

Application Sheet

Egg replacement

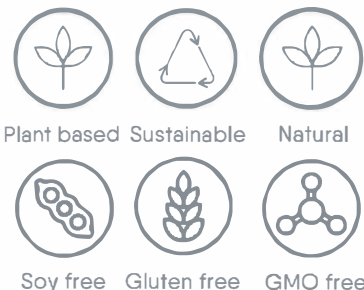
Eggs and egg protein are used in a variety of food products due to their excellent functional properties and protein quality. Concerns about high cholesterol, allergies, animal welfare, high food costs, as well as the negative impact on the environment has led to an increased interest in alternative proteins that act as egg replacers in food. Food manufacturers are looking to pea protein to fill their needs as a replacement for egg powders and egg whites.



Pea proteins are a sustainable protein source that allows for the formulation of high quality protein enriched food. It shows solubility patterns and emulsifying properties similar to egg protein. They have high functionality, allowing them to partially or fully replace egg. However, the difficulty in replacing eggs is assessing their functional role in a given application because they could be responsible for functionalities as diverse as solubility, gelling, film formation, foaming or emulsification.

Understanding the eggs' functionality within a formula is required whether the goal is complete or partial replacement. For instance, pea protein is able to form foams but egg protein form stronger foams in room temperature. Therefore, for some application there is not a one-to-one replacement for all that they do, and the combination of different ingredients (gums, starches, fibers, etc.) should be considered to do the job.

PisumPRO® YP55 is a natural pea protein concentrate (55% protein content) obtained without the use of water or any chemical in a highly sustainable process, keeping the native functionality of the protein. Being a natural and allergen free product it has excellent label appeal (clean label).



It can be used for egg replacement in a variety of products for its protein content, allergen free nature and functional properties, including good solubility, water and fat absorption, emulsification and heat setting. For better results, **PisumPRO® YP55** should be previously dispersed in hot water (70°C) and left it to cool down. The concentrate-water mixture has a yellowish-orange, creamy color similar to eggs.

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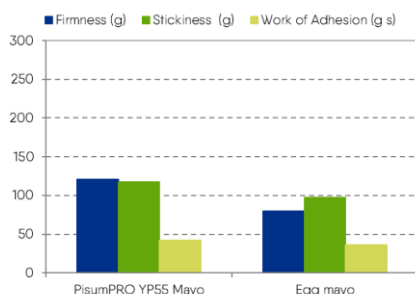
Egg replacement

Application: egg replacement in emulsified sauces

PisumPRO® YP55 holds on to both fat and water, making a creamy, stable emulsion that offers process stability and holds flavor components together. **PisumPRO® YP** can be used to emulsify the fat and to provide flowability, replacing eggs in mayonnaise alike sauces.



PisumPRO® YP55 has been used in an egg-free mayo and compared against a formulation made with egg yolk. Rice starch **OryzaMYL® H90** has been used in the recipe to increase the viscosity and enhance the emulsion stability by retarding droplet movement. Instrumental measurements with a TTC spreadability rig revealed a similar consistency and stickiness:



Consumer-friendly labelling:

Water (50%), sunflower oil (30%), pea protein (5%), mustard, wine vinegar, lemon juice, rice starch, rice syrup, salt, sunflower lecithin, carob gum.

Compared to conventional products with egg, the egg-free mayo with **PisumPRO® YP55** contains 50% less fat.

It also allows to make 50% reduced-fat salad dressings with the mouthfeel, taste and stability of their full-fat counterparts.

	Nutrition facts, per 100g	
	Egg-free	Market
Energy (kJ/kcal)	1315/313	2314/552
Fat (g)	30,8	61
Carbohydrate (g)	5,7	2,0
Fiber (g)	0,8	0,0
Protein (g)	2,8	0,7
Salt (g)	0,8	1,1

PisumPRO® YP55 shows excellent emulsifying characteristics and heat resistance. The emulsions are stable after retorting and long storage and have a nice color and a soft, consistent and flowable texture with no bitter or pea flavor.

These are the key benefits:

- Vegan, dairy-free, egg-free, cholesterol-free
- Soy-free, Gluten-free
- Fat-reduced
- Contains no hydrogenated oils or trans fats
- Preservatives free
- 1 year shelf-life, ambient temperature



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Egg replacement

Application: vegan scrambled eggs and omelets

The desirable characteristics of scrambles and omelets depends, among other properties, on the irreversible coagulation and ability to form gel networks upon heating of egg proteins, which coagulate between 62° C and 70° C.

PisumPRO® YP55 contributes to scramble gelling and can be successfully used in a vegan egg alternative with the appeal of scrambles and better nutritional profile than egg.



Ingredients:

Pea protein, sunflower oil, gums, potato starch, salt, flavouring, colouring, acidity regulator.

Some egg replacers of the market are only valid for binding functionality, but not for scrambles.

With **PisumPRO® YP55**, the resulting vegan egg have better yield upon cooking while the cooking behaviour, consistency, colour, and appearance of chicken eggs scrambles.

Nutrition facts of scramble, per 100g		
	Plant-protein	Egg
Energy (kcal)	62	143
Fat (g)	3,0	9,5
of which saturated (g)	0,0	3,1
Carbohydrates (g)	4,1	0,7
Protein (g)	4,0	12,6
Cholesterol (mg)	0,0	372,0

PisumPRO® YP55 shows excellent emulsifying characteristics and heat resistance. The emulsions are stable after retorting and long storage and have a nice color and a soft, consistent and flowable texture with no bitter or pea flavor.

Benefits respect to chicken-eggs:

- Health benefits:
 - no cholesterol
 - less fat (60% less)
 - allergen-free
- Highly sustainable:
 - less impact on carbon fingerprint
 - takes less water to produce
 - fewer greenhouse gases emission



Vegan



Egg free



Allergen free



Sustainable

Application Sheet

Egg replacement

Application: egg replacement in bakery

Egg replacement in bakery is not “a piece of cake”. Eggs are polyfunctional, contributing to binding, thicken batters and doughs, allow adhesion and shine and benefit the crumb moistness, structure and volume of baked goods. Some of these characteristics are related to their emulsifying and foaming properties while other to the aggregation and formation of insoluble networks during the baking process.

Plant-proteins are good options for egg replacement in bakery, but some issues can arise when using them, like bitter or beany taste, lack of structure and binding, cakes sunk in the middle, crumbly texture, etc.

Leavened baked goods made with **PisumPRO® YP55** have good texture and volume, less yellow color, and slightly denser structure. Pea protein produces denser cakes with greater moistness than cakes made with eggs.



PisumPRO® YP55 Control (egg)

The basic taste profile of pea matches with sweet flavors such as vanilla, chocolate, nuts, cream, etc.

PisumPRO® YP55 For better results, it is advised to disperse **PisumPRO® YP55** in hot water (70°C) and let cool before use. You may then whip it at high speed to foam, include flavorings, and mix with the rest of ingredients of your recipe. The recipe may be fortified with lecithin in order to improve the functional properties.

Application: egg replacement in pasta

Eggs or egg whites are sometimes included in pasta recipes for binding, reducing starch leaching upon cooking and improving final texture. Replacing eggs with **PisumPRO® YP55** lowers costs, improves the nutritional profile and avoids allergenicity, while improving firmness and maintaining the desired texture even after overcooking.



Retort pasta is designed to withstand demanding processing environments. Special pasta products with 2-4% egg albumin are produced for canned food processors. Excessive softening of pasta during retorting and storage of moist products is a natural process resulting of water penetration. The effectiveness of replacing egg whites in pasta through **PisumPRO® YP55** and **ViciaPRO® FB65** to decrease water absorption during retort process and long storage has been studied. Replacing the egg white through 5-10% **PisumPRO** can be done achieving similar ability of the pasta to withstand retorting.

Application Sheet

Egg
replacement

Key Benefits of PisumPRO® YP55:

PisumPRO® YP55 is a natural, non GMO, clean label and allergen free pea protein concentrate obtained by a sustainable and natural process. The protein preserves the functionality and properties required for egg replacement.



PisumPRO® YP55 allows to replace entirely the egg of your recipe, emulsifies the fat, provides thickness and structure and improves the spreadability in sauces. It provides a yellowish-orange, creamy color similar to eggs.

Swapping eggs for PisumPRO® YP55 not only reduces intake of cholesterol, saturated fat, and animal protein, but increases the amount of fiber, antioxidants, vitamins, minerals, and phytochemicals. This change can lead to long-term health benefits.

APPLICATIONS For egg replacement in sauces, cakes, cookies, vegan eggs, etc.

USAGE For better results, PisumPRO® YP55 should be previously dispersed in hot water (70°C) and the mixture should be left it to cool down for at least 15 minutes. In cakes, it is recommended to whip it at high speed for 10 minutes. It is advised to store PisumPRO out of light and tightly sealed to maintain neutral flavor.

BENEFITS

- Egg-replacement
- Cost reduction
- Bland taste
- Good emulsifying properties
- Good solubility
- Highly sustainable
- Vegan, allergen free, GMO free, gluten-free



LABELLING PisumPRO® YP55 : pea protein