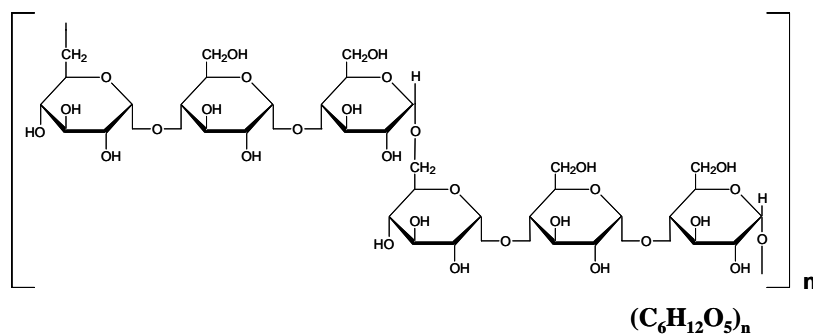


# PULLULAN

## A natural innovative polysaccharide from Hayashibara

**Pullulan** is natural water-soluble polysaccharide, produced from starch by fermentation. Available as a white powder it is odorless, flavorless, and highly stable. Pullulan consists of maltotriose units linked through alpha 1,6 - glucosidic bonds.



## What does Pullulan do?

**Pullulan** is an extremely versatile ingredient providing a technology platform for product innovation. It is an excellent film-former, producing a film which is heat sealable with good oxygen barrier properties and which can also be printed. Pullulan film is sometimes referred to as 'edible packaging'. Importantly colours, flavours and functional ingredients can be entrapped in the film matrix and effectively stabilized. Pullulan can be formed into capsules for use with pharmaceutical and nutraceutical products. Its non-animal origin means there are no 'BSE concerns and it is also suitable for all consumers groups.

**Pullulan can be used as either an innovative or decorative film or used in granule form for:**

- **Tabletting**
- **Pan coating**
- **Agglomeration**
- **Sauces and dressings**
- **Innovative soft candy**
- **Manufacture**
- **Coatings**
- **Capsules**



## Film Uses

### Product Decoration

**Pullulan Film** is strong and its shape is retained during printing. This ensures high quality images that are readily achieved when used in confectionery and bakery products.



### Decoration

**Pullulan Film** can be used innovatively in sugar confectionery. As the film is formed it can be readily colored and flavored and finely comminuted. The small pieces of colored and flavored film can be added to the confection to provide product uniqueness.

### Ideal carrier system

As pullulan film is formed it can be used to entrap flavors, colors and other active ingredients. Due to its excellent oxygen barrier properties these ingredients are effectively stabilized in the film as it is formed. The film can then be cut to any size. Such technology provides an innovative and 'easy to use' carrier and delivery system for a wide variety of ingredients. Furthermore as flavors are sealed in the film matrix such technology provides a means to deliver highly pungent materials which would otherwise need to be segregated.

### Coatings

**Pullulan** solutions which are odorless and flavorless can be used as a coating for a wide range of food products to improve appearance, reduce blemishes and increase shelf life.

### Unit Dosing

**Pullulan** film is heat sealable with excellent oxygen barrier properties and readily soluble. It can therefore be formed into pouches to pack dry ingredients for subsequent use in food manufacturing and processing operations. Such potential uses include the reduction of dust formation and to ensure accurate dispensing of expensive or highly potent ingredients.

# Powder Uses

## Tabletting

**Pullulan** is an excellent tabletting excipient

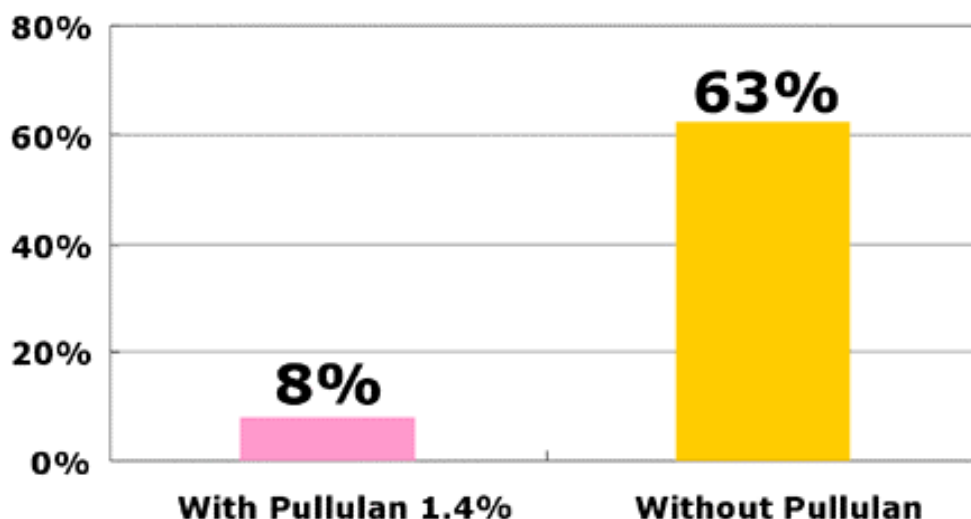
## For pan-coating

Pan coating performance can be improved by using ingredients that improve adhesion and shine without increasing the viscosity of the coating syrup. In these respects **Pullulan** with its excellent adhesive properties and extremely low viscosity is ideally suited for pan-coating chewing gum, chocolate and candies. When used in a base coat, **Pullulan** provides improved coating adhesion when compared to gum arabic.



When used in a top coat, **Pullulan's** adhesive properties significantly increases the strength and resilience of the coating reducing damage during transport and distribution.

**Percentages of cracked tablets**



Tablets coated with/without pullulan were dropped from 150 cm.  
The number of tablets with crack were counted.  
(Yoshioka, T., et al., Kaseiyakukenkkyu 5, 37-42; (1986))

## Agglomeration

**Pullulan** has about double the adhesive strength of food starch. This property combined with its lack of flavor enables it to be used effectively in typical agglomeration processes.

## Dressings and Sauces

Due to its 'adhesive properties' use of granular pullulan in sauces improves their 'on product' retention without unduly increasing sauce viscosity. It is acknowledged that it is difficult to retain sauces on the surface of some pre-cooked meat and fish products; but this problem can be overcome by incorporating pullulan into the formulation.



Pullulan can be used in vegetable and salad dressings to promote improved adhesion of the dressing.

## Innovative soft candy manufacturing

Incorporation of 2-3% **Pullulan**, enables innovative soft chewy candies to be made by a cold extrusion process without resorting to conventional boiling. This enables heat sensitive materials to be used in these products.



## Coatings

**Pullulan** solutions which are odorless and flavorless can be used as a coating for a wide range of food products to improve appearance, reduce blemishes and increase shelf life.



## Capsules

Pullulan can be formed into capsules for use with pharmaceutical and nutraceutical products. Its non-animal origin ensures there are no safety concerns with consumers and it is suitable for all consumer groups. Its excellent oxygen barrier properties ensure that the shelf life of products is optimised.

