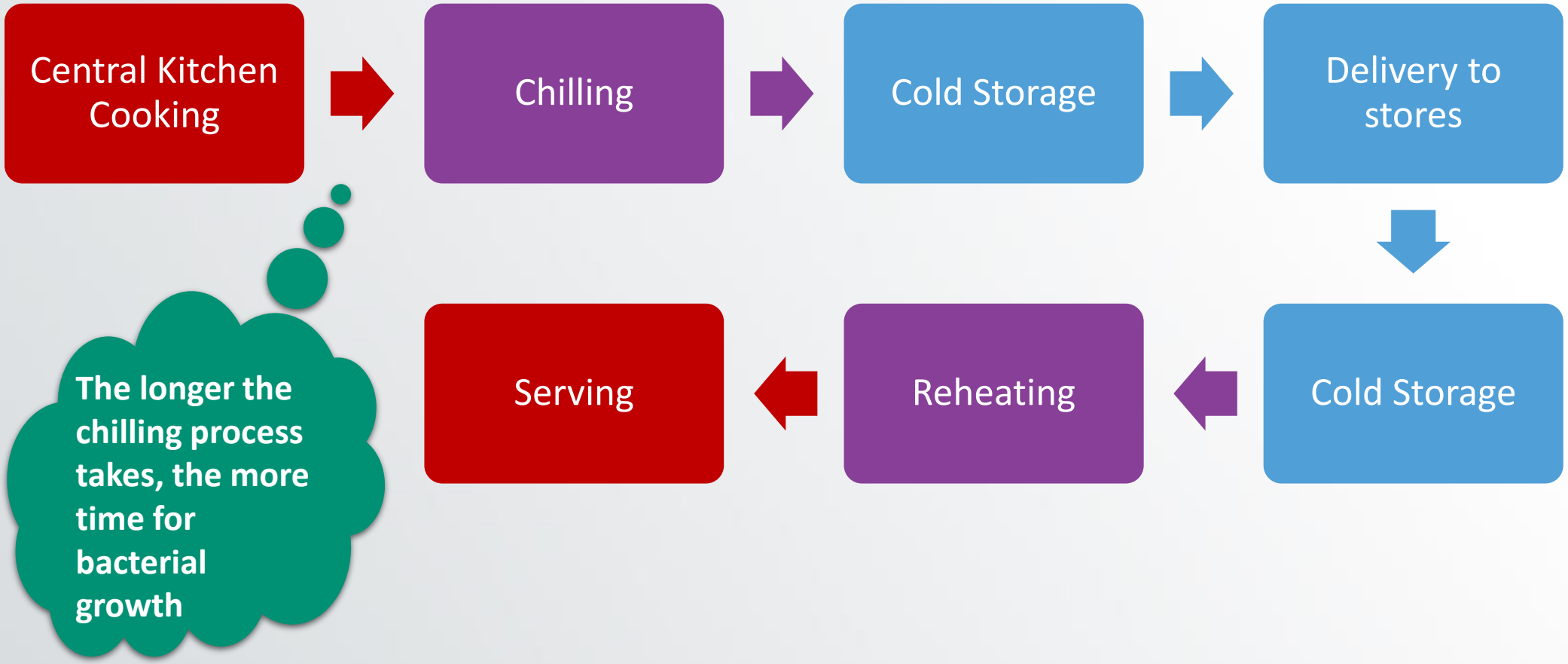
Liquid Chilling Technology & High Pressure Processing Technology

