Hotfill - Mango Fruit Drinks - What

Starring:

Hotfill is the process by which liquid product is filled at hot condition after the pasteurization process, then the pack or container is sealed afterwards cooling. Hotfill method is used extensively in modern food and beverages industry.

Steps Include:

- Heat treatment of the liquid [commercial sterile product]
- Filled in a container at hot condition [containers sometimes can be pre-warmed]
- Closure application [allow to sterilize the head space]
- Cooling the liquid filled container

Figure: Hotfill filling

Why Industry performs Hotfill process:

Hotfill method undergoes by removing micro-organisms which could contaminate the liquid drink. It is noted that if there are no micro-organisms in the liquid or beverages, then the beverage will sustain storing in the environment.

The head space sterilization [inside the bottle to cap] tends to minimize the damage of gas and micro-organisms from the surrounding environment or air.

Hotfill eliminates the use of preservatives and chemicals [peoples are getting concerned about public health]

Hotfill Process:

Basically Hotfill is the process where beverages firstly get commercially sterilization, then filled at hot temperature in the specific container, then ensures head space sterilization and finally cooling down the container with beverages.

Some steps are involved in Hotfill process. Generally, the process can be described as below.

- Beverages gets pasteurized or any other means of heat treatment which can be termed as commercial sterile product. The heat treatment temperature can be 90 – 100 C followed by a holding time 15 – 30 seconds.
- Then the beverage is cooled primarily at 72 – 76 C or 82 – 86 C while leaving the pasteurizer or the heat treatment unit. The beverage is filled in the specific container at hot condition. Closure application is performed immediately after Hotfill. [containers sometimes can be pre-warmed]
- After Closure application the container or bottle gets tilted [07 – 30 seconds] by which the head space or the top side of the bottle with closure inside can be sterilized.
- The container or bottle then undergoes through a cooling tunnel by which the temperature can gets down to 36 – 40 C or near about. While cooling down, the head space portion generates a vacuum inside the bottle.

What is Hotfill?

Hotfill is a process where acidic type product undergoes a heat treatment with a holding time, later the product is filled at hot condition & the product as well as the container is allowed to stay the hot condition for a certain period of time to attain a longer shelf life. PET bottles, aluminium foils can sustain the entire heat treatment during the process by keeping product characteristics as desired.

Figure: Hotfill

Hotfill is a system for sterilizing products with it container inside portion as well as the inside of the closure. All the steps designed to ensure the product safety with its extend shelf life as desired. The products which have poses a pH value <4.5 are used in Hotfill process.

Hotfill – Merits:

- The technique ensures the product taste, nutritional value.
- End users can put their rely on to it.
- PET bottle is cost effective.
- PET bottles are easier to carry rather than the glass bottles.

What is Cold Fill?

Cold Fill is a process where neutral pH base product undergoes an extreme cold treatment and later the product as well as the container is allowed to stay on the extreme cold condition to attain a shorter shelf life. Any type of packaging material can sustain the cold condition during the process by keeping product characteristics as desired.

In comparison with Hotfill technology, cold fill utilizes extreme cold to kill the micro-organisms [bacteria]. Among the products that are usually cold filled are pasteurized milk, UHT milk, milk based drinks, fruit juices, vegetable juices, coffee beverages, tea, sport drinks, mixed beverages, flavored water etc.

Hotfill process is not suitable for the products that are increasingly sold as “Fresh” and “Natural” condition, as temperature effects on product quality.

Figure: Cold Filling

Cold Fill – Merits:

- Cost effective
- Product quality remains stable
- Food nutrients remains stable
- No preservative is added
- There is no variation in product flavor

What is Aseptic Fill?

Aseptic Filling is a process where high acidic type product undergoes a heat treatment with a holding time, later the product is filled at hot condition & the product as well as the container is allowed to stay the hot condition for a certain period of time to attain a longer shelf life. PET bottles, glass bottles, aluminium foils can sustain the entire heat treatment during the process by keeping product characteristics as desired.

In aseptic filling technology the product will be sterile or commercial sterile as well as the product container contact surface will be sterile followed by an aseptic transfer of product. As example: Hotfill aseptic filling, UHT aseptic filling, Pulp aseptic filling etc.

Figure: Aseptic Filling

The purpose of aseptic filling is to prevent micro-organisms from entering into the packet during and after packaging. During aseptic processing, sterilized package/container is filled with commercially sterile food product and sealed in a hygienic condition.

For milk, the combination of UHT treatment and packaging sterilization ensures the milk can last up to 06 months shelf life in ambient condition.

Aseptic Fill – Merits:

- To ensure longer shelf life
- To ensure nutritional and sensory properties [flavor, texture, appearance, health benefits]
- For achieving best filling speed with accuracy
- Product and container sterility

Differences in between Hotfill and Cold Fill

Criteria	Hotfill	Cold Fill	Aseptic Fill
What	Uses heat to sterilize the product & container	Utilizes extreme cold to kill bacteria	Uses heat to sterilize the product & container
Holding time	Both the product & container are kept at a holding time for about 15 – 30 seconds.	Both the product & container are kept at an extreme cool temperature.	Both the product & container are kept at a holding time for about 15 – 30 seconds.
Applicable for	Hotfill is used for acidic type products. [mango drink, orange drink etc.]	Cold Fill is suitable for neutral type products. [milk, milk cream etc.]	Appropriate for high acid products
Preservative condition	No preservatives is used	No preservative is used	No preservatives is used
Containers compatibility	PET bottle is working well. Alu foil also.	Any type of packaging container works well	PET, glass, aluminum
Shelf Life	Longer Shelf Line	Shorter Shelf Life	Longer Shelf Life
Micro-organism killing process	Heat & holding	Extreme cold holding	Heat & holding
Items compatibility	Fruits & vegetable juice, soft drinks, water, tea etc.	Milk, cream, juice etc.	Food, pharmaceutical [Hotfill aseptic filling, UHT aseptic filling, Pulp aseptic filling etc.]