Industrial & Biotech Applications

During the first half of the 20th century, Zein was used in a variety of industrial applications, from fabric to record albums. With the introduction of synthetics, the use of Zein was significantly reduced. More recently, the use of edible films like Zein has attracted interest as a way to reduce pollution and recycling problems. New applications for Zein are continually being developed. Some examples we are currently involved with include:

Paper and Cardboard Industry

Zein is used for sizing, impregnating, coating, laminating, and gluing paper. One of the uses is as a glossy protective coating, which is applied as Zein varnish and known as overprint or label varnish. It gives a glossy finish and resists scuffing, water, alcohol and grease.

Zein is resistant to penetration by the oils and greases, making it ideal to coat cardboard containers for greasy foods. Food containers remain biodegradable with a zein coating, unlike boxes treated with wax.

Aeronautical Industry

Zein is used in the electrophoretic process for chrome plating repair by the aeronautic industry. FloZein™ LE performs as the electrophoretic activator in coating suspensions. It is co-deposited with the metals (aluminum, manganese and chromium) in the initial electrophoretic coating.

By acting as an electrical insulator, it promotes coatings of uniform thickness and tends to limit the ultimate thickness of the coating. It has been found that FloZein™ LE improves suspensions for electrophoretic deposition of metallic solids and ceramics on a wide variety of base materials.

Printing Industry

Zein is being added to printing ink to reduce the drying time and improve the rub resistance of ink applied to a variety of materials. Since Zein is a food ingredient, it can be used with edible inks.

Biomedical Industry

Natural pharmaceutical excipients have been applied extensively in the past decades owing to their safety and biocompatibility. Zein offers great benefit over other synthetic polymers used in controlled drug and biomedical delivery systems. It is used in a variety of medical fields including pharmaceutical and biomedical drug targeting, vaccine, tissue engineering, and gene delivery.

The good electrospinnability of zein is important for producing zein and zein-based nanofibers for applications in tissue engineering and drug delivery. The use of zein's hydrolysate peptides for reducing blood pressure is another important issue related to the application of derivatives of zein in the biomedical field.

Packaging Industry

Zein has been used to produce polymeric films that are biodegradable and can be used as a coating to protect food and related materials from spoilage. Zein films can replace commercial coating agents, like carnauba wax and shellac, inside food packets. The properties of the films, like biodegradability, mechanical properties, water absorption, barrier properties, etc., largely depend on the interaction between local existent proteins, plasticizers and other functional groups.