

Food future: improving sustainability in the food and beverage industry



Food gas technology has transformed the way retailers and customers receive and consume packaged foods across the world. For years, Air Products has been developing solutions for the food and beverage industry to ensure the highest quality of product and improve sustainability.

The environmental impact of the global food and beverage sector

To understand the environmental benefits of these solutions, our researchers examined three examples where food gases technology has led to reduced carbon emissions:

- Food Freezing
- Modified Atmosphere Packaging (MAP)
- Beverage Bottling

70% increase
in food production expected by 2050¹



The food and beverage sector makes up **about a 1/3** of total anthropogenic emissions²

50% consumers cite food waste and wasteful packaging as leading environmental issues⁴

Around a 1/5 of food industry emissions relates to energy used in transport, packaging and processing³



1% versus 3%
The equivalent of 3% of the total product is wasted with other technologies versus 1% with cryogenic freezing⁶

Food freezing

While the carbon footprint of cryogenic freezing is greater than mechanical freezing, the impact of food waste resulting from dehydration is three times greater for other technologies compared with cryogenic freezing.



0.297 kg CO₂e
Emissions avoided by using cryogenic freezing versus mechanical per kilogram of burgers frozen⁶

Modified Atmosphere Packaging (MAP)

Using MAP techniques, the shelf life of fresh food products can be safely extended by between 50% and 500%, depending on the product. Using our [Food Packaging Calculator](#), our researchers assessed the avoided emissions using MAP techniques by food type (kg CO₂e/kg packaged).

Beef 3.114 kg	Dairy 0.172 kg	Nuts 0.0178 kg
Chicken 0.375 kg	Vegetables 0.127 kg	

Juice bottling

Aseptic packaging systems, which use nitrogen to create a sterile atmosphere during juice packaging, have a lower environmental impact than hot filling systems. Reduced carbon emissions are achieved through the use of lower weight PET bottles (hot filling systems require a thicker bottle that can withstand the higher temperatures needed), and a lower energy requirement.



0.006 kg CO₂e
Emissions avoided by using an aseptic packaging system per 0.5 liters of juice⁵

More information

Our White Paper 'Food future: improving sustainability in the food and beverage industry' explains more about how our Freshline® range has used innovation in cryogenic freezing, MAP, and beverage bottling technologies to lower food waste, reduce the use of plastics, and avoid emissions from transport, storage and production.

¹State of Green, The food and beverage industry
²Carbon 4 Finance, Report on the food and beverage sector, 2020
³Carbon 4 Finance, Report on the food and beverage sector, 2020
⁴Tetra Pak Index 2021
⁵Calculations based on Manfredi, et al, Journal of Food Engineering, February 2015
⁶Comparative Life Cycle Assessment of freezing technologies, Blejman et al, May 2013 (Air Products internal LCA)