



What is Reduced Oxygen Packaging (ROP)?

The reduction of the oxygen in a package by mechanically removing the oxygen, displacing the oxygen with another gas or combination of gases, or otherwise lowering the oxygen concentration to a level lower than the surrounding air. These processes include:



Vacuum Packaging
Modified Atmospheric Packaging (MAP)
Controlled Atmospheric Packaging (CAP)
Cook-Chill
Sous Vide

Vacuum Packaging: A special process in which air is removed from a package of food. The package is hermetically sealed so a vacuum remains inside the package.

Modified Atmosphere Packaging (MAP): The gases inside a package of food are modified, by either removing oxygen or adding carbon dioxide or nitrogen. The composition of the gases will change with time, as the bag is permeable.

Controlled Atmosphere Packaging (CAP): The gases inside a package of food are modified and will stay the same until the package is opened. The gases can be controlled by removing all the oxygen, packaging only food that does not produce oxygen, using packets of "oxygen scavengers", and sealing the food in impermeable bags.

Cook-Chill:

Cook-Chill Packaging: 1) Cooked, hot food is placed in impermeable bags
2) Air is expelled from bags
3) Bags are sealed or crimped closed
4) Bags are rapidly chilled
5) Bags are kept refrigerated to inhibit the growth of pathogens.

Sous Vide:

Sous Vide packaging: 1) Raw or *partially cooked* food is placed in a hermetically sealed, impermeable bag
2) Food is cooked in the bag
3) Bags are rapidly chilled
4) Bags are kept refrigerated to inhibit the growth of pathogens





Hazards of ROP:

Clostridium botulinum



Listeria monocytogenes



Food cooked using sous vide is often cooked at a lower temperature than it would be using more conventional cooking methods. It may also be more difficult to verify the final cooking temperature of the product while inside the bag. For these reasons, there is a high risk of temperature abuse.

Preparing food using reduced oxygen packaging can also increase the risk of food borne illness as some bacteria can survive without oxygen. *Clostridium botulinum* creates toxic spores in low oxygen environments. If these spores are consumed, they may cause botulism.

Food prepared using ROP methods often have a longer shelf life than foods that are wrapped in more conventional methods. This longer shelf life under refrigeration, can allow slow growing bacteria, such as *Listeria*, to reach higher numbers than it would normally.

These processes require pre-approval. Please contact your area sanitarian prior to conducting any of these processes on site.