ABSTRACT

Biobased Materials for Paper Coating

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As defined by the United States Secretary of Agriculture in the Farm Security and Rural Investment Act of 2002: "The term 'biobased product' means a product determined by the Secretary to be a commercial or industrial product (other than food or feed) that is composed, in whole or in significant part, of biological products or renewable domestic agricultural materials (including plant, animal, and marine materials) or forestry materials OR an intermediate feedstock." Drivers for the high level of interest in expanding the use of biobased materials in paper coating include sustainability, given biobased materials are derived from renewable resources, and have a reduced carbon footprint. The increasing prices of crude oil and petrochemical feedstock are also key drivers. The coated paper industry has a long history of using conventional biobased materials including modified starches, proteins such as soy and casein, and cellulose derivatives. Recently developed technologies including nanotechnology provide keys to biobased materials that not only offer sustainability and cost benefits but also improvements in coated paper and paperboard properties along with better runnability and reduced energy consumption in paper coating operations. Examples of recently developed biobased coating materials include nanocrystalline cellulose, nanofibrillated cellulose, nanoparticle biopolymer coating binder made from starch, starch-based pigments and polylactic acid resins and dispersions. Other biobased materials are on the horizon for use by the paper industry, provided advances in scale and economics are realized. The development of biobased coating materials is expected to continue apace to improve sustainability along with quality and profitability of coated paper and paperboard.