# Solein® – Food Out of Thin Air

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## Problem

Throughout history, humanity has found success by harnessing the bounty of nature. Modern agriculture has created an era of well-being but also led us to exceed the limits of the planet. To create a prosperous future, we must find ways to spend natural resources more wisely.

## Solution

Solar Foods produces protein, Solein®, using carbon dioxide and electricity. Solein is a unique microbial protein (microbial protein-rich powder): a food produced without farming or fossil fuels. It is a revolutionary leap in food science and presents all of humanity an opportunity to reap a previously undiscovered harvest. Without the limitations of traditional farming, this method of food production has the potential to transform the sustainability, availability and transparency of what we eat and where food can be produced.

Solein is grown with air and electricity as the primary resources in a fermentor similar to the ones used in breweries and wineries. The Solein microbes are put in a liquid – called a growth medium – within the fermentor. The liquid is continuously supplied with small bubbles of hydrogen and carbon dioxide. They are also fed nutrients including nitrogen, calcium, phosphorus and potassium, which are the same nutrients that plants normally source through their roots from the soil. The microbes eat these ingredients to grow and multiply. The final dried powder is Solein, which is made up of whole cells that are up to 70% protein.

Solein is a versatile food ingredient, and its adaptability is almost limitless. It can be used as a protein ingredient in a wide variety of foods such as pasta, spreads, drinks, yogurts, meat-like products and more. Solein can also be used as a nutritional fortifier, and it can bring techno-functional properties into foods. In addition to protein, Solein provides a source of iron, fibre, and B vitamins. Solein vanishes into foods easily making it ideal for every food imaginable, sweet or savory.

## Benefits

Solein unlocks a world of new food diversity that is genuinely sustainable. It not only creates an infinite food supply for our world but also allows consumers to choose foods with a genuinely sustainable protein source.

- *Secure supply*
  Solein can be grown anywhere in the world, providing a secure supply of protein.



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- *No ethical or environmental harm*
  Solein avoids all the ethical dilemmas of agriculture from destructive land use to animal suffering.
- *Cost competitive*
  Solein production can easily be scaled and the price of renewable energy is rapidly dropping.
- *Nutritious*
  Solein has a verifiably balanced nutritional profile containing protein, dietary fibres, vitamins and minerals.
- *Highly functional*
  Solein has been successfully tested in multiple foods with different tastes and textures, ranging from alternative meat to noodles to ice cream.

Based on a lifecycle analysis study, as a protein source, Solein's comparative greenhouse gas emissions are approximately 1% that of meat protein and about 20% of plant protein production. It also takes just a fraction of the amount of water to produce Solein in comparison to meat protein.
Solein production is independent of weather and climate conditions, liberating global protein production from the limits of traditional agriculture. It can be produced in harsh environments, such as desert and Arctic areas or even outer space, where traditional food production is not possible.

# Practical recommendations

Solein is designed for use as an ingredient by the food industry. Solein enables the creation of nutritious, sustainable, and healthy food products. Food brands will be able to add Solein into their products to substitute traditional ingredients or protein sources. Because Solein upgrades the nutritional profile of foods, it can be used for a wide variety of functional benefits in foods. Solein vanishes into foods easily making it ideal for virtually every food imaginable.

# Further information

## Weblinks

www.solarfoods.com **I** www.solein.com

**About this practice abstract and GIANT LEAPS**

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