food, farming, natural resources, and rural America. 2006 Sept., v. 4, no. 4; p. 8.
http://purl.access.gpo.gov/GPO/LPS27344
CALL NUMBER: DNAL aHD1751 .A52
DESCRIPTORS: soybeans ; international trade ; trade policy ; market prices ; biofuels ; United States

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Ganesan, V. ; Rosentrater, K.A. ; Muthukumarappan, K. Methodology to Determine Soluble Content in Dry Grind Ethanol Coproduct Streams. Applied engineering in agriculture. 2006 Nov., v. 22, no. 6; p. 899-903.
http://hdl.handle.net/10113/1925
ABSTRACT: Distillers grains and syrup are coproducts from fuel ethanol dry grind processing. Ethanol manufacturing is dramatically increasing in the United States, primarily in Midwestern states, and thus the availability of these feed products is also growing. Confusion currently exists in industrial nomenclature regarding "solubles" in these streams because no standards are in place. In our study, dissolved materials were considered soluble matter. We developed a methodology to determine the dry basis soluble content in condensed distillers solubles(CDS) and distillers dried grains with solubles (DDGS).A mass balance analytical approach was initially used, but results were not in good agreement with experimental data. This method was thus deemed a poor predictor offinal soluble content. This led to the development of anew methodology for determining, as well as predicting, soluble content for various coproduct

streams, which produced results with R2 > 0.96. This approach is applicable for all dry grind ethanol coproduct streams and is useful for value-added product development research.
CALL NUMBER: DNAL S671.A66
DESCRIPTORS: distillers grains ; proximate composition ; dry matter content ; syrups ; biomass ; solubility ; plant byproducts ; chemical analysis
SUBJECT: distillers dried grains with solubles ; condensed distillers solubles ; dry basis soluble content ; mass balance ; AgSpace

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Kwiatkowski, J.R. ; McAloon, A.J. ; Taylor, F. ; Johnston, D.B. Modeling the process and costs of fuel ethanol productionby the corn dry-grind process. Industrial crops and products. 2006 May, v. 23, issue 3; p. 288-296.
http://hdl.handle.net/10113/4338 ; http://dx.doi.org/10.1016/j.indcrop.2005.08.004
ABSTRACT: The corn dry-grind process is the most widely used method in the U.S. for generating fuel ethanol by fermentation of grain. Increasing demand for domestically produced fuel and changes in the regulations on fuel oxygenate shave led to increased production of ethanol mainly by the dry-grind process. Fuel ethanol plants are being commissioned and constructed at an unprecedented rate based on this demand, though a need for a more efficient and cost-effective plant still exists. A process and cost model for a conventional corn dry-grind processing facility producing 119 million kg/year (40 million gal/year) of ethanol was developed as a research tool for use in evaluating new processing technologies and products from starch-based commodities. The models were developed using SuperPro Designer® software and they handle the composition of raw materials and products, sizing of unit operations, utility consumptions, estimation of capital and operating costs, and there venues from products and coproducts. The model is based on data gathered from ethanol producers, technology suppliers, equipment manufacturers, and engineers working in the industry. Intended applications of this model including Descriptors: evaluating existing and new grain conversion technologies, determining the impact of alternate feedstocks, and sensitivity analysis of key economic factors. In one sensitivity analysis, the cost of producing ethanol increased from US$ 0.235 l-1 to US$0.365 l-1 (US$ 0.89 gal-1 to US$ 1.38 gal-1) as the price of corn increased from US$ 0.071 kg-1 to US$ 0.125kg-1 (US$ 1.80 bu-1 to US$ 3.20 bu-1). Another example gave a reduction from 151 to 140 million l/year as the amount of starch in the feed was lowered from 59.5% to55% (w/w). This model is available on request from the authors for non-commercial research and educational usesto show the impact on ethanol production costs of changes in the process and coproducts of the ethanol from starch process.
CALL NUMBER: DNAL SB13.I52
DESCRIPTORS: ethanol ; ethanol production ; fuel production ; dry milling ; factories ; corn ; process control ; simulation models ; cost analysis ; processing technology ; computer software ; raw materials ; chemical composition ; profitability ; plant byproducts
SUBJECT: coproducts ; AgSpace

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Robertson, G.H. ; Wong, D.W.S. ; Lee, C.C. ; Wagschal, K. ; Smith, M.R. ; Orts, W.J. Native or raw starch digestion: a key step in energy efficient biorefining of grain. Journal of agricultural and food chemistry. 2006 Jan. 25, v. 54, no. 2; p. 353-365.
http://hdl.handle.net/10113/913
ABSTRACT: Improved molecular disassembly and depolymerization of grain starch to glucose are key to reducing energy use in the bioconversion of glucose to chemicals, ingredients, and fuels. In fuel ethanol production, these biorefining steps use 10-20% of the energy content of the fuel ethanol. The need to minimize energy use and to raise the net yield of energy can be met by replacing high-temperature, liquid-phase, enzymatic digestion with low temperature, solid-phase, enzymatic digestion. Also called cold hydrolysis, the approach is a step toward a "green" method for the production of fuel ethanol. There has been substantial prior and increased recent interest in this approach that is presented in this first review of the subject. We include incentives, developmental research, fundamental factors of raw starch digestion, and novel approaches in enzymology and processing. The discussion draws on resources found in enzymology, engineering, plant physiology, cereal chemistry, and kinetics.
CALL NUMBER: DNAL 381 J8223
DESCRIPTORS: small grains ; starch ; enzymatic hydrolysis ; alpha-amylase ; glucan 1,4-alpha-glucosidase ; saccharification ; fermentation ; sugars ; glucose ; alcoholic fermentation ; ethanol ; heat treatment ; biofuels ; ethanol production
SUBJECT: raw starch ; AgSpace

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Dunn, R.O. Oxidative Stability of Biodiesel by Dynamic Mode Pressurized-Differential Scanning Calorimetry (P-DSC). Transactions of the ASABE. 2006 Sept-Oct, v. 49, no. 5; p. 1633-1641.
http://hdl.handle.net/10113/364

ABSTRACT: Biodiesel, an alternative diesel fuel made from transesterification of vegetable oils or animal fats, is composed of saturated and unsaturated long-chain fatty acid alkyl esters. During long-term storage, oxidation caused by contact with ambient air presents legitimate concerns for monitoring fuel quality. Extended oxidative degradation can affect kinematic viscosity, cetane number, and acid value of the fuel. This work investigates the suitability of dynamic mode (positive air purge) pressurized-differential scanning calorimetry (P-DSC) as a means for evaluating the oxidation reaction during non-isothermal heating scans. Methyl oleate, methyl linoleate, and soybean oil fatty acid methylesters (FAME) were analyzed by P-DSC and the results compared with those from thermogravimetric analyses (TGA), conventional DSC, and static mode (zero purge gas flow) P-DSC scans. Results from TGA showed that ambient air pressure was too low to allow measurable oxidation during analyses. Although some degree of oxidation was detected for DSC and static mode P-DSC heating scans, results demonstrated that the highest degree of oxidation occurred during dynamic mode P-DSC scans. For DSC and P-DSC analyses, oxidation onset temperature (OT) increased with relative oxidative stability, with the highest values being observed for methyl oleate. Treating soybean oil FAME with antioxidants increased their relative oxidative stability, resulting in an increase in OT. Statistical comparison of response factors (R(F)) relative to methyl oleate obtained from non-isothermal heating scans with those obtained from OSI analyses showed the highest degree of correlation (P= 0.79) with respect to dynamic mode P-DSC.
CALL NUMBER: DNAL S671 .A452
DESCRIPTORS: biodiesel ; oxidative stability ; oxidation ; analytical methods ; differential scanning calorimetry ; fatty acid esters ; soybean oil ; temperature ; thermogravimetry ; antioxidants
SUBJECT: methyl oleate ; methyl linoleates ; AgSpace

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Holt, G.A. ; Blodgett, T.L. ; Nakayama, F.S. Physical and combustion characteristics of pellet fuel from cotton gin by-products produced by select processing. Treatments Industrial crops and products. 2006 Nov., v. 24, issue 3; p. 204-213.
http://hdl.handle.net/10113/4330 ; http://dx.doi.org/10.1016/j.indcrop.2006.06.005
ABSTRACT: Agricultural plant wastes when properly processed into useful commodities can become an economic asset. It has been estimated that over 2.04 million Mg of cotton by-products are generated each year in the United States. On average, disposal of these byproducts costs the cotton gin approximately $ 1.65 (U.S.) per Mg. One means of changing a financial liability into a potential revenue generator is to process the by-products into renewable, compact pellet-type fuel that can be used at the site or transported to the consumer. Furnace and water heaters that can burn pelletized plant materials have become popular and their safety, low pollution, and reasonable operational costs have been demonstrated. Also, the drastic increases in the price of liquefied fuel and its uncertain supply place a premium for finding and using alternate, low-cost, cellulose-based fuels. The objectives of our study were to fabricate pellet fuel from cotton gin by-products using select processing techniques, determine its physical properties, and measure the emissions when fired in a commercial pellet stove used for residential heating. By-products from two cotton gins were collected and processed into fuel pellets. A total of seven different pellet fuels were evaluated, six from cotton ginby-products and one from wood. The treatments resulted from using different material streams from the ginning process as well as varying quantities of starch and/or crude cottonseed oil during the fuel pellet manufacturing process. The fuel pellet density from the various treatments ranged from 488 to 678 kg/m3. The various treatments were burned in a conventional pellet stove (four replications) and the gaseous and particulate emissions measured. The average calorific value of the pellets ranged from 17.9 to 20.9 MJ/kg(HHV). The ash content for the various treatments ranged from a low of 4.88% to a high of 9.75%. The sodium content indicated concentration ranges from 91 to 282ppm depending on the treatment. The emissions from the cotton gin by-product pellets were higher than for a premium grade wood pellet. The emissions measured during testing were CO, NO, NO2, SO2, and particulates. The pellet stove was setup following the manufacturer's recommendation to burn wood pellets, but was not adjusted for the cotton gin fuel pellets. By utilizing various additives and processing techniques, cotton gin by-products could be used to manufacture a pellet fuel that has commercial potential. However, work remains to minimize the ash content and determine the optimal settings for maximizing combustion.
CALL NUMBER: DNAL SB13.I52
DESCRIPTORS: pellets ; cotton gin trash ; cotton ginning ; renewable energy sources ; biofuels ; physical properties ; combustion ; Gossypium ; plant residues ; biomass ; research and development
SUBJECT: fuel pellets ; AgSpace

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Biswas, A. ; Saha, B.C. ; Lawton, J.W. ; Shogren, R.L. ; Willett, J.L. Process for obtaining cellulose acetate from agricultural by-products. Carbohydrate polymers. 2006 Apr. 19, v. 64, issue 1; p. 134-137.
http://hdl.handle.net/10113/532 ; http://dx.doi.org/10.1016/j.carbpol.2005.11.002
ABSTRACT: Agricultural residues such as corn fiber, rice hulls and wheat straw can be used as abundant low-cost feedstock for production of fuel ethanol. However, the cost of cellulase enzymes to saccharify cellulose to glucose is a major hindrance. As an alternative, a novel process to obtain industrially important cellulose acetate from these by-

products after removing hemicellulosic sugars was developed. Rice-straw, wheat hull and corn fiber were treated with dilute acid at a moderate temperature to hydrolyze the hemicellulose to monomeric sugars that can be fermented to ethanol. The cellulose was then treated with acetic anhydride and catalytic amount of sulfuric acid to make cellulose acetate. The production of cellulose acetate was confirmed by NMR analysis. The pretreatment used to hydrolyze the hemicellulose was also useful for cellulose acetate production. Without the pretreatment cellulose acetate conversions from wheat straw, corn fiber, and rice hulls were 0.5, 1.8and 13.5, respectively. After pretreatment the conversion rate increased to about 25 wt% for all three agricultural residues used.
CALL NUMBER: DNAL QD320.C35
DESCRIPTORS: crop residues ; byproducts ; cellulose acetate
AgSpace
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Thompson, S. Promise of renewable energy focus of St. Louis conference. Rural cooperatives. 2006 Nov-Dec, v. 73, no. 6; p. 8-10, 38-39.
http://purl.access.gpo.gov/GPO/LPS5331
CALL NUMBER: DNAL aHD1491.U6R87
DESCRIPTORS: renewable energy sources ; biodiesel ; issues and policy ; United States
SUBJECT: renewable energy industry ; Internet resource
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Renewable energy sparks surge of new co-ops. Rural cooperatives. 2006 July-Aug, v. 73, no. 4; p. 18-19, 30.
http://purl.access.gpo.gov/GPO/LPS5331
CALL NUMBER: DNAL aHD1491.U6R87
DESCRIPTORS: cooperatives ; renewable energy sources ; biofuels ; United States
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Rosentrater, K.A. Some Physical Properties of Distillers Dried Grains With Solubles (DDGS). Applied engineering in agriculture. 2006 July, v. 22, no. 4; p. 589-595.
http://hdl.handle.net/10113/3124
ABSTRACT: With the rapid growth in the fuel ethanol industry in recent years, considerable research is being devoted to determining distillers dried grains with solubles (DDGS) nutritional properties and to optimizing their inclusion in livestock diets; physical properties of these materials, however, have been largely ignored. Using standard laboratory methods, several physical properties for typical DDGS streams were determined, including moisture content, water activity, thermal properties (conductivity, resistivity, and diffusivity), bulk density, angle of repose, and color. The DDGS samples in this study were golden-brown in color and exhibited physical properties similar to other dry feed ingredients, such as hominy feed, corn gluten feed, and other corn-based materials. As a first step, the numerical data generated during this study will help fill a current void in design information for the ethanol and livestock industries.
CALL NUMBER: DNAL S671.A66
DESCRIPTORS: distillers grains ; corn ; byproducts ; moisture content ; water activity ; thermal properties ; bulk density ; color ; thermal conductivity ; thermal diffusivity ; processing residues ; feed industry ; feed processing ; angle of repose
SUBJECT: distillers dried grains with solubles ; thermal resistivity ; AgSpace
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Sanderson, M.A. ; Adler, P.R. ; Boateng, A.A. ; Casler, M.D. ; Sarath, G. Switchgrass as a biofuels feedstock in the USA. Canadian journal of plant science = Revue Canadienne de phytotechnie. 2006 Dec., v. 86, no. 5; p. 1315-1325.
http://pubs.nrc-cnrc.gc.ca/aic-journals/cjps.html
CALL NUMBER: DNAL 450 C16
DESCRIPTORS: Panicum virgatum ; grasses ; range management ; stand management ; crop production ; crop yield ; biofuels ; USDA ; Agricultural Research Service ; research projects ; literature reviews ; United States
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Comis, D. Switching to switchgrass makes sense. Agricultural research. 2006 July, v. 54, no. 7; p. 19.
http://www.ars.usda.gov/is/AR/archive/jul06/grass0706.htm
CALL NUMBER: DNAL 1.98 Ag84
DESCRIPTORS: agricultural research ; Agricultural Research Service ; Panicum virgatum ; biofuels ; carbon sequestration ; United States
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Moser, Bryan R. ; Erhan, Sevim Z. Synthesis and evaluation of a series of ?-hydroxy ethers derived from isopropyl oleate. Journal of the American Oil Chemists' Society. Berlin/Heidelberg: Springer-Verlag
2006 Nov., v. 83, no. 11; p. 959-963.
http://hdl.handle.net/10113/8048 ; http://dx.doi.org/10.1007/s11746-006-5053-7

ABSTRACT: Several fatty derivatives with bulky moieties were prepared by treatment of epoxidized isopropyl oleate with a number of alcohols in the presence of sulfuric acid catalyst to provide a series of ?-hydroxy ethers ingood yield. The materials were analyzed for cold flow performance through cloud point and pour point determinations. The most promising ?-hydroxy ether produced in this study, with respect to both low temperature behavior and economic criteria, was isopropyl 9(10)-(2-ethylhexoxy) 10(9)-hydroxy stearate, which has a cloud point of -23°C and pour point of-24°C.
CALL NUMBER: DNAL 307.8 J82
DESCRIPTORS: ethers ; oleic acid ; hydroxylation ; biodiesel
AgSpace
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Comis, D. Wind and sun and farm-based energy sources. Agricultural research. 2006 Aug., v. 54, no. 8; p. 4-7.
http://www.ars.usda.gov/is/AR/archive/aug06/energy0806.htm
CALL NUMBER: DNAL 1.98 Ag84
DESCRIPTORS: agricultural research ; Agricultural Research Service ; renewable energy sources ; wind power ; solar energy ; biofuels ; Minnesota ; Texas ; Alaska
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Bioenergy, dairy producers among recipients of $14.6 million in VAPGs. Rural cooperatives. 2005 Nov-Dec, v. 72, no. 6; p. 9, 34.
http://purl.access.gpo.gov/GPO/LPS5331
CALL NUMBER: DNAL aHD1491.U6R87
DESCRIPTORS: value added ; grants ; USDA ; cooperatives ; United States
SUBJECT: value added producer grants ; USDA Rural Development ; Internet resource
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Cassida, K.A. ; Muir, J.P. ; Hussey, M.A. ; Read, J.C. ; Venuto, B.C. ; Ocumpaugh, W.R. Biofuel component concentrations and yields of switchgrass in south central U.S. environments. Crop science. 2005 Mar-Apr, v. 45, no. 2; p. 682-692.
http://hdl.handle.net/10113/3393
ABSTRACT: Optimizing biofuel production and quality from switchgrass (Panicum virgatum L.) may require matching of ecotype and morphological type to environments, particularly in southern regions. Nine genotypes from four combinations of ecotype and morphological switchgrass type were harvested from 1998 to 2000 in five sites across Texas, Arkansas, and Louisiana that varied in latitude and precipitation. An additive main effects and multiplicative interaction (AMMI) method was used to evaluate genotype x environment interaction (G x E) patterns for traits important to biofuel production. Compared with upland genotypes across all site-years, lowland genotypes had greater lignocellulose yields(3.26 vs. 7.40 Mg ha(-1)), greater removal rates of soil N (41 vs. 83 kg ha(-1)) and P (6 vs. 12 kg ha(-1)),greater concentrations of moisture (394 vs. 452 gkg(-1)) and cellulose (388 vs. 394 g kg(-1)), and lower concentrations of N (6.3 vs. 5.7 g kg(-1)) and ash (48vs. 40 g kg(-1)). Compared with northern ecotypes, southern ecotypes had greater lignocellulose yields (4.95 vs. 6.85 Mg ha(-1)), greater removal rates of soilN (60 vs. 76 kg ha(-1)) and P (8 vs. 11 kg ha(-1)),greater moisture concentrations (417 vs. 445 g kg(-1)),and lower ash concentrations (45 vs. 40 g kg(-1)). Lignocellulose yield paralleled dry matter yield (DMY) patterns. Switchgrass biofuel production efforts in the south-central USA should focus on improving DMY of southern lowland genotypes to maximize lignocellulose yields, but management factors may be more effective in optimizing moisture, ash, and mineral concentrations for combustion.
CALL NUMBER: DNAL 64.8 C883
DESCRIPTORS: Panicum virgatum ; biofuels ; crop production ; crop yield ; yield components ; genotype ; genotype-environment interaction ; lignocellulose ; nutrient uptake ; nitrogen ; cellulose ; nitrogen content ; phosphorus ; ecotypes ; dry matter accumulation ; Texas ; Arkansas ; Louisiana
SUBJECT: biofuel crops ; lowland genotype ; upland genotype ; AgSpace
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Cassida, K.A. ; Muir, J.P. ; Hussey, M.A. ; Read, J.C. ; Venuto, B.C. ; Ocumpaugh, W.R. Biomass yield and stand characteristics of switchgrass in south central U.S. environments. Crop science. 2005 Mar-Apr, v. 45, no. 2; p. 673-681.
http://hdl.handle.net/10113/3392
ABSTRACT: Optimizing feedstock production from switchgrass (Panicumvirgatum L.) requires careful matching of genotype to environment, especially for southern U.S. regions. Nine genotypes from four combinations of ecotype andmorphological type were harvested once yearly in autumn for 3 or 4 yr at five locations across Texas, Arkansas, and Louisiana that varied in latitude and precipitation. Genotypes were evaluated for dry matter yield (DMY), plant density, tiller density, lodging, and rust (caused by Puccinia spp.) infection. Genotype x environment (GxE) interactions were identified for most traits. Biomass yield of all genotypes tended to increase with latitude, but lowland morphological

types may have been more sensitive than upland morphological types to differences in moisture availability. Yield (5.82 vs.14.97 Mg ha(-1), respectively) and persistence (final stand density, 3.99 vs. 5.96 plants m(-2)) were lower for upland than for lowland genotypes, particularly at higher rainfall and more southern sites. Lowland genotypes were often able to compensate for stand thinning by increasing individual plant size, but upland genotypes were not. Lodging and rust scores were higher for upland than for lowland genotypes. Yield (13.65 vs.9.75 Mg ha(-1)) and final plant density (5.58 vs. 4.95plants m(-2)) were higher for southern than northern ecotypes. The southern-lowland combination exhibited the best yield and persistence over the study region, andgenotypes within this group exhibited variability in yield among sites. Therefore, development of switchgrass cultivars for biomass production in the southern USA should focus on the southern-lowland genotypes.
CALL NUMBER: DNAL 64.8 C883
DESCRIPTORS: Panicum virgatum ; biofuels ; crop production ; crop yield ; dry matter accumulation ; genotype ; genotype-environment interaction ; agronomic traits ; lodging ; rust diseases ; plant density ; tillers ; ecotypes ; Texas ; Arkansas ; Louisiana
SUBJECT: biofuel crops ; lowland genotype ; upland genotype ; AgSpace
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Berdahl, J.D. ; Frank, A.B. ; Krupinsky, J.M. ; Carr, P.M. ; Hanson, J.D. ; Johnson, H.A. Biomass yield, phenology, and survival of diverse switchgrass cultivars and experimental strains in western North Dakota. Agronomy journal. 2005 Mar-Apr, v. 97, no. 2; p. 549-555.
http://hdl.handle.net/10113/3789
CALL NUMBER: DNAL 4 AM34P
DESCRIPTORS: Panicum virgatum ; biofuels ; crops ; crop yield ; phenology ; cultivars ; mortality ; field experimentation ; plant development ; plant adaptation ; harvesting ; genotype-environment interaction ; harvest date ; soil water content ; North Dakota
SUBJECT: yield potential ; AgSpace
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Knothe, G. Dependence of biodiesel fuel properties on the structure of fatty acid alkyl esters. Fuel processing technology. 2005 June 25, v. 86, issue 10; p. 1059-1070.
http://hdl.handle.net/10113/272 ; http://dx.doi.org/10.1016/j.fuproc.2004.11.002
ABSTRACT: Biodiesel, defined as the mono-alkyl esters of vegetable oils or animal fats, is an “alternative” diesel fuelthat is becoming accepted in a steadily growing number of countries around the world. Since the source of biodiesel varies with the location and other sources such as recycled oils are continuously gaining interest, it is important to possess data on how the various fatty acid profiles of the different sources can influence biodiesel fuel properties. The properties of the various individual fatty esters that comprise biodiesel determine the overall fuel properties of the biodiesel fuel. In turn, the properties of the various fatty esters are determined by the structural features of the fatty acid and the alcohol moieties that comprise a fatty ester. Structural features that influence the physical and fuel properties of a fatty ester molecule are chain length, degree of unsaturation, and branching of the chain. Important fuel properties of biodiesel that are influenced by the fatty acid profile and, in turn, by the structural features of the various fatty esters are cetane number and ultimately exhauste missions, heat of combustion, cold flow, oxidative stability, viscosity, and lubricity.
CALL NUMBER: DNAL TP315
DESCRIPTORS: biodiesel ; fatty acid esters ; chemical composition ; chemical structure ; energy content ; oxidative stability ; viscosity ; physicochemical properties ; emissions
SUBJECT: fatty acid alkyl esters ; cetane number ; lubricity ; heat of combustion ; fuel properties ; AgSpace
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Casler, M.D. Ecotypic variation among switchgrass populations from the northern USA. Crop science. 2005 Jan-Feb, v. 45, no. 1; p. 388-398.
http://hdl.handle.net/10113/3386
ABSTRACT: Switchgrass (Panicum virgatum L.) is a widely adapted warm-season perennial that has considerable potential as a biofuel crop. Broad species adaptation, natural selection, and photoperiodism have combined to create considerable ecotypic differentiation in switchgrass.The objective of this study was to characterize phenotypic variability among switchgrass ecotypes collected from prairie remnants in the northern USA. Thirty-eight switchgrass collections from 33prairie-remnant sites and 11 switchgrass cultivars were evaluated for 2 yr at two locations (Arlington and Marshfield, WI) for nine variables: biomass yield, survival, dry matter, lodging, maturity, plant height, holocellulose, lignin, and ash. Autocorrelations, measuring spatial variation, and correlations between phenotypic distances and geographic distances were all nonsignificant. A small amount of variation for maturity, lodging, holocellulose, lignin, and ash could be attributed to latitude and/or longitude of the collection site. Populations from several of the western most collection sites clustered with cultivars from the Great Plains, suggesting an ecological basis for some of the phenotypic variation observed. However, there was a considerable amount of phenotypic

variability between populations from collection sites in close proximity to each other. Hardiness zones (defined largely by temperature extremes) and eco regions (defined largely by soil type and historic vegetation) partly define the phenotypic characteristics for many switchgrass populations collected from prairie remnants. Most switchgrass populations can be utilized for conservation and restoration projects throughout a combined eco region and hardiness zone without undue concern over contaminating, diluting, or swamping the local switchgrass gene pool.
CALL NUMBER: DNAL 64.8 C883
DESCRIPTORS: Panicum virgatum ; ecotypes ; plant genetic resources ; cultivars plant growth ; agronomic traits ; chemical constituents of plants ; phenotypic variation ; geographical variation ; Indiana ; Michigan ; Minnesota ; Ohio ; Wisconsin ; New York
AgSpace
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Dunn, R.O. Effect of antioxidants on the oxidative stability of methyl soyate (biodiesel). Fuel processing technology. 2005 June 25, v. 86, issue 10; p. 1071-1085.
http://hdl.handle.net/10113/273 ; http://dx.doi.org/10.1016/j.fuproc.2004.11.003
ABSTRACT: Biodiesel, an alternative diesel fuel derived from transesterification of vegetable oils or animal fats, is composed of saturated and unsaturated long-chain fatty acid alkyl esters. When exposed to air during storage, autoxidation of biodiesel can cause degradation of fuel quality by adversely affecting properties such askinematic viscosity, acid value and peroxide value. One approach for increasing resistance of fatty derivatives against autoxidation is to treat them with oxidation inhibitors (antioxidants). This study examines the effectiveness of five such antioxidants, tert-butylhydroquinone (TBHQ), butylated hydroxyanisole (BHA), butylated hydroxytoluene (BHT), propyl gallate (PrG) and ?-Tocopherol in mixtures with soybean oil fatty acid methyl esters (SME). Antioxidant activity interms of increasing oxidation onset temperature (OT) was determined by non-isothermal pressurized-differential scanning calorimetry (P-DSC). Analyses were conducted in static (zero gas flow) and dynamic (positive gas flow) mode under 2000 kPa (290 psig) pressure and 5 °C/min heating scan rate. Results showed that PrG, BHT and BHA were most effective and ?-Tocopherol least effective in increasing OT. Increasing antioxidant loading (concentration) showed sharp increases in activity for loadings up to 1000 ppm followed by smaller increases inactivity at higher loadings. Phase equilibrium studies were also conducted to test physical compatibility of antioxidants in SME-No. 2 diesel fuel (D2) blends. Overall, this study recommends BHA or TBHQ (loadings upto 3000 ppm) for safeguarding biodiesel from effects of autoxidation during storage. BHT is also suitable at relatively low loadings (210 ppm after blending). PrG showed some compatibility problems and may not be readily soluble in blends with larger SME ratios. Although ?-Tocopherol showed very good compatibility in blends, it was significantly less effective than the synthetic antioxidants screened in this work.
CALL NUMBER: DNAL TP315
DESCRIPTORS: biodiesel ; oxidative stability ; fatty acid esters ; autoxidation ; antioxidants ; butylated hydroxytoluene ; butylated hydroxyanisole ; propyl gallate ; alpha-tocopherol ; differential scanning calorimetry
SUBJECT: tert-butylhydroquinone ; fatty acid methyl esters ; pressurized-differential scanning calorimetry ; methyl soyate ; AgSpace
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Crooks, A. ; Dunn, J. Fuel ethanol industry structure, past & present. Rural cooperatives. 2005 Nov-Dec, v. 72, no. 6; p. 18-19.
http://purl.access.gpo.gov/GPO/LPS5331
CALL NUMBER: DNAL aHD1491.U6R87
DESCRIPTORS: ethanol ; cooperatives ; industry
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Knothe, G. ; Steidley, K.R. Lubricity of Components of Biodiesel and Petrodiesel. The Origin of Biodiesel Lubricity Energy & fuels. 2005 May, v. 19, no. 3; p. 1192-1200.
http://hdl.handle.net/10113/271 ; http://dx.doi.org/10.1021/ef049684c
ABSTRACT: An alternative diesel fuel that is steadily gaining attention and significance is biodiesel, which is defined as the monoalkyl esters of vegetable oils and animal fats. Previous literature states that low blend levels of biodiesel can restore lubricity to(ultra-)low-sulfur petroleum-derived diesel (petrodiesel) fuels, which have poor lubricity. This feature has been discussed as a major technical advantage of biodiesel. In this work, the lubricity of numerous fatty compounds was studied and compared to that of hydrocarbon compounds found in petrodiesel. The effects of blending compounds found in biodiesel on petrodiesel lubricity were also studied. Lubricity was determined using the high-frequency reciprocating rig (HFRR) test. Dibenzothiophene, which is contained in nondesulfurized petrodiesel, does not enhance petrodiesel lubricity. Fatty compounds possess better lubricity than hydrocarbons, because of their polarity-imparting O atoms. Neat free fatty acids, monoacylglycerols, and glycerol possess better lubricity than neat esters, because of their free OH groups. Lubricity improves somewhat with the chain length and the presence of double bonds. An order of oxygenated moieties enhancing lubricity (COOH > CHO > OH > COOCH3 >C=O > C-O-C) was

obtained from studying various oxygenated C10 compounds. Results on neat C3 compounds with OH, NH2, and SH groups show that oxygen enhances lubricity more than nitrogen and sulfur. Adding commercial biodiesel improves lubricity of low-sulfur petrodiesel more than neat fatty esters, indicating thatother biodiesel components cause lubricity enhancement at low biodiesel blend levels. Adding glycerol to a neatester and then adding this mixture at low blend levels to low-lubricity petrodiesel did not improve petrodiesel lubricity. However, adding polar compounds such as free fatty acids or monoacylglycerols improves the lubricity of low-level blends of esters in low-lubricitypetrodiesel. Thus, some species (free fatty acids, monoacylglycerols) considered contaminants resulting from biodiesel production are responsible for the lubricity of low-level blends of biodiesel in(ultra-)low-sulfur petrodiesel. Commercial biodiesel is required at a level of 1%-2% in low-lubricitypetrodiesel, which exceeds the typical additive level, to attain the lubricity-imparting additive level of biodiesel contaminants in petrodiesel.
CALL NUMBER: DNAL TP315
DESCRIPTORS: biodiesel ; diesel fuel ; mixtures ; contaminants ; free fatty acids ; monoacylglycerols ; glycerol ; hydrocarbons ; esters
SUBJECT: lubricity ; neat fatty esters ; neat fatty acids ; AgSpace
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Henson, C.A. ; Muslin, E.H. ; Clark, S.E. Modified barley ?-glucosidase. United States Department of Agriculture patents. 2005 Feb. 1, no. US 6,849,439 B2; 21 p.
http://hdl.handle.net/10113/7564
ABSTRACT: Barley ?-glucosidase is an important enzyme in theconversion of barley starch to fermentable sugars duringthe industrial production of ethanol, as in brewing andfuel ethanol production. The enzyme is, however,relatively thermolabile, a disadvantage for an enzymeuseful in industrial processes which are preferablyconducted at elevated temperatures. Site directedmutagenesis has been conducted to make mutant forms ofbarley ?-glucosidase which have improvedthermostability. The sites for this site-directedmutagenesis were selected by sequence comparisons withthe sequences of other ?-glucosidase proteins which aremore thermostable. The recombinant mutant enzymes thusproduced have been demonstrated to improve thethermostability of the enzyme.
CALL NUMBER: DNAL aT223.V4A4
DESCRIPTORS: Hordeum vulgare ; barley ; plant proteins ; alpha-glucosidase ; site-directed mutagenesis ; amino acid substitution ; recombinant fusion proteins ; enzyme activity ; thermal stability ; glycosylation ; amino acid sequences ; USDA ; patents ; United States
SUBJECT: molecular sequence data ; AgSpace
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Core, J. New method simplifies biodiesel production. Agricultural research. 2005 Apr., v. 53, no. 4; p. 13.
http://www.ars.usda.gov/is/AR/archive/apr05/diesel0405.htm
CALL NUMBER: DNAL 1.98 Ag84
DESCRIPTORS: new methods ; biofuels ; biological production ; soybean oil ; extraction ; hexane ; flakes ; Glycine max ; soybeans ; methanol ; sodium hydroxide ; transesterification ; costs and returns
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Core, J. New varieties and techniques make barley better for fuel and food. Agricultural research. 2005 July, v. 53, no. 7; p. 20-21.
http://www.ars.usda.gov/is/AR/archive/jul05/barley0705.htm
CALL NUMBER: DNAL 1.98 Ag84
DESCRIPTORS: varieties ; barley ; Hordeum vulgare ; ethanol production ; barley starch ; new methods ; feed processing ; processing technology ; plant byproducts ; beta-glucans ; distillers grains ; soluble fiber ; food processing
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Macias-Corral, M.A. ; Samani, Z.A. ; Hanson, A.T. ; DelaVega, R. ; Funk, P.A. Producing energy and soil amendment from dairy manure and cotton gin waste. Transactions of the ASAE. 2005 July-Aug, v. 48, no. 4; p. 1521-1526.
http://hdl.handle.net/10113/5518
ABSTRACT: Millions of tonnes of feedlot manure and cotton gin waste are generated in the U.S. each year. Dairy and feedlot operations in New Mexico produce 1.2 million tonnes of manure annually. Traditionally, manure has been used as a soil amendment in agriculture. However, land application of manure is limited in New Mexico due to problems with salinity, potential ground water contamination, and limited availability of agricultural land. Waste treatment alternatives are sought. A two-phase anaerobic digestion system was used to evaluate the feasibility of producing methane and soil amendment from mixed agricultural wastes. Cotton ginwaste and dairy manure were combined and used as feedstock. Under mesophilic conditions, 48% of the combined waste was converted into biogas. The gas yield was 87 m3 of methane per tonne of mixed waste. Methane concentration in the biogas averaged 72%. Gas production with mixed waste increased 35% compared to digesting dairy waste alone. Nutrient analyses of the residuals showed that they could be used as soil amendments. Residual solid material from the two-phase anaerobic digester had a considerably higher nitrogen and lower sodium content than aerobically composted manure. Anaerobic digestion lasted

from one to three months and required 0.15 m3 of water per 1 m3 of waste. Aerobic composting of similar waste in New Mexico takes eight to nine months and consumes 1.2 m3 of water per 1 m3 of waste.
CALL NUMBER: DNAL 290.9 Am32T
DESCRIPTORS: cotton gin trash ; cattle manure ; dairy cattle ; anaerobic digestion ; animal manure management ; methane production ; biogas ; soil amendments ; methane ; nitrogen content
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Vogt, K.A. ; Andreu, M.G. ; Vogt, D.J. ; Sigurdardottir, R. ; Edmonds, R.L. ; Schiess, P. ; Hodgson, K. Societal values and economic return added for forest owners by linking forests to bioenergy production. Journal of forestry. 2005 Jan-Feb., v. 103, no. 1; p. 21-27.
CALL NUMBER: DNAL 99.8 F768
DESCRIPTORS: forest ownership ; landowners ; bioenergy ; renewable energy sources ; income
SUBJECT: income generation
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Igathinathane, C. ; Womac, A.R. ; Sokhansanj, S. ; Pordesimo, L.O. Sorption equilibrium moisture characteristics of selected corn stover components. Transactions of the ASAE. 2005 July-Aug, v. 48, no. 4; p. 1449-1460.
http://hdl.handle.net/10113/5517
ABSTRACT: Corn stover equilibrium moisture isotherms were developed to aide biomass engineering of consistent, uniform-quality feedstock supplies for renewable bioenergy and bioproducts. Equilibrium moisture content(EMC) and equilibrium relative humidity (ERH) sorption data of corn leaf, stalk skin, and stalk pith were experimentally determined using the static gravimetric method at six temperatures ranging from 10 degrees C to40 degrees C and at ten ERH values ranging from 0.11 to0.98. The greatest EMC values for corn leaf and stalk pith generally corresponded with ERH below and above0.90, respectively, at all temperatures. Only at some intermediate ERH range at 20 degrees C to 40 degrees Cwas stalk skin EMC greater than stalk pith EMC. Cornstover components followed a type II isotherm typically observed among food materials. EMC of all components was proportional to ERH and inversely proportional to temperature. Observed EMC ranges were 3.9% to 56.4%,3.1% to 41.1%, and 2.7% to 71.5% dry basis (d.b.) forcorn leaf, stalk skin, and stalk pith, respectively. Calculated whole-stalk EMC values ranged from 3.1% to49.2% d.b. Isotherm data were fitted with the EMC model of Henderson, and modified versions of Henderson, Chung-Pfost, Halsey, Oswin, and Guggenheim-Anderson-deBoer. The modified Oswin model (R2> 0.98; F > 2085) followed by the modified Halsey model (R2 > 0.97; F > 1758) produced the best fit for cornst over components studied. The Henderson, modified Henderson, and modified Chung-Pfost models were not suitable since these models did not produce randomized residuals. The modified Oswin model (R2 = 0.99; F =6274) best described the stalk EMC. Results have practical applications in corn stover collection method and timing; process handling, grinding, and drying requirements; transportation efficiency of dry matter; and necessary storage environment, shelf life, and potential microorganism safety hazards. For example, results indicated that higher EMC values for corn stover leaf may result in greater propensity for the onset of mold growth and may determine minimal storage requirements or potential advantages in separating leaf from stalk fractions.
CALL NUMBER: DNAL 290.9 Am32T
DESCRIPTORS: corn stover ; biomass ; moisture content ; sorption isotherms ; relative humidity ; storage conditions ; bioenergy ; biofuels ; leaves ; stems ; equations ; mathematics and statistics
SUBJECT: biomass feedstocks ; equilibrium moisture content ; equilibrium relative humidity ; AgSpace
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Campbell, D. (ed.). Balancing act: risk-hedging strategy big part of Iowa ethanol co-op's success. Rural cooperatives. 2004 July-Aug., v. 71, no. 4; p. 18-20.
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DESCRIPTORS: cooperatives ; ethanol ; corn ; business management ; Iowa
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CALL NUMBER: DNAL aHD1491.U6R87
DESCRIPTORS: cooperatives ; biofuels ; soybean products ; Iowa
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CALL NUMBER: DNAL aHD1491.U6R87
DESCRIPTORS: biofuels ; cooperatives ; rapeseed ; business management ; Colorado
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Richter, S. Buying biodiesel 'off the rack': CHS investing in new injection technology to streamline biodiesel blending
process. Rural cooperatives. 2004 July-Aug., v. 71, no. 4; p. 28-29.
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DESCRIPTORS: biofuels ; soybeans ; cooperatives ; new products
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CALL NUMBER: DNAL aHD1491.U6R87
DESCRIPTORS: cooperatives ; ethanol ; farmers ; investment ; South Dakota
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CALL NUMBER: DNAL aHD1491.U6R87
DESCRIPTORS: cooperatives ; ethanol ; rural communities ; biofuels ; farm income ; Minnesota
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CALL NUMBER: DNAL aHD1491.U6R87
DESCRIPTORS: biofuels ; ethanol ; cooperatives ; economic outlook and situation ; Midwestern United States ; Great Plains region
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CALL NUMBER: DNAL aHD1491.U6R87
DESCRIPTORS: cooperatives ; ethanol ; ethanol production ; economic outlook and situation
SUBJECT: limited liabioity corporation ; Internet resource
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SUBJECT: breeding programs
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Crooks, A.C. Lost horizon: membership 'horizon' problem preceded demise of MCP.
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CALL NUMBER: DNAL aHD1491.U6R87
DESCRIPTORS: cooperatives ; corn ; corn products ; business management
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Searcy, D. MFA oil committed to development and marketing of renewable fuels. Rural cooperatives.
2004 July-Aug., v. 71, no. 4; p. 26-27.
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CALL NUMBER: DNAL aHD1491.U6R87
DESCRIPTORS: renewable energy sources ; cooperatives ; biofuels ; Missouri
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CALL NUMBER: DNAL 1.98 Ag84
DESCRIPTORS: wet milling ; ethanol production ; biofuels ; new methods ; corn ; Zea mays ; dry milling ; continuous fermentation ; costs and returns ; econometric models
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CALL NUMBER: DNAL aHD1491.U6R87
DESCRIPTORS: biofuels ; ethanol ; cooperatives ; Minnesota
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Cohen, M.F., Mazzola, M. A reason to be optimistic about biodiesel: seed meal as a valuable soil amendment. Trends in biotechnology. 2004 May, v. 22, no. 5: p. 211-212.
CALL NUMBER: DNAL TA166.T72
DESCRIPTORS: rapeseed meal ; soil amendments ; disease control ; root diseases ; Thanatephorus cucumeris ; plant pathogenic fungi ; Malus domestica ; apples
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Hastings, A. The right thing: GROWMARK's Kelly says time is right for renewable fuels to gain larger share of market. Rural cooperatives. 2004 July-Aug., v. 71, no. 4: p. 30-31.
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CALL NUMBER: DNAL aHD1491.U6R87
DESCRIPTORS: renewable energy sources ; cooperatives ; biofuels ; markets ; United States
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USDA grants support home-grown fuels. Rural cooperatives. 2004 July-Aug., v. 71, no. 4: p. 34-37.
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DESCRIPTORS: USDA ; rural economics ; biofuels ; ethanol ; governmental programs and projects ; United States
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DESCRIPTORS: ethanol ; USDA ; biofuels
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Dien, B.S., Cotta, M.A., Jeffries, T.W. Bacteria engineered for fuel ethanol production: current status. Applied microbiology and biotechnology. 2003 Dec., v. 63, no. 3: p. 258-266.
URL: http://hdl.handle.net/10113/2625
ABSTRACT: The lack of industrially suitable microorganisms for converting biomass into fuel ethanol has traditionally been cited as a major technical roadblock to developing a bioethanol industry. In the last two decades, numerous microorganisms have been engineered to selectively produce ethanol. Lignocellulosic biomass contains complex carbohydrates that necessitate utilizing microorganisms capable of fermenting sugars not fermentable by brewers' yeast. The most significant of these is xylose. The greatest successes have been in the engineering of Gram-negative bacteria: Escherichia coli, Klebsiella oxytoca, and Zymomonas mobilis. E. coli and K. oxytoca are naturally able to use a wide spectrum of sugars, and work has concentrated on engineering these strains to selectively produce ethanol. Z. mobilis produces ethanol at high yields, but ferments only glucose and fructose. Work on this organism has concentrated on introducing pathways for the fermentation of arabinose and xylose. The history of constructing these strains and current progress in refining them are detailed in this review.
CALL NUMBER: DNAL QR1.E9
DESCRIPTORS: genetically engineered microorganisms ; Escherichia coli ; Klebsiella oxytoca ; Zymomonas mobilis ; Pectobacterium chrysanthemi ; carbohydrate metabolism ; alcoholic fermentation ; biofuels ; literature reviews
==========Leathers, T.D. Bioconversions of maize residues to value-added coproducts using yeast-like fungi FEMS yeast research. 2003 Apr., v. 3, issue 2: p. 133-140.
URL: http://hdl.handle.net/10113/2546 ; http://dx.doi.org/10.1016/S1567-1356(03)00003-5
ABSTRACT: Agricultural residues are abundant potential feedstocks for bioconversions to industrial fuels and chemicals. Every bushel of maize (approximately 25 kg) processed for sweeteners, oil, or ethanol generates nearly 7 kg of protein- and fiber-rich residues. Currently these materials are sold for very low returns as animal feed ingredients. Yeast-like fungi are promising biocatalysts for conversions of agricultural residues. Although corn fiber (pericarp) arabinoxylan is resistant to digestion by commercially available enzymes, a crude mixture of enzymes from the yeast-like fungus Aureobasidium partially saccharifies corn fiber without chemical pretreatment. Sugars derived from corn fiber can be converted to ethanol or other valuable products using a variety of naturally occurring or recombinant yeasts. Examples are presented of Pichia guilliermondii strains for the conversion of corn fiber hydrolysates to the alternative sweetener xylitol. Corn-based fuel ethanol production also generates enormous volumes of low-value stillage residues. These nutritionally rich materials are prospective substrates for numerous yeast fermentations. Strains

of Aureobasidium and the red yeast Phaffia rhodozyma utilize stillage residues for production of the polysaccharide pullulan and the carotenoid astaxanthin, respectively.
CALL NUMBER: DNAL QR151 .F46
DESCRIPTORS: yeasts ; Endomycetales ; biotransformation ; value-added products ; crop residues ; agricultural wastes ; lignocellulosic wastes ; sugars ; alcoholic fermentation ; ethanol production ; carbohydrate metabolism ; xylitol ; polysaccharides ; biotechnology ; waste utilization ; literature reviews
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Knothe, G., Matheaus, A.C.,Ryan, T.W. III. Cetane numbers of branched and straight-chain fatty esters determined in an ignition quality tester. Fuel. 2003 May, v. 82, issue 8: p. 971-975.
URL: http://hdl.handle.net/10113/2555 ; http://dx.doi.org/10.1016/S0016-2361(02)00382-4
ABSTRACT: The cetane number is a widely used diesel fuel quality parameter related to the ignition delay time (and combustion quality) of a fuel. It has been applied to alternative diesel fuels such as biodiesel and its components. In this work, the cetane numbers of numerous straight-chain and branched fatty acid esters were determined. Specifically, 29 samples of esters of methyl, ethyl, n-propyl, n-butyl, iso-propyl, iso-butyl, 2-butyl, and 2-ethylhexyl esters of palmitic, stearic, oleic and linoleic acid were investigated. It was found that branching in the ester moiety does not significantly affect cetane number compared to the straight-chain esters. Therefore, branched esters, which have been suggested as a possible improvement for the cold-flow properties of biodiesel, can be employed without significantly affecting ignition properties compared to the more common methyl esters. Unsaturation in the fatty acid chain was again observed to be the most significant factor causing lower cetane numbers. Cetane numbers were determined in an Ignition Quality Tester (IQT) which is a newly developed, automated rapid method using only small amounts of material for determining cetane numbers. The IQT is as applicable to biodiesel and its components as previous cetane-testing methods.
CALL NUMBER: DNAL TP315
DESCRIPTORS: biodiesel ; fatty acid esters ; energy content ; combustion ; product quality
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DESCRIPTORS: anaerobic digestion ; waste treatment ; biogas ; biological treatment ; crop yield ; economic analysis ; fertigation ; food wastes ; food processing wastes ; liquid fertilizers ; methane ; organic fertilizers ; organic production ; recycling ; waste utilization ; Florida
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CALL NUMBER: DNAL 1.98 Ag84
DESCRIPTORS: bioenergy ; biogas ; ethanol production ; USDA ; fermentation ; enzymes ; biotechnology ; corn ; industrial microbiology ; United States
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DESCRIPTORS: biogas ; prices ; fatty acid esters ; enzymes
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United States Department of Agriculture patents. 2002 June 4, no. US 6,399,800 B1
http://hdl.handle.net/10113/6976
ABSTRACT: A method for producing fatty acid alkyl esters from a feedstock, involving: (a) saponifying the feedstock with an alkali to form a saponified feedstock, (b) removing the water from the saponified feedstock to form a dried saponified feedstock containing no more than about 10% water, (c) esterifying the dried saponified feedstock with an alcohol in the presence of an inorganic acid catalyst to form fatty acid alkyl esters even with water present at levels up to about 3 wt %, and (d) recovering the fatty acid alkyl esters.
CALL NUMBER: DNAL aT223.V4A4
DESCRIPTORS: vegetable oil ; soybeans ; soapstock ; soybean oil ; biodiesel ; renewable resources ; triacylglycerols ; fatty acids ; esters ; saponification ; drying ; esterification ; patents ; USDA ; United States
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DESCRIPTORS: biomass ; fuels ; soybean oil ; air transportation ; cold ; temperature
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Thompson, S. Bovine biogas: dairy co-op sees major potential in methane gas recovery technology. Rural cooperatives. Nov/Dec 2001. v. 68 (6): p. 16-20.
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CALL NUMBER: DNAL aHD1491.U6R87
DESCRIPTORS: dairy cooperatives ; methane ; biogas ; cattle ; cattle manure ; Oregon
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DESCRIPTORS: cooperatives ; dairy cattle ; biogas ; methane
Oregon
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http://hdl.handle.net/10113/6303
ABSTRACT: Recombinant bacteria are disclosed which are transformed with heterologous DNA coding for alcohol dehydrogenase (adh) and pyruvate decarboxylase (pdc), and which are effective for use in the production of ethanol, but which do not require the presence of antibiotics in the culture medium to maintain genetic stability and high ethanol productivity. These recombinant bacteria are produced using mutant host strains which are substantially deficient in the ability to fermentatively reduce pyruvate. When grown in an anaerobic environment, the recombinant pyruvate mutants transformed with the adh and pdc genes are genetically stable, maintaining the inserted genes and ethanol productivity even in the absence of antibiotics.
CALL NUMBER: DNAL aT223.V4A4
DESCRIPTORS: biofuels ; ethanol production ; bacteria ; fermentation ; genetic engineering ; genetic recombination ; genes ; plasmids ; lactate dehydrogenase ; pyruvate decarboxylase ; enzyme activity ; anaerobic conditions ; culture media ; antibiotics ; patents ; USDA ; United States
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DESCRIPTORS: ethanol ; USDA ; United States
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DESCRIPTORS: Tripsacum dactyloides ; plant growth ; regrowth ; cutting ; harvesting ; nitrogen fertilizers ; fertilizer application ; application rate ; biomass ; biofuels ; dry matter accumulation ; genotype ; crop production
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CALL NUMBER: DNAL aHD1755.A376
DESCRIPTORS: fuel oils ; soybean oil ; supply ; United States
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DESCRIPTORS: Eragrostis curvula ; plant growth ; biomass ; biofuels ; plant cultural practices ; crop yield ; dry matter accumulation ; harvesting

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Saha, B.C., Bothast, R.J. Thermostable α-L-arabinofuranosidase from Aureobasidium pullulans
United States Department of Agriculture patents. 1999 Mar. 16, no. 5,882,905
URL: http://hdl.handle.net/10113/5884
ABSTRACT: An α-L-arabinofuranosidase enzyme which is highly thermostable, and is effective for the hydrolysis of arabinofuranosyl residues from L-arabinose containing polysaccharides and hemicelluloses is disclosed. The enzyme is produced by color variant Aureobasidium pullulans strain NRRL Y-21792. This α-L-arabinofuranosidase may be used in conjunction with xylanolytic enzymes for the treatment of hemicellulosic materials to produce fermentable sugars, particularly xylose and L-arabinose.
CALL NUMBER: DNAL aT223.V4A4
DESCRIPTORS: Zea mays ; corn ; biofuels ; arabinose ; polysaccharides ; hemicellulose ; hydrolysis ; fermentation ; ethanol production ; alpha-N-arabinofuranosidase ; enzyme activity ; xylanolytic microorganisms ; Aureobasidium pullulans ; thermal stability ; patents ; USDA ; United States

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McCraw, L.C. Better cold-weather starts for biodiesel fuel. Agricultural research. Apr 1998. v. 46 (4); p. 21.
http://www.ars.usda.gov/is/AR/archive/apr98/cold0498.pdf
CALL NUMBER: DNAL 1.98 Ag84

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Zhang, X., Peterson, C., Reece, D., Haws, R., Moller, G. Biodegradability of biodiesel in the aquatic environment. Transactions of the ASAE. Sept/Oct 1998. v. 41 (5): p. 1423-1430.
ABSTRACT: The biodegradability of various biodiesel fuels was examined by the CO2 evolution method (EPA 560/6-82-003). BOD5 (EPA 405.1), COD (EPA 410), and gas chromatography (GC) analyses in an aquatic systems. The fuels examined included the methyl- and ethyl-esters of rapeseed oil and soybean oil, neat rapeseed oil, neat soybean oil and Phillips 2-D low sulfur, reference petroleum diesel. Blends of biodiesel/petroleum diesel at different volumetric ratios, including 80/20, 50/50, and 20/80, were also examined. The results demonstrate that all the biodiesel fuels are "readily biodegradable". Moreover, in the presence of REE, the degradation rate of petroleum diesel increased to twice that of petroleum diesel alone. The pattern of biodegradation in the blends and reasons why biodiesel is more readily degradable than petroleum diesel are discussed. The biodegradation monitoring results from both CO2 evolution and GC methods are compared.
CALL NUMBER: DNAL 290.9 Am32T
DESCRIPTORS: fuels ; biodegradation ; chemical oxygen demand ; gas chromatography

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Thompson, J.C. ; Peterson, C.L. ; Reece, D.L. ; Beck, S.M. Two-year storage study with methyl and ethyl esters of rapeseed. Transactions of the ASAE. July/Aug 1998. v. 41 (4) ; p. 931-939.
ABSTRACT: Methyl and ethyl esters, prepared from various vegetable oils by the process of transesterification, have shown much promise as fuels for all types of diesel engines. Very limited information is available on possible deterioration of biodiesel in storage. This project was designed to determine the extent of deterioration of Rape Methyl Ester (RME) and Rape Ethyl Ester (REE) in storage. The study involved triplicate samples of RME and REE stored in glass and steel containers at room temperature (inside) and at the local ambient outdoor temperatures (outside). The study was conducted for 24 months. At the beginning of the study and at three-month intervals, samples were taken for measurement of peroxide value, acid value, density, viscosity, and heat of combustion. At the conclusion of the study, engine performance tests were conducted with the two year stored REE and RME, new REE and RME, and low sulfur diesel reference fuel. On the average, the esters increased over time in all of the previously mentioned properties with the exception of heat of combustion, which decreased. Regression models are presented to predict the deterioration with time. Engine power varied less than 2% for both Biodiesel fuels compared to the stored counterparts while smoke density decreased 3.2% for the stored RME and increased 17.5% for stored REE.
CALL NUMBER: DNAL 290.9 Am32T
DESCRIPTORS: esters ; fuels ; storage ; duration ; physical properties ; rapeseed ; biofuels
SUBJECTS: fuel crops ; fuel analysis

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De Hoof, C.F. ; Kleit, S. ; Chang, S.J. ; Gazo, R. ; Buchart, M.E. Survey and mapping of wood residue users and producers in Louisiana. Forest products journal. Mar 1997. v. 47 (3) ; p. 31-37.

ABSTRACT: Natural by-products of the forest products industry are biomass residues such as bark, wood chips, and sawdust. Disposing of them poses problems for the air and water. One popular waste management solution is to use them for fuel. To measure the potential for using wood residue for fuel and other uses, a study was conducted of the primary and secondary wood processors in Louisiana. The study revealed that while some firms use wood residues for their own boilers, or sell it to others for fuel, there is still unused waste. One reason for this may be the lower cost of competing energy sources. A geographic information system (GIS) was used to map all sites claiming to produce and/or consume wood residue. These data are layered with timber supply data from the USDA Forest Service. A hardcopy directory of biomass sites, including cotton gin trash, rice hulls, and sugar bagasse was developed for public distribution.
CALL NUMBER: DNAL 99.9 F7662J
DESCRIPTORS: wastes ; wood residues ; waste utilization ; waste disposal ; fuels ; bioenergy ; surveys ; Louisiana
SUBJECTS: forest products industries
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Peterson, C. ; Reece, D. Emissions characteristics of ethyl and methyl ester of rapeseed oil compared with low sulfur diesel control fuel in a chassis dynamometer test of a pickup truck. Transactions of the ASAE. May/June 1996. v. 39 (3) ; p. 805-816.
ABSTRACT: Comprehensive tests were performed on an on-road vehicle in cooperation with the Los Angeles County Metropolitan Transit Authority emissions test facility. All tests were with a transient chassis dynamometer. Tests included both a double arterial cycle of 768 s duration and an EPA heavy duty vehicle cycle of 1,060 s duration. The test vehicle was a 1994 pickup truck with a 5.9-L turbocharged and intercooled, direct injection diesel engine. Rapeseed methyl (RME) and ethyl esters (REE) and blends were compared with low sulfur diesel control fuel. Emissions data includes all regulated emissions: hydrocarbons (HC), carbon monoxide (CO), carbon dioxide (CO2), oxides of nitrogen (NOx), and particulate matter (PM). In these tests the average of 100% RME and 100% REE reduced HC (52.4%), CO (47.6%), NOx (10.0%), and increases in CO2 (0.9%) and PM (9.9%) compared to the diesel control fuel. Also, 100% REE reduced HC (8.7%), CO (4.3%), and NOx (3.4%) compared to 100% RME.
CALL NUMBER: DNAL 290.9 Am32T
DESCRIPTORS: rapeseed oil ; ethanol ; diesel engines ; trucks ; hydrocarbons ; carbon monoxide ; carbon dioxide ; nitrogen oxides ; ps ; testing ; chemical composition ; emissions ; California
SUBJECTS: fuel appraisals ; diesel oil ; rapeseed oil methyl esters ; rapeseed oil ethyl esters ; alternative fuels ; hybrid fuels ; particulate matter in exhaust gases ; emission controls ; road testing
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McFarland, M.J. Forage, biomass, and biogas integrated systems for animal waste management. Sustainable Agriculture Research and Education (SARE) research projects. Southern Region. 1996. ; 30 p.
CALL NUMBER: DNAL S441.S8552
DESCRIPTORS: waste utilization ; land application ; Panicum virgatum ; forage ; crop production ; energy resources ; Texas
SUBJECTS: dairy wastes ; energy production
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Wright, D.E. Agricultural editors Wheeler McMillen and Clifford. V. Gregory and the farm chemurgic movement. Agric. hist. Agricultural history. Spring 1995. v. 69 (2) ; p. 272-287.
CALL NUMBER: DNAL 30.98 Ag8
DESCRIPTORS: industrial applications ; agricultural policy ; USDA ; information dissemination ; agrochemicals ; history ; United States
SUBJECTS: journalism ; agricultural production ; gasohol
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Sanderson, M.A. Forage, biomass, and biogas integrated systems for animal waste management. Agriculture in Concert with the Environment (ACE) research projects. Southern Region. 1995. ; 19 p.
CALL NUMBER: DNAL S441.S8557
DESCRIPTORS: waste utilization ; land application ; Panicum virgatum ; forage ; crop production ; energy resources ; Texas
SUBJECTS: dairy wastes ; energy production
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Wright, D.E. Alcohol wrecks a marriage: the Farm Chemurgic Movement and the USDA in the alcohol fuels campaign in the spring of 1933. Agricultural history. Winter 1993. v. 67 (1) ; p. 36-66.
CALL NUMBER: DNAL 30.98 AG8
DESCRIPTORS: chemistry ; agricultural wastes ; compound fertilizers ; fiberboards ; fuels ; history ; innovation adoption ; politics ; rural development ; USDA ; literature reviews ; United States
SUBJECTS: agricultural crises ; new deal usda

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Dunn, R.O. ; Schwab, A.W. ; Bagby, M.O. Solubilization and related phenomena in nonaqueous triolein/unsaturated long chain fatty alcohol/methanol solutions. ARS reprints collection. 1993. [559] ; 16 p.
CALL NUMBER: DNAL aS441.A77
DESCRIPTORS: triolein ; methanol ; fatty alcohols ; solutions ; solubilization ; viscosity ; fuels ; solubility ; physicochemical properties
SUBJECTS: micelles ; oil miscible concentrates ; unsaturated long chain fatty alcohols ; miscible phase activity ; hybrid fuels research ; miscibility ; interfacial tension ; diesel fuels

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Misra, M.K. ; Ragland, K.W. ; Baker, A.J. Wood ash composition as a function of furnace temperature.
FS reprints collection. 1993. [102] ; 14 p.
CALL NUMBER: DNAL aSD143.F77
DESCRIPTORS: bark ; elements ; softwood ; hardwood ; species differences

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Whitman, C.E. ; Evans, G.R. Biofuels and the carbon balance. Yearbook of agriculture.
1992. ; p. 260-264.
http://naldr.nal.usda.gov/NALWeb/Agricola_Link.asp?Accessio n=IND93048089
CALL NUMBER: DNAL 1 AG84Y
DESCRIPTORS: air pollution ; carbon dioxide ; biomass ; biogeochemical cycles ; federal government ; laws and regulations ; United States
SUBJECTS: fuel crops ; Internet resource

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Miller, E.K. Biofuels--January 1986-August 1992. Quick Bibliogr Ser U S Dep Agric Natl Agric Libr U S
Quick bibliography series - U.S. Department of Agriculture, National Agricultural Library (U.S.).
Sept 1992. (92-63) ; 69 p.
CALL NUMBER: DNAL aZ5071.N3
DESCRIPTORS: biomass ; fuels ; energy resources ; bibliographies
SUBJECTS: fuel crops

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Harris, W.L. ; Rosen, H.N. Conversion of biomass to fuel and energy. Yearbook of agriculture. 1992. ; p. 212-221.
http://naldr.nal.usda.gov/NALWeb/Agricola_Link.asp?Accessio n=IND93048082
CALL NUMBER: DNAL 1 AG84Y
DESCRIPTORS: biomass ; Zea mays ; milling ; ethanol ; cellulose ; oilseed plants ; United States
SUBJECTS: fuel crops ; Internet resource

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Conway, R.K. ; Moorer, R. ; Dungan, M. Developing biofuels: federal programs. Yearbook of agriculture.
1992. ; p. 200-204.
http://naldr.nal.usda.gov/NALWeb/Agricola_Link.asp?Accessio n=IND93048080
CALL NUMBER: DNAL 1 AG84Y
DESCRIPTORS: biomass ; rural development ; United States
SUBJECTS: government research ; fuel crops ; Internet resource

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McClelland, J. ; Farrell, J. Feedstocks for biofuels. Yearbook of agriculture.
1992. ; p. 204-211.
http://naldr.nal.usda.gov/NALWeb/Agricola_Link.asp?Accessio n=IND93048081
CALL NUMBER: DNAL 1 AG84Y
DESCRIPTORS: biomass ; Zea mays ; woody plants ; forage crops ; cost benefit analysis ; oilseed plants ; United States
SUBJECTS: fuel crops ; Internet resource

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Stokes, B.J. Harvesting small trees and forest residues. FS reprints collection. 1992. [112] ; 17 p.
CALL NUMBER: DNAL aSD143.F77
DESCRIPTORS: forest trees ; biomass ; fuelwood ; harvesting ; databases ; felling ; logging ; slash ; Canada ; Italy ; New Zealand ; Norway ; Sweden ; Switzerland ; United Kingdom ; United States
SUBJECTS: forestry machinery ; size ; forestry practices

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Gardner, B. New demands for biofuels and alternative products. Outlook - Proc Agric Outlook Conf U S Dep Agric Outlook - Proceedings, Agricultural Outlook Conference, U.S. Department of Agriculture. 1992. (68th) ; p. 23-29.

CALL NUMBER: DNAL 1.90 C2OU8
DESCRIPTORS: fuels ; agricultural products ; cost benefit analysis ; technology ; production costs ; energy resources ; United States
SUBJECTS: energy policy

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Ag center to increase ethanol research. Genetic engineering news. June 1991. v. 11 (6) ; p. 38.
CALL NUMBER: DNAL QH442.G456
DESCRIPTORS: fuels ; ethanol ; biomass ; fermentation ; waste utilization ; research projects ; USDA ; agricultural wastes ; energy resources ; Illinois
SUBJECTS: national center for agricultural utilization research

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AGnews: vine weevil targeted; ag fellowship award; more fuel alcohol. BioEngineering news. Sept 15, 1990. v. 11 (38) ; p. 2, 8.
CALL NUMBER: DNAL A00033
DESCRIPTORS: biological control ; Heterorhabditis bacteriophora ; Xenorhabdus ; Curculionidae ; USDA ; biotechnology ; ethanol production
SUBJECTS: postsecondary education ; news column ; us national corn growers association

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Earle, J.F.K. ; Chynoweth, D.P. ; Nordstedt, R.A. Anaerobic bioconversion: biogasification of municipal solid waste. Bulletin - Florida Cooperative Extension Service, University of Florida. Apr 1990. (267) ; 10 p.
CALL NUMBER: DNAL 275.29 F66
DESCRIPTORS: solid wastes ; United States
SUBJECTS: municipal refuse disposal

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Larson, J.A. Biogas and alcohols from biomass: January 1986-September 1990. Quick bibliography series - U.S. Department of Agriculture, National Agricultural Library (U.S.). Dec 1990. (91-39) ; 81 p. ill.
CALL NUMBER: DNAL aZ5071.N3
DESCRIPTORS: biogas ; alcohols ; biomass ; bibliographies

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CALL NUMBER: DNAL aZ5071.N3
DESCRIPTORS: fuels ; biomass ; alcohols ; bibliographies

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Larson, J.A. Biogas from biomass, 1985-1987. Quick bibliography series - National Agricultural Library (U.S.). Feb 1988. (88-23) ; 44 p. CALL NUMBER: DNAL aZ5071.N3
DESCRIPTORS: biomass ; agricultural wastes ; methane ; methane production

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Fabian, E. Biogas systems for the dairy. 4. Digesters on New York dairies. St. Lawrence County cooperative extension news. Oct 1988. v. 72 (10) ; p. 12. ill.
CALL NUMBER: DNAL S544.3.N7S3
DESCRIPTORS: methane ; methane production ; New York
SUBJECTS: digesters ; farm dairies

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Gill, M. Corn-based ethanol: situation and outlook. Situation Outlook Rep Feed U S Dep Agric Econ Res Serv Situation and outlook report ; Feed - United States Department of Agriculture, Economic Research Service. May 1987. (302) ; p. 30-37. maps.
CALL NUMBER: DNAL aHD9052.U5S67
DESCRIPTORS: corn ; ethanol ; supply balance ; imports ; domestic trade ; sales ; agricultural outlook and situation ; United States
SUBJECTS: fuel inventories

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Brink, D.L. ; Merriman, M.M. ; Gullekson, E.E. Ethanol fuel, organic chemicals, single-cell proteins: a new forest products industry. USDA Forest Service general technical report PSW - United States, Pacific Southwest Forest and Range Experiment Station. Nov 1987. (100) ; p. 237-243.
CALL NUMBER: DNAL aSD11.A325
DESCRIPTORS: ethanol ; proteins ; lignocellulose ; fermentation
SUBJECTS: wood chemical industry ; forest products industries

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Why gasohol can't pass the farm income cost-benefit test. Farmline - United States Dept. of Agriculture, Economic Research Service. Feb 1987. v. 8 (2) ; p. 10-12. ill.
CALL NUMBER: DNAL aHD1401.A2U52
DESCRIPTORS: ethanol ; fuels ; farm income ; economic depression ; United States
SUBJECTS: tax incentives

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Gavett, E.E. ; Grinnell, G.E. ; Smith, N.L. Fuel ethanol and agriculture: an economic assessment. Agricultural economic report - United States Dept. of Agriculture. Aug 1986. (562) ; 54 p.
ABSTRACT: Increased fuel ethanol production from renewable resources like grain through 1995 would raise net farm income benefiting mainly corn and livestock producers. Production of additional byproduct feeds would depress prices of soybeans. Large ethanol subsidies, which are required to sustain the industry, would offset any savings in agricultural commodity programs. Increased ethanol production would also raise consumer expenditures for food. Any benefits of higher income to farmers would be more than offset by increased Government costs and consumer food expenditures. Direct cash payments to corn growers would be more economical than attempting to boost farm income through ethanol subsidies.
CALL NUMBER: DNAL A281.9 AG8A
DESCRIPTORS: ethanol ; economic analysis ; farm income ; laws and regulations ; costs and returns ; cost benefit analysis

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Robertson, G.H. ; Pavlath, A.E. Dehydration of ethanol. United States Department of Agriculture patents. Dec 3, 1985. (4,556,460) ; 1 p. ill.
ABSTRACT: A process and apparatus for dewatering an ethanol-water solution is disclosed wherein a carrier gas is used to vaporize the solution and transport the vapors to a sorbent where water is sorbed in preference to ethanol. The invention is particularly suited for small-scale production of fuel-grade ethanol for blending with gasoline.
CALL NUMBER: DNAL aT223.V4A4
DESCRIPTORS: ethanol ; patents ; small businesses ; USDA ; United States
SUBJECTS: fuel moisture content ; dehydration

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Livezey, J. Estimates of corn use for major food and industrial products. Feed outlook and situation report FdS - United States Dept. of Agriculture, Economic Research Service. May 1985. (296) ; p. 12-15.
ABSTRACT: Extract: This presents a historical breakout of corn use for food and industrial products. A discussion of the three major corn processing industries as well as the products they produce is included. Most of the growth in corn use is attributed to steadily increasing demand for high fructose corn syrup and fuel alcohol. The outlook is for continued growth, but at a slower pace.
CALL NUMBER: DNAL 1.941 S8F32
DESCRIPTORS: corn ; foods ; feed grains ; food grains ; corn syrup ; corn oil ; corn gluten meal
SUBJECTS: estimates

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Schwab, A.W. ; Pryde, E.H. Microemulsions from vegetable oil and aqueous alcohol with 1-butanol surfactant as alternative fuel for diesel engines. United States patent - United States Patent Office. July 2, 1985. (4,526,586) ; 1 p. ill.
ABSTRACT: Hybrid fuel microemulsions are prepared from vegetable oil, a C1-C3 alcohol, water, and 1-butanol as the nonionic surfactant. These fuels are characterized by an acceptable viscosity and compare favorably to No. 2 diesel fuel in terms of engine performance properties.
CALL NUMBER: DNAL NO CALL NO. (PAT)
DESCRIPTORS: plant fats and oils ; fuels ; diesel engines ; emulsions ; biomass ; patents ; United States

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Schwab, A.W. ; Pryde, E.H. Microemulsions from vegetable oil and lower alcohol with octanol surfactant as alternative fuel for diesel engines. United States Department of Agriculture patents. Dec 10, 1985. (4,557,734) ; 1 p. ill.
ABSTRACT: Hybrid fuel microemulsions are prepared from vegetable oil, methanol or ethanol, a straight-chain isomer of octanol, and optionally water. The fuels are characterized by a relatively high water tolerance, acceptable viscosity, and performance properties comparable to No. 2 diesel fuel.
CALL NUMBER: DNAL aT223.V4A4
DESCRIPTORS: plant fats and oils ; fuels ; diesel engines ; surfactants ; patents ; USDA ; United States

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Gavett, E.E. Overview of USDA energy policy perspectives. Energy applications of biomass / edited by Michael Z. Lowenstein. London ; Elsevier, c1985. ; p. 75-77.
CALL NUMBER: DNAL TP360.N278 1984
DESCRIPTORS: bioenergy ; renewable resources ; national planning ; USDA ; United States
SUBJECTS: energy policy ; fourth national energy policy plan ; joint usda/doe biomass energy production and use plan for the united states, 1983-1990
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Gill, M. ; Allen, E. Status of the U.S. ethanol market. Feed outlook and situation report FdS - United States Dept. of Agriculture, Economic Research Service. Aug 1985. (297) ; p. 14-22.
ABSTRACT: Extract: Alcohol fuel production capacity has expanded rapidly due to Federal and State incentives to encourage production from domestically abundant renewable resources. Corn, which can be converted into ethanol, has emerged as the premier source for the foreseeable future. With the EPA phasedown of the use of lead in gasoline, demand has surged for ethanol as an octane-enhancer. Ethanol is competitive with other octane-boosters only because of Federal and State production incentives. Limited production capacity and the long lead time required to install new capacity, will make it difficult for the domestic industry to meet accelerated demand for ethanol. Because imports, especially from Brazil, are an increasing source of U.S. supplies, domestic producers have filed an anti-dumping case, alleging that Brazilian production is heavily subsidized.
CALL NUMBER: DNAL 1.941 S8F32
DESCRIPTORS: ethanol ; markets ; feeds ; octane ; imports ; biomass ; United States
SUBJECTS: energy consumption ; stocks
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Schwab, A.W. Diesel fuel-aqueous alcohol microemulsions. United States patent - United States Patent Office. May 29, 1984. (4,451,265) ; 1 p. ill.
CALL NUMBER: DNAL NO CALL NO. (PAT)
DESCRIPTORS: fatty acids ; emulsions ; alcohols ; fuels ; patents ; United States
SUBJECTS: diesel oil ; citation only
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Rafats, J. Jerusalem artichoke. Quick bibliography series - National Agricultural Library. Sept 1984. (84-67) ; 6 p.
CALL NUMBER: DNAL aZ5071.N3
DESCRIPTORS: Jerusalem artichokes ; bioenergy
SUBJECTS: production
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Tanner, J. The price to be paid for black gold. International agricultural development. Nov/Dec 1984. v. 4 (6) ; p. 22-23.
CALL NUMBER: DNAL aS544.A3I6
DESCRIPTORS: ethanol ; fuelwood ; Brazil ; Zimbabwe ; Nicaragua
SUBJECTS: fuel crops
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Bryan, W.L. Alternate extraction and fermentation processes for sweet sorghum. 3rd annual Solar and Biomass Workshop, April 26-28, 1983, Holiday Inn, Atlanta Airport/North Atlanta, Georgia / co-sponsors United States Department of Agriculture ... [et al.]. [Washington, D.C. ; The Department, 1983?]. ; p. 147-150. ill.
CALL NUMBER: DNAL aTJ810.S6 1983
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Harris, F.D. ; Stahl, T. Biogas-ethanol interfacing with an engine/generator set. 3 Annu Solar Biomass Workshop 3rd annual Solar and Biomass Workshop, April 26-28, 1983, Holiday Inn, Atlanta Airport/North Atlanta, Georgia / co-sponsors United States Department of Agriculture ... [et al.].
[Washington, D.C. ; The Department, 1983?]. ; p. 82-85. ill.
CALL NUMBER: DNAL aTJ810.S6 1983
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A biomass energy production and use plan for the United States, 1983-90. Agricultural economic report - United States Dept. of Agriculture. Nov 1983. (505) ; 17 p.
ABSTRACT: Extract: This report to the President and the Congress assesses the feasibility of achieving the Energy Security Act's goal of producing 8.4 billion gallons of alcohol per year--equal to 10 percent of all U.S. gasoline consumption--by 1990. The goal, though technologically attainable, is not economically feasible even under optimistic market scenarios because it would require $41 to $66 billion in government subsidies over the 1983-90 period. A more realistic maximum potential, with existing subsidies, is 1.5 billion gallons of alcohol fuel per year.
CALL NUMBER: DNAL A281.9 AG8A

DESCRIPTORS: biomass ; energy ; petroleum ; ethanol ; wood ; prices ; supply ; demand ; feed grains ; United States
SUBJECTS: incentives ; uses ; production ; Fuel
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Bravo-Ureta, B.E. ; McMahon, G. An economic evaluation of anaerobic digestion on cage layer operations. Bulletin - Cooperative Extension Service, University of Connecticut. 1983. (83-23) ; 14 p.
CALL NUMBER: DNAL 275.29 C76B
DESCRIPTORS: energy costs ; waste utilization ; New England region
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Ureta-Bravo, B.E. ; McMahon, G. An economic evaluation of anaerobic digestion on cage layer operations. Bulletin - Cooperative Extension Service, University of Connecticut. 1983. (83-23) ; 14 p.
ABSTRACT: Extract: This report presents the net present values associated with biogas-to-electricity systems (BES) for five farm sizes under alternative situations. The results show that farm size, electricity price projections, and the quantity of electricity produced had a major effect on the feasibility of the BES investment. Alternative assumptions regarding tax credits and interest rates were also analyzed, but these two factors had only a marginal impact on the investment's feasibility.
CALL NUMBER: DNAL 275.29 C76B
DESCRIPTORS: poultry ; electricity ; capital ; fertilizers
SUBJECTS: Manure
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Garcia, A. III. ; Fischer, J.R. ; Iannotti, E.L. Ethanol research on the Missouri Integrated Energy Farm System. 3rd annual Solar and Biomass Workshop, April 26-28, 1983, Holiday Inn, Atlanta Airport/North Atlanta, Georgia / co-sponsors United States Department of Agriculture ... [et al.]. [Washington, D.C. ; The Department, 1983?]. ; p. 86-89.
CALL NUMBER: DNAL aTJ810.S6 1983
DESCRIPTORS: Missouri
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Broder, J.D. ; Waddell, E.L. Jr. Farm alcohol/methane production model. 3rd annual Solar and Biomass Workshop, April 26-28, 1983, Holiday Inn, Atlanta Airport/North Atlanta, Georgia / co-sponsors United States Department of Agriculture ... [et al.]. [Washington, D.C. ; The Department, 1983?]. ; p. 199-201.
CALL NUMBER: DNAL aTJ810.S6 1983
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CALL NUMBER: DNAL aTJ810.S6 1983
DESCRIPTORS: Georgia
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Moy, J.H. ; Yang, P.Y. A solar-biogas system for food drying. 3rd annual Solar and Biomass Workshop, April 26-28, 1983, Holiday Inn, Atlanta Airport/North Atlanta, Georgia / co-sponsors United States Department of Agriculture ... [et al.]. [Washington, D.C. ; The Department, 1983?]. ; p. 51-54. ill.
CALL NUMBER: DNAL aTJ810.S6 1983
DESCRIPTORS: Hawaii
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Fairbank, W.C. Biogas fuel from manure--some considerations for California agriculture. Leaflet - University of California, Cooperative Extension Service. Feb 1982. (21292) ; 4 p. ill.
CALL NUMBER: DNAL S544.3.C2C3
DESCRIPTORS: California
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Fulhage, C. ; Iannotti, G. Biogas production considerations and experience at the University of Missouri. Energy for production agriculture ; a national symposium for extension specialists, November 16-18, 1982, St. Louis, Missouri / spon. Cooperative Extension Service, Univ. of Mississippi ... [et al.]. St. Louis, Mo. ; University of Missouri, 1982. ; p. 65-70.
CALL NUMBER: DNAL S494.5.E5E57
DESCRIPTORS: pig manure ; Missouri
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Hermanson, R.E. Biogas production from dairy cattle manure. Extension bulletin - Washington State University, Cooperative Extension Service. Mar 1982. (0987) ; 6 p.
CALL NUMBER: DNAL 275.29 W27P

DESCRIPTORS: biogas ; cattle manure ; energy recovery ; waste disposal ; energy resources
SUBJECTS: dairy effluent

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Kurtzman, C.P. ; Bothast, R.J. ; Vancauwenberge, J.E. Conversion of D-xylose to ethanol by the yeast Pachysolen tannophilus. United States patent - United States Patent Office. Nov 16, 1982. (4,359,534) ; 6 p.
CALL NUMBER: DNAL NO CALL NO. (PAT)

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Gill, M. ; Dargan, A.D. Estimated capacity of U.S. ethanol plants. ERS Staff Rep U S Dep Agric Econ Res Serv ERS staff report - United States Dept. of Agriculture, Economic Research Service. Feb 1982. (AGES820210) ; 31 p.
ABSTRACT: Extract: This report presents and explains data on U.S. alcohol fuel production capacity for 1980-83. The major feedstock used is corn because of its availability and the technical ease of conversion to alcohol by means of the well-known fermentation process. The Corn Belt is currently the leading alcoholfuel production region. The estimates of likely, optimistic, and highly optimistic capacity by the end of 1983 are 1.5, 1.7 and 2 billion gallons, respectively. These estimates indicate that the national alcohol fuel production goal of 60,000 barrels per day (920 million gallons per year) by the end of 1982 will not be achieved.
CALL NUMBER: DNAL 916762(AGE)
DESCRIPTORS: United States
SUBJECTS: projections ; Fuel ; Synthetics

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Garthe, J.W. Ethanol fuel programs in the Northeast. Energy for production agriculture ; a national symposium for extension specialists, November 16-18, 1982, St. Louis, Missouri / spon. Cooperative Extension Service, Univ. of Mississippi ... [et al.]. St. Louis, Mo. ; University of Missouri, 1982. ; p. 80-82. maps.
CALL NUMBER: DNAL S494.5.E5E57
SUBJECTS: North Eastern States (USA)

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Waelti, H. Extension programs on portable liquid fuel in the Western States. Energy for production agriculture ; a national symposium for extension specialists, November 16-18, 1982, St. Louis, Missouri / spon. Cooperative Extension Service, Univ. of Mississippi ... [et al.]. St. Louis, Mo. ; University of Missouri, 1982. ; p. 83-86.
CALL NUMBER: DNAL S494.5.E5E57
SUBJECTS: Western States (USA)

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Livezey, J. Food and industrial demand for corn. Feed situation FdS - United States Dept. of Agriculture, Economic Research Service. Aug 1982. (FdS-286) ; p. 10-12.
ABSTRACT: Extract: Corn used for food and industrial purposes now accounts for almost one-third of the corn purchased for domestic use, up from one-fifth in the early seventies. Rapid growth in production of high fructose corn syrup (HFCS) accelerated the rate of use late in the decade. In addition, since 1979 gasohol subsidies have encouraged ethanol production by corn processors. Food and industrial use of corn is expected to continue to grow in the early eighties, possibly at a faster rate than in the late seventies. Total food and industrial use of corn will likely reach 1 billion bushels by 1985.
CALL NUMBER: DNAL 1.941 S8F32
DESCRIPTORS: demand ; fuels ; milling ; corn
SUBJECTS: food

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CALL NUMBER: DNAL 916762(AGE)
DESCRIPTORS: energy ; economic analysis ; byproducts ; economic feasibility ; grains
SUBJECTS: Alternatives ; Fuel ; Gasoline

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ABSTRACT: Extract: Alcohol may be produced from corn using one of several alternative processes. In this economic analysis, two processes, each with a somewhat different mix of by-product residues are compared. They are the conventional distillery process and a milling process. The milling process has higher capital and start-up costs, but these are more than offset by lower operating costs and higher by-product values. From a broader societal view the milling process is also favored since its by-products--corn gluten meal, corn gluten feed, fodder yeast, and corn oil--are better feed and food substitutes for soybean products than the distillers' dried grain and solubles produced from the conventional distillery process. This allows greater land substitution between soybeans and corn which results in somewhat lower food price increases at given levels of alcohol production.
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SUBJECTS: Comparative analysis ; Fuel ; Synthetics

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SUBJECTS: agricultural production ; production ; Fuel ; Implications ; Synthetics

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DESCRIPTORS: Montana

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DESCRIPTORS: ethanol production
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DESCRIPTORS: fuels ; feed formulation ; byproducts ; grains ; feeds
SUBJECTS: production
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SUBJECTS: efficiency ; Alternatives ; Fuel ; On-farm ; Synthetics
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SUBJECTS: Alcohol
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SUBJECTS: Fuel ; Synthetics
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CALL NUMBER: DNAL No Call No. (ENR)
DESCRIPTORS: ethanol ; issues and policy
SUBJECTS: Alcohol ; Organic ; Social Implications
========== United States. Dept. of Agriculture. Economics and Statistics Service. International Economics Division. Consortium on trade research. ESS - United States Dept. of Agriculture, Economics and Statistics Service. Dec 1980. (2)
ABSTRACT: Membership in the European Community (EC) for Greece, Spain, and Portugal may reduce trade between the United States and the EC in selected commodities; prospects for a North American Common Market are not bright; and the diversion of agricultural crops from export to fuel alcohol production would very likely increase, rather than reduce, balance-of-payment deficits for the United States and Brazil. The first meeting of the Consortium on Trade Research, established by the Economics and Statistics Service's International Economics Division and several universities, focused on and continues to analyze these and other global topics.
CALL NUMBER: DNAL aHD1751.U56
DESCRIPTORS: research ; marketing ; trade agreements ; products and commodities ; fuels ; European Union ; trade ; North America ; Greece ; Spain ; Portugal
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