

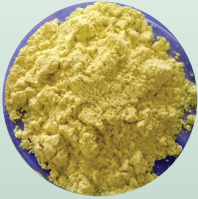


Flo Chemical Corporation *World Leading Producer of ZEIN*

# ZEIN: All-Natural Edible Coating

Whether you are developing a new formulation or looking to reformulate with an all-natural coating alternative, ZEIN or ZEIN combination products may be the solution.

Flo Chemical Corporation offers ZEIN products—innovative coating materials for new and traditional food, pharmaceutical, nutraceutical and industrial applications. Our product line is all-natural, enhancing the safety, health qualities and environmental impact of our customers' end products.



## All-Natural Product that Offers Unique Properties:

- All natural, “green” product
- Biodegradable
- GRAS
- ⓈKosher certified
- Non-GMO and GMO versions available
- Bio-based polymer
- USP monograph compliant
- Made in USA



## Creates High Quality Edible Coatings that are:

- Transparent, odorless, tasteless
- Gluten-free
- Sugar-free
- Vegetarian
- An ideal substitute for shellac
- Fast drying
- Mixable with plasticizers, colors and flavors
- Free from fragmenting, cracking, flaking
- Digestible
- Lactose-free



## Used for a Variety of Food, Pharmaceutical and Industrial Applications:

**ENCAPSULATION** Provides protective surface against moisture and edible fats escaping from within. Conversely, ZEIN protects from external moisture and fats, but also from external gasses including oxygen, protecting from oxidation, micro growth due to moisture migration and rancidity.

**ENTERIC COATING** Natural alternative to chemical coatings to protect active ingredients from attack by stomach acids.

**TIME RELEASE** Coating powders, sweeteners and flavors for time release preparations.

**ADHESIVE** Freshly applied ZEIN film has tackiness and adheres completely when dried, providing a medium for flavors and additives.

**INCREASED SHELF LIFE** ZEIN provides a barrier against oxygen, moisture and microbes that can cause product degradation.

**TASTE BARRIER** Unpleasant tasting ingredients can be encapsulated with ZEIN to mask the flavor while in the mouth. The ZEIN layer is attacked by enzymes that originate in the mouth or intestine to release these ingredients.

**INDUSTRIAL** Chrome plating repair process for the aeronautical industry. Biodegradable packaging for foods, water resistant surfaces for pipes and conduits, paper coating and other innovative applications.



*Continuously  
making  
Freeman ZEIN  
for over  
35 years*



## Competitive Landscape: Coating Categories

NAME	Hard & Durable	Easy to prepare apply, dry	Non-caloric	Easily tolerated	All Natural	Competitive
Shellac	✗	✗	✓	✓	✓	✓
Starch, Lipids Cellulose	✗	✗	✗	✓	✓	✗
Sugar	✓	✗	✗	✓	✓	✗
Whey, Casein	✗	✗	✓	✗	✓	✗
Waxes	✗	✗	✓	✗	✗	✗
Synthetic Coats	✓	✓	✓	✓	✗	✓
Zein	✓	✓	✓	✓	✓	✓

### What is ZEIN?

ZEIN is the water-insoluble prolamine from corn gluten, extracted by physical rather than chemical means. It is, therefore, totally natural. It is a food ingredient, not an additive. It is unique in its ability to form odorless, tasteless, clear, hard and almost invisible edible films. Since ZEIN films are completely safe to ingest, they are the perfect coating for foods and pharmaceutical ingredients, as well as for implantable medical devices. ZEIN has been shown to be remarkably resistant to bacterial attack, which frequently decomposes other proteinaceous material.

ZEIN can be combined with many different ingredients to create a wide range of coating properties and colors. It is a better coating than shellac (confectioners or pharmaceutical glaze) because ZEIN coating solutions offer extended shelf-life, particularly under high-humidity and high-heat conditions.

### Flo Chemical Corporation - The Only North American Producer of ZEIN

Flo Chemical Corporation is a world leader in ZEIN and ZEIN derivative product manufacturing, producing all natural edible coatings and encapsulation products for the food, pharmaceutical, nutraceutical and aeronautical industries. We have been producing Freeman ZEIN since 1978, and have partnered with scores of companies to develop exciting applications with our ZEIN products.

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