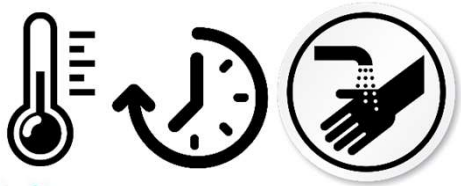
袋裝飯糰的微生物質素

MICROBIOLOGICAL QUALITY OF PACKAGED RICE BALLS

03 2025



食物環境衞生署
Food and Environmental Hygiene Department

食物安全中心
Centre for Food Safety

引言
INTRODUCTION

飯糰是一種以煮熟的飯包裹各式配料而成的飯製品

袋裝飯糰方便的包裝或會促使消費者隨身帶着飯糰隨時吃

Rice ball (onigiri) is a type of rice product with various ingredients embedded inside some cooked rice

The convenient package design of packaged rice balls may encourage consumers to consume rice balls on-the-go

潛在微生物風險
POTENTIAL MICROBIOLOGICAL RISK

- 消費者或會把袋裝飯糰長時間置於不當的溫度，某些飯糰的陳列溫度更在攝氏四度以上
  - 蠟樣芽孢桿菌有機會滋長，這也是煮熟飯製品的常見危害物
- 飯糰餡料通常都是預先製成的即食配料，如食物處理人員不遵守“良好衞生規範”，食物或會受致病菌(例如金黃葡萄球菌)污染
- 李斯特菌是一種在環境中無處不在的致病菌，也可能令配料在配製期間受到污染

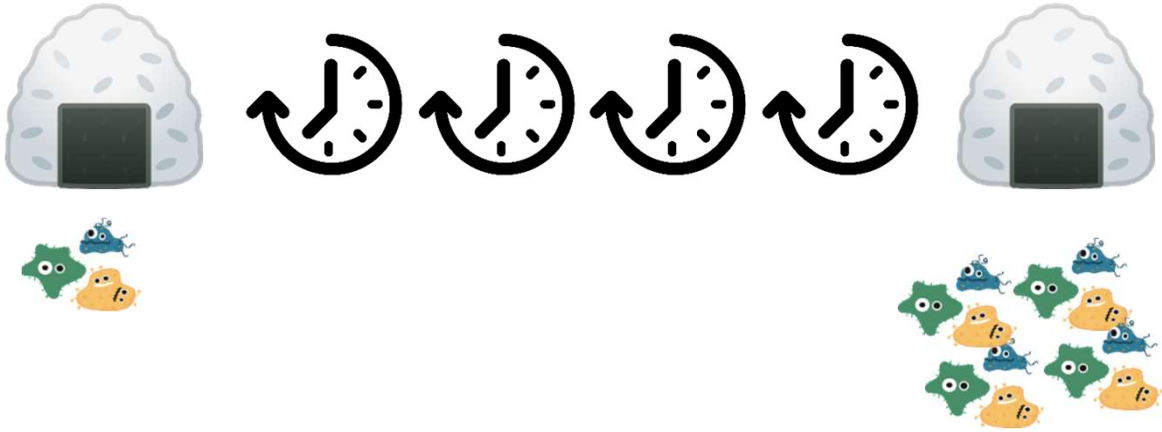
- Consumers may keep packaged rice balls at improper temperature for extended period before consumption. Certain rice balls are also displayed above 4°C
  - *Bacillus cereus* may have the potential to grow, it is a common hazard in cooked rice products
- Ingredients embedded in rice balls are usually ready-to-eat and prepared in advance, post-cooking contamination with *Staphylococcus aureus* may result if food handlers do not observe Good Hygiene Practices (GHPs)
- *Listeria monocytogenes*, a ubiquitous pathogen in the environment, can potentially contaminate the ingredients during the preparation process

金黃葡萄球菌
S. aureus

研究目的
OBJECTIVE

評估袋裝飯糰在購買後在室溫下存放一段時間的微生物質素

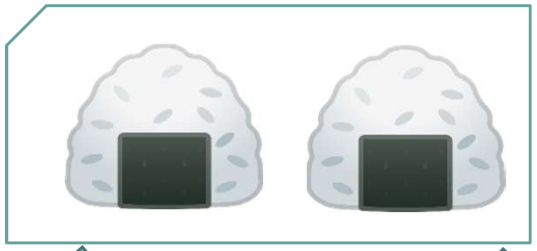
To assess the microbiological quality of packaged rice balls left under ambient condition for a period of time after purchase



