



SOY-BASED PAINTS AND COATINGS

Soybean-oil-based polymers help paint industry reduce VOCs and lower raw material costs.

SOYBEAN USAGE POTENTIAL

Updated market studies directed at the coatings industry indicate that emulsion polymers will continue to grow in a major segment – architectural interior and exterior coatings. This is expected once the housing and construction market turns around. The United Soybean Board continues to fund projects for developing emulsion compatible systems and feasibility studies for soy polyols in industrial-coatings that will reverse the 10-year trend of reduced consumption of soybean oil in resins, paints and varnishes. Current consumption in these areas is about 22 million bushels of soybeans.

According to the latest Census Reports for the 2008 year, the paint industry decreased in volume shipped by 11 percent to 1,222.4 million gallons. Shipment value decreased 6 percent to \$18,421.3 million. The architectural coatings segment was the hardest hit for the year with a volume decline of 11 percent to 682 million gallons. The value decrease was 12 percent to \$8,669 million. The housing and construction industry slowdown is still adversely affecting the total coatings industry.

PROJECTED TIME TO MARKET ENTRY

Market entry was started in 2003 with substantial penetration expected within the next 5-10 years. New Century Coatings has expanded its distribution of the soy-methyl-ester-based coatings to include a new architectural paint called Dura Soy One. Green Products Inc. has nationally expanded its soy-based roof, metal and concrete coatings product line and introduced a premium 15-year guaranteed soy-oil-based roof coating called ELMS Platinum. TKO Waterproof Coatings of Woodstock, Ill., has also introduced a line of roofing products. Rust-Oleum introduced their Varithane clear soy polyurethane wood coating in 2009, and Sherwin-Williams is near a full market introduction of a new soy/polyester/acrylic hybrid industrial coating.

CURRENT RESEARCH STATUS

Fisher Composites and Battelle have developed a standard-cure soy containing powder coating to the point where a major resin company has exercised an option to license the new technology. This new soy-based resin was introduced to John Deere in 2008. Long-term weathering studies continue.

Lehigh University has completed the feasibility study of replacing acrylic polymers in both ultraviolet-cured inks and wood coatings. A new commercial marketing team composed of Sun Chemical, Lehigh, Northampton Community College and Omni Tech have been formed to commercialize the resin in 2009. A major resin company has expressed an interest in running lab trials with the new soy-based lithographic ink.



Sherwin-Williams is in phase 1 of developing a new soy/acrylic architectural coating to meet a VOC content of 50 g/l. This product could be commercialized in the 2010-2011 time period.

PPG is near commercialization of two new coatings containing soy. In one coating soy polyols will be used to

replace petrochemical soy polyols in the flexible coating of a major footwear product. In another coating, glycerin is being evaluated as a clear coating over a plastic substrate. Both coatings should be commercialized in 2010.





SOY-BASED PAINTS AND COATINGS

Rust-Oleum has been awarded a contract to make a new line of soy acrylic water-based stains and coatings. This resin will be based upon previous work supported by the USB at Eastern Michigan for a non-yellowing soy acrylic resin.

Reichhold is being supported by the USB to develop an environmentally friendly water-based traffic paint. The coating will utilize new water-based soy alkyd latex technology to compete against acrylic traffic paints.

OUTLOOK FOR FUTURE USB SUPPORT REQUIRED TO ACHIEVE BROAD MARKET ACCEPTANCE

Coatings TAP meetings have focused on supplementing university research efforts with the private sector through joint projects or consortia involving raw material producers, resin producers and coatings manufacturers.

PROJECT COVERAGE VERSUS MARKET OPPORTUNITY

Economics and environmental considerations are two key factors driving change in today's coatings marketplace. Paint and coatings manufacturers are focusing on developing cost-effective technology and providing products that enhance performance and meet government regulations. The researchers have generated broader interest in soy-derived coatings through technical presentations at local and national coatings seminars and trade association meetings and with publication of technical papers in technical journals.

Battelle's new soy-based powder coating resin system will allow soy materials to penetrate the fastest-growing coatings market. In addition, the new soy powder coating resin will give the coatings formulator new tools to use on previously difficult-to-cure substrates.

Lehigh University's work will allow the replacement of more expensive acrylate polymers with soy materials as well as improve the cure rates and performance properties of 100 percent acrylate systems.

The Sherwin-Williams project will provide one of the lowest VOC products in the marketplace. In addition, the anticipated soy content will allow the finished coating to meet guidelines for preferred federal procurement.

The PPG project will move forward on the corporate mission to provide more environmentally friendly coatings. It is also the USB Program's first feasibility study in coatings to determine if soy polyols can replace petrochemical polyols.

The two new projects from Rust-Oleum and Northampton Community College will expand our work into new soy-based wood stains and coatings.

For more information, visit: soynewuses.org

The Reichhold soy-based traffic paint can reclaim what once was a major market for soy-based-solvent traffic paints. Acrylics have captured 90 percent of this million-pound paint market due to the more environmentally friendly nature of water-based acrylics.

ISSUES AFFECTING COMMERCIAL SUCCESS

Industry scientists and engineers are rapidly moving toward solving major issues for soy-derived water-based coatings – hydrolytic stability (shelf life) and yellowing – as well as customer satisfaction in ease of application, speed of drying of finished product, cleanup, etc. All of these critical issues are addressed on a daily basis through communication among technical and marketing people. Coating Technical Advisory Panel (TAP) meetings enable scientists and marketers to prioritize and plan for solving industry problems, contributing to reversing the downward trend of soy-based polymer use in architectural paints.

TAP members were advised that, due to cutbacks in industry labs, evaluations of experimental products are moving in a new direction. Coating companies are advising suppliers to furnish samples in the "formulated state" – meaning the preparation of a ready-to-use paint, rather than a basic resin. This places additional responsibilities on the principal investigators who direct the research. Because of this trend, more emphasis will be placed on principal investigators with extensive labs who partner with a willing coatings manufacturer that will clearly define its needs.

More and more emphasis is being placed upon zero/low VOC paints as odor and toxicity become problems in institutional and retail markets. The Sherwin-Williams project is expected to deliver one of the most user friendly coatings in the marketplace. There is a great interest in sustainable technology in coatings, and soy is expected to play a large role in resolving this issue.

ABOUT USB

USB is made up of 68 U.S. farmer-directors who oversee the investments of the soybean checkoff, a U.S. soybean research and promotion program, on behalf of all U.S. soybean farmers. Checkoff funds are invested in the areas of animal utilization, human utilization, industrial utilization, industry relations, market access and supply. As stipulated in the Soybean Promotion, Research and Consumer Information Act, USDA's Agricultural Marketing Service has oversight responsibilities for USB and the soybean checkoff.



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