HKPC TechDive

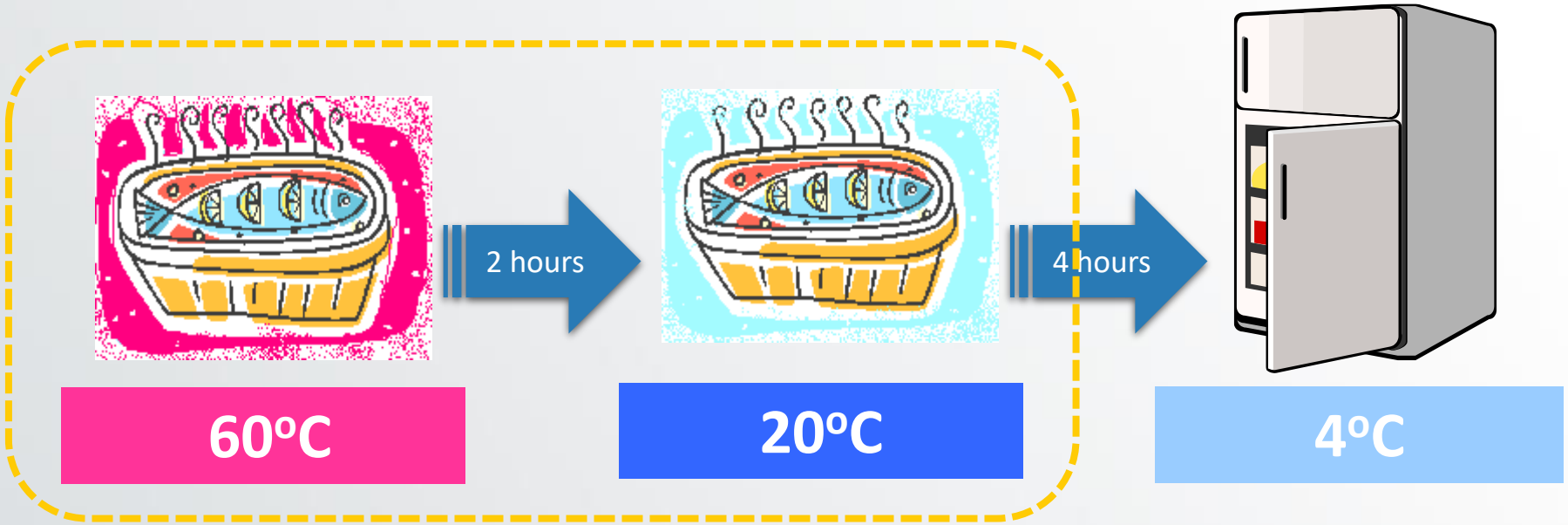
26 March 2020

Liquid Chilling Technology

Main steps in food processing



FEHD's advice



According to the "Food Hygiene Code" formulated by the FEHD, cooked food must be handled with the following cooling methods if they are not served immediately:

I. Reduce the temperature of food from 60 ° C to 20 ° C in 2 hours or less first;

II. Then reduce the temperature of the food from 20 ° C to 4 ° C over the next 4 hours or less.

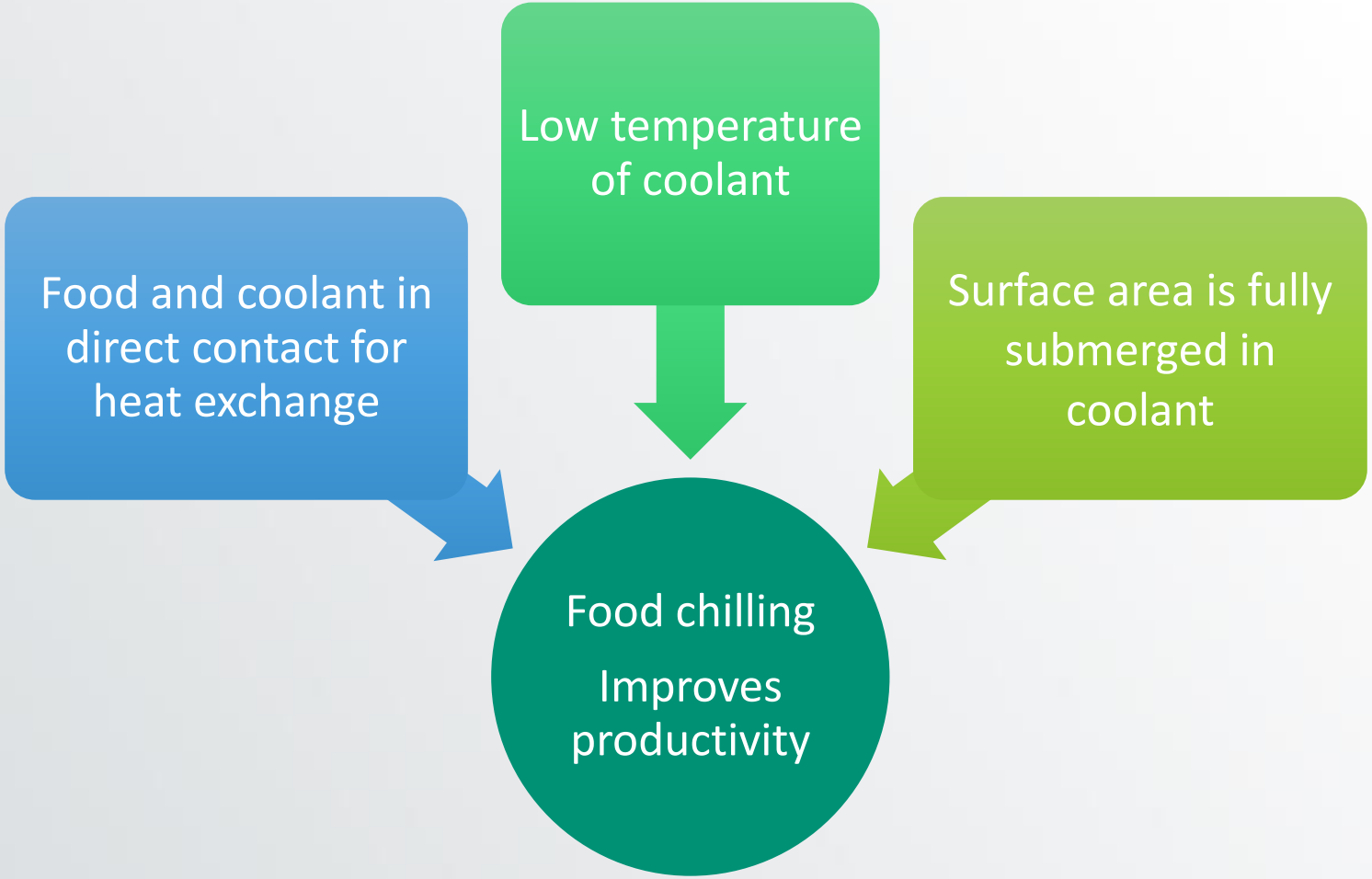
Chilling Speed

The advantages of increasing the chilling speed of food (Reducing chilling time) are as follows：

Principles of Liquid Chilling

- Submerge hot packed food in a chilled food grade coolant to cool it.

Principles of Liquid Chilling



Automatic Liquid Chilling System – 1st generation

2009

- Daily production：10 tons

Automatic Liquid Chilling System – 2nd generation

2011

- Daily production: 20 tons

Each submerging basket 4x2 trays

Manual conveying system

Automatic Liquid Chilling System – 3rd generation

2012

- Daily production: 40 tons

Automatic door opening and output system

Each submerging basket holds 7x2 trays

Automatic conveying system

Automatic Liquid Chilling System – 4th generation

2013

- Daily production: 7 tons
- Expansion for sausage and radish cake chilling

Radish cake after chilling

Chilling tank

Sausages after chilling

Automatic Liquid Chilling System – 5th generation

2014

- Daily production: 40 tons
- Convenience arm to assist loading and unloading

Chilling tank

Automatic Liquid Chilling System – 6th generation

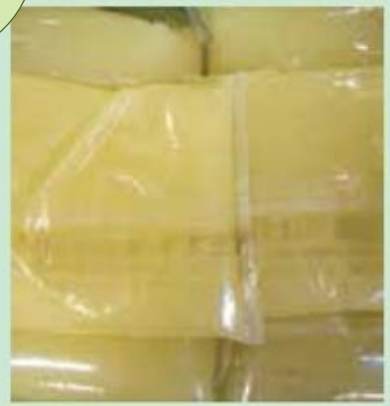
2016

- Daily production: 15 tons

Functionality

Time A
15 mins

Low viscosity soups



Temp. Before: 73°C

Temp. after 15mins: 12°C

Time B
25 mins

Medium viscosity sauces and soups

Temp. Before: 83°C

Temp. after 25mins: 32°C

Time C
35 mins

High viscosity sauces

Temp. Before: 84°C

Temp. after 35 mins: 37°C

Time D
40 mins

Solid foods

Temp. Before: 77°C

Temp. after 25 mins: 17°C

Benefits

Reduces chilling time by 60%,
increases food safety

Reduces operation costs by 50%

Increase food quality,
preserves food freshness

Saves water, electricity, and reduces
waste water. Protects the environment

Awards

機器及機械工具設計優異証書
MACHINERY AND MACHINE TOOLS DESIGN CERTIFICATE OF MERIT

香港中華廠商聯合會
The Chinese Manufacturers' Association of Hong Kong

2011 Hong Kong Awards for Industries:
MACHINERY AND MACHINE TOOLS DESIGN CERTIFICATE OF MERIT

This certificate has been awarded to

Automatic Liquid Freezing System for Food Processing Industry

of

Materials Technology Division, Hong Kong Productivity Council

for its outstanding design

2011 香港工商業獎
機器及機械工具設計優異証書

香港生產力促進局材料科技部的
食品加工業使用的自動化液體速凍系統

為設計優秀之產品　特予證書以資表彰

Dr David Y K Wong, JP
CMA President
廠商會會長　黃友基博士

Professor Lap-Chee Tsui,
Chairman, Panel of Judges
評審委員會主席　徐立之教授

Certificate of Merit,
2011 Hong Kong Awards For Industries

DIPLÔME

Inventions Geneva

SALON INTERNATIONAL DES INVENTIONS

GENÈVE

Après examen, le jury international a décidé

de remettre à: Hong Kong Productivity Council

pour l'invention: Système qui fournit un processus de refroidissement efficace pour la manipulation des emballages d'aliments chauds

MÉDAILLE D'OR
GOLD MEDAL
GOLDMEDAILLE

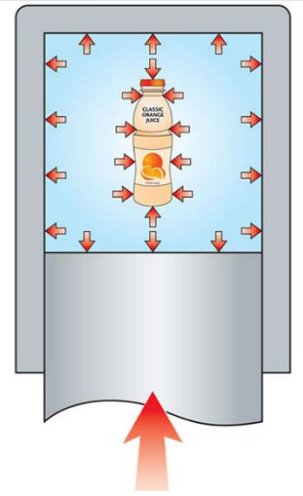
Genève, le 31 mars 2017

Gold Medal,
45th Geneva Inventions

High Pressure Processing (HPP)

Application of Technology

High Pressure Processing Technology



- **Cold** Pasteurization Technology
- High isostatic pressure of **300 – 600MPa** inactivates microorganisms
- Preserve **sensorial** and **nutritional attributes** of fresh food with extended shelf life

Application of Technology
Recognized by FDA

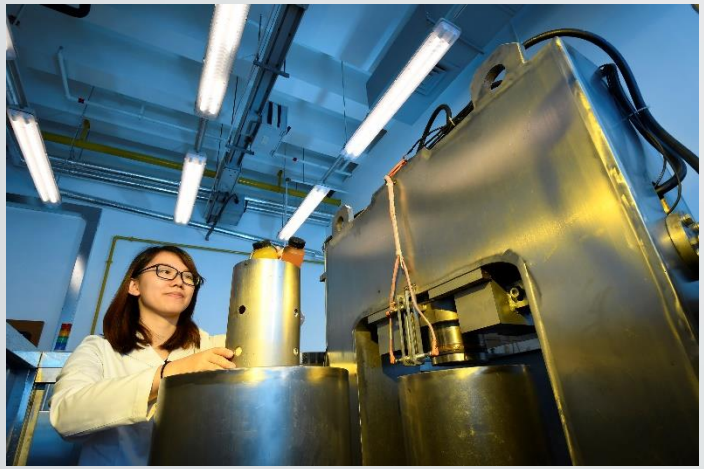
Source: http://www.fda.gov/Food/FoodScienceResearch/SafePracticesforFoodProcesses/ucm101456.htm

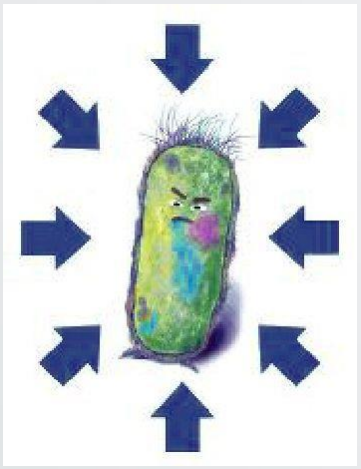
Application of Technology

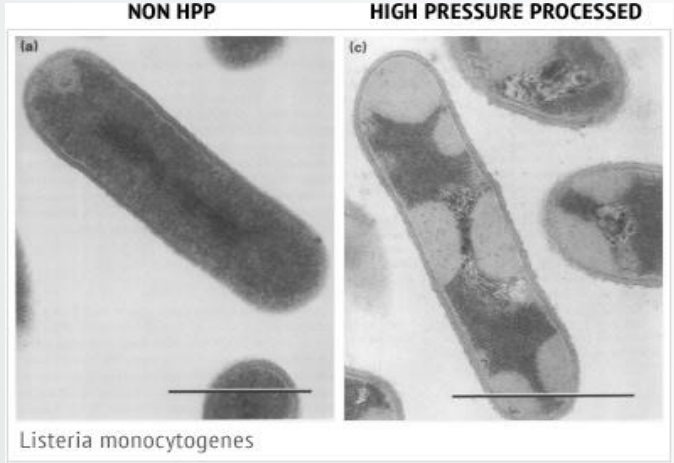
High Pressure Processing

- High Pressure **disrupts bacterial cell membrane** and **denatures enzymes**.

- Increases permeability of cell membrane causing **leakage** and **cell death**.







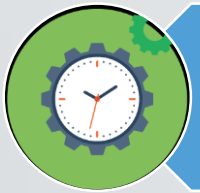
Benefits

Suitable for **heat sensitive products**

Replace the use of **preservatives**

Environmental friendly

Increase yield by **25%+**



Short processing time
(3 mins in pasteurization)

Commercialized System

Product Description- Innovation

Pressure generation by direct hydraulic	• **World 1st** • Minimize maintenance cost
Pressure Reserve Mechanism	• Energy saving **by 30%-40%** • Enhance efficiency
Bi-vessels	• Support in series & independent operation • **Continuous** production
Integrated System	• Only **2 operators** required • User friendly

Functionality

3 days → **70 days (Chill)**

3 days → **90 days (Chill)**

3 days → **60 days (Chill)**

3 days → **60 days (Chill)**

14 days → **28 days (Chill)**

30 days → **120 days (Chill)**

Awards

Gold Medal with the congratulations of the jury, 46th Geneva Inventions

Gold Medal with the congratulations of the jury, Silicon Valley International Invention Festival in 2019

Gold Medal, Beijing Online Invention

China Association of Inventions (CAI) Award Invention & Innovation

Certificate of Merit, 2019 Hong Kong Awards For Industries

Q&A

Hong Kong Productivity Council
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