研究方法
METHODOLOGY

- **2024年2月至3月間**
- **收集了63對袋裝飯糰樣本**

- February and March 2024
- Collected 63 pairs of packaged rice balls



一個樣本在購買後隨即冷藏於攝氏四度或以下
Keep under refrigeration at ≤ 4°C once after purchase

對照樣本Control sample

飯糰在購買後的微生物質素
Microbiological quality after purchase

一個樣本在購買後置於室溫下四小時後才加以冷藏
Left under ambient conditions after purchase for **4 hours** before refrigeration

已存放四小時
Incubated for 4 hours

模擬樣本Simulated sample

比較對照樣本，飯糰在購買後在室溫下存放一段時間後的微生物質素
Comparison with control samples, microbiological quality after having been left under ambient conditions after purchase

微生物測試
Microbiological tests

樣本種類
SAMPLE TYPES

從四家連鎖外賣店和五家連鎖超級市場/連鎖便利店收集了袋裝飯糰樣本

Collected rice ball samples from 4 takeaway chains & 5 supermarket chains/convenient store chains

配料 Ingredient	樣本數目 No. of Samples		總數 Total
	超級市場/便利店 Supermarket/Convenient store	外賣店 Takeaway store	
未經煮熟的蛋 Egg (undercooked)	1	2	**3**
魚籽 Fish roe	4	6	**10**
沙律醬汁或調料醬 salad sauce or dressing	4	5	**9**
經烹煮的肉類 Cooked meat	10	7	**17**
經烹煮的海鮮 Cooked seafood	15	8	**23**
經烹煮的蛋 Egg (cooked)	0	1	**1**
總數 Total	**34**	**29**	**63**

結果和討論
RESULTS AND DISCUSSION

微生物質素
MICROBIOLOGICAL QUALITY

根據《食品微生物含量指引》
Refers to “Microbiological Guidelines for Food”

指引的食物類別 Food category in the Guidelines	檢測結果 (每克樣本的菌落形成單位) Result (colony-forming unit (cfu/g))		
	滿意 Satisfactory	尚可 Borderline	不滿意 Unsatisfactory
需氧菌落計數檢測結果[攝氏30度/48小時] ACC [30°C /48 hours]			
類別 Category 5 經烹煮並冷凍，在出售或進食前經若干處理程序的食物 Cooked foods chilled but with some handling prior to sale or consumption	$<10^5$	10^5-$<10^7$	$\geq 10^7$
類別 Category 9 生的即食肉類和魚類、凍煙燻魚類 Raw ready-to-eat meat and fish, cold smoked fish	$<10^6$	10^6-$<10^7$	$\geq 10^7$
類別 Category 12 新鮮水果和蔬菜、含有生的蔬菜的食品 Fresh fruit and vegetables, products containing raw vegetables	N/A	N/A	N/A
衞生指示微生物 - 大腸桿菌 Hygiene indicator organisms - *E. coli*			
	<20	20 - $\leq 10^2$	$>10^2$

需氧菌落計數及大腸桿菌結果
ACC and *E. coli* RESULTS
(需氧菌落計數適用樣本數目 NUMBER OF ACC APPLICABLE SAMPLES = 58)

對照樣本Control sample

飯糰在購買後的微生物質素
Microbiological quality after bought

	需氧菌落計數結果 (每克樣本的菌落形成單位) ACC Result (cfu/g)					
	$<10^3$	10^3-$<10^4$	10^4-$<10^5$	10^5-$<10^6$	10^6-$<10^7$	$\geq 10^7$

類別 Category 5	滿意 Satisfactory			尚可 Borderline		不滿意 Unsatisfactory
飯糰 Rice balls	46	2	1	0	0	0

類別 Category 9	滿意 Satisfactory				尚可 Borderline	不滿意 Unsatisfactory
含有魚籽的飯糰 Rice balls containing fish roes	8	0	1	0	0	0

紅燒三文魚飯糰
Rice ball with braised salmon
大腸桿菌 *E. coli* 540 cfu/g

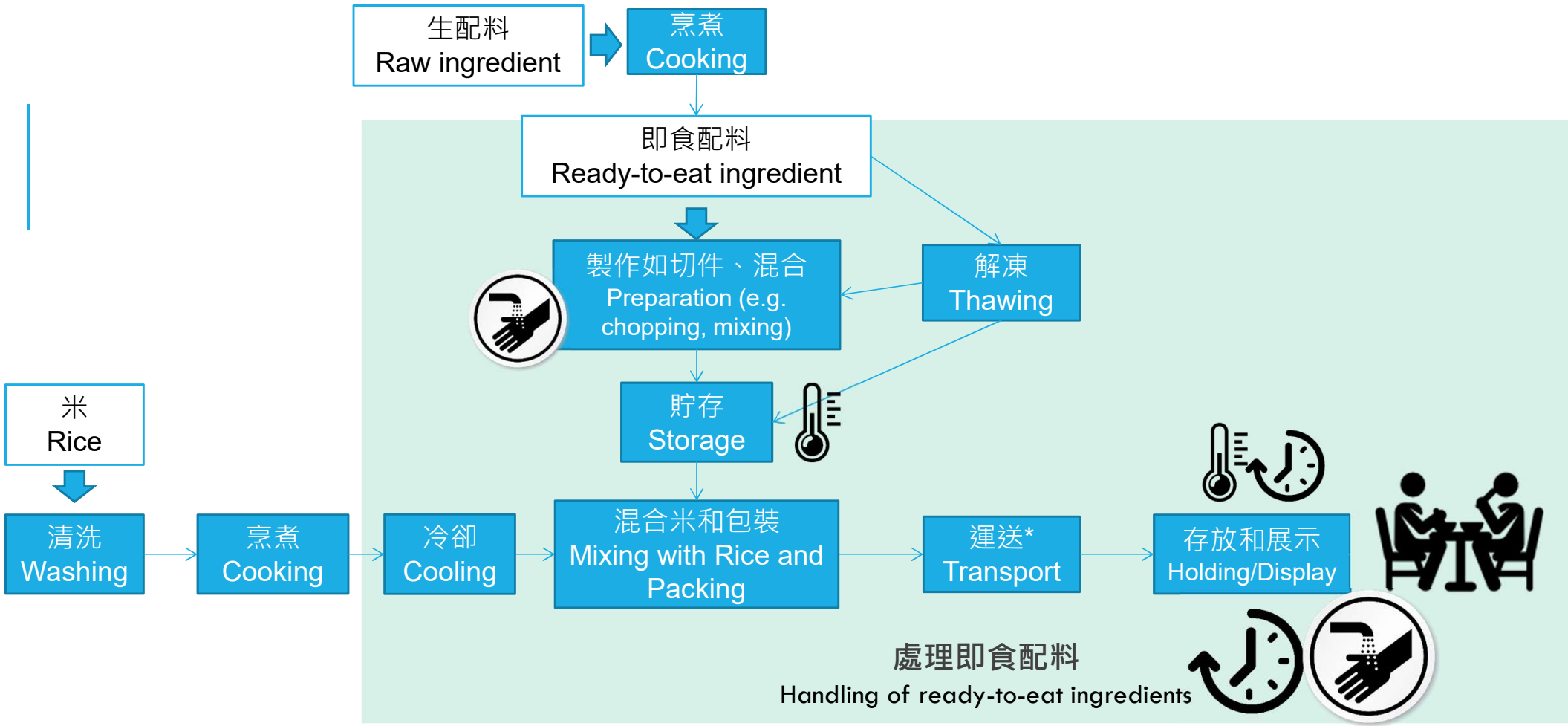
微生物安全
MICROBIOLOGICAL SAFETY

對照樣本Control sample

飯糰在購買後的微生物質素
Microbiological quality after bought

準則 Criterion	檢測結果(每克樣本的菌落形成單位) Result (cfu/g)		
	滿意 Satisfactory	尚可 Borderline	不滿意 (可能危害健康及/或不宜供人食用) Unsatisfactory: potentially injurious to health and/or unfit for human consumption
李斯特菌 *Listeria monocytogenes*	< 10	10 - ≤ 100	> 100
金黃葡萄球菌及其他凝固酶陽性葡萄球菌 *S. aureus* and other coagulase-positive staphylococci	< 20	20 - $\leq 10^4$	> 10^4
蠟樣芽孢桿菌 *Bacillus cereus*	< 10^3	10^3 - $\leq 10^5$	> 10^5

所有樣本均為滿意
Samples were all found satisfactory



*可能只適用於某些生產線

May be only included in some production lines

飯糰在購買後的微生物質素
MICROBIOLOGICAL QUALITY OF RICE BALLS AFTER PURCHASE

- 全部樣本均符合微生物含量方面的食物安全準則，對照飯糰的微生物質素整體令人滿意
- 衞生質素方面，有一個紅燒三文魚對照飯糰樣本因驗出過量大腸桿菌而被評為欠佳
  - 反映製造及處理食物的過程或有待改善
- 用作飯糰餡料的即食配料是預先配製的，而且會貯存一段時間，製造商處理即食配料時，應遵從良好衞生規範，並應限制這些有潛在危險的配料不受溫度控制的時間

- All samples complied with the microbiological food safety criteria. The overall microbiological quality of control samples of rice balls was found satisfactory.
- Hygienic quality: one control sample of rice ball with braised salmon was rated as unsatisfactory, with excessive level of *E. coli* detected
  - There may be room for improvement in the food manufacturing and handling process
- Ready-to-eat ingredients for enclosing in rice balls are prepared in advance and stored for a period of time. Manufacturers should follow the GHPs when handling ready-to-eat ingredients as well as limit the amount of time these potentially hazardous ingredients left out of temperature control

跟進行動
FOLLOW-UP ACTIONS

- 食物安全中心已向相關製造商提供食品製備過程的建議，提醒在處理即食食材時須遵守良好衞生規範，尤其是避免交叉污染及細菌滋生。
- 其後抽取的一個跟進樣本，檢驗結果令人滿意。

- The CFS has provided advice on the food preparatory process to the concerned manufacturer and reminded them to follow GHPs when handling ready-to-eat ingredients especially to prevent cross-contamination and the growth of bacteria.
- A follow-up sample was taken, and the result was satisfactory.

模擬樣本Simulated sample

飯糰在室溫下存放一段時間後的微生物質素

MICROBIOLOGICAL QUALITY OF RICE BALLS AFTER HAVING BEEN LEFT UNDER AMBIENT CONDITIONS FOR A PERIOD OF TIME

(適用樣本數目 NUMBER OF APPLICABLE SAMPLES = 58)

	需氧菌落計數結果 (每克樣本的菌落形成單位) ACC Result (cfu/g)					
	$<10^3$	10^3-$<10^4$	10^4-$<10^5$	10^5-$<10^6$	10^6-$<10^7$	$\geq 10^7$
類別 Category 5	滿意 Satisfactory			尚可 Borderline		不滿意 Unsatisfactory
飯糰 Rice balls	45	2	1	1	0	0
類別 Category 9	滿意 Satisfactory				尚可 Borderline	不滿意 Unsatisfactory
含有魚籽的飯糰 Contain fish roes	8	0	1	0	0	0

沒有達至不滿意水平的樣本

No samples had ACC risen to unsatisfactory level

模擬樣本Simulated sample

飯糰在室溫下存放一段時間後的微生物質素

MICROBIOLOGICAL QUALITY OF RICE BALLS AFTER HAVING BEEN LEFT UNDER AMBIENT CONDITIONS FOR A PERIOD OF TIME

- 在58個模擬樣本中，當中有三個樣本較相應的對照樣本增加了逾十倍
- 驗出過量大腸桿菌紅燒三文魚飯糰模擬樣本的大腸桿菌含量增加了1.1倍

- Nine among 58 simulated samples had ACC increased in which three samples were found to have more than 10-fold increase in ACC comparing to the corresponding control samples
- Only the corresponding simulated sample of the braised salmon rice ball detected with excessive level of *E. coli* had 1.1-fold increase in *E. coli*

模擬樣本Simulated sample

飯糰在室溫下存放一段時間後的微生物質素

MICROBIOLOGICAL QUALITY OF RICE BALLS AFTER HAVING BEEN LEFT UNDER AMBIENT CONDITIONS FOR A PERIOD OF TIME

- 一如其他容易變壞的即食食品，飯糰可在室溫下陳列或存放不多於四小時。凡在攝氏4度至60度的溫度範圍內處理即食配料的時間，均須計算在內
- 飯糰如被致病菌污染和長時間置於室溫下，被污染飯糰中的致病菌可大量滋生，引致食物中毒

- As other perishable ready-to-eat food, rice balls could be displayed or stored at ambient temperature for a period of not more than four hours. All durations during handling of ready-to-eat ingredients, between 4°C and 60°C must be taken into account
- If the rice ball has been contaminated by pathogenic bacteria and left under ambient conditions for a prolonged period of time, the bacteria in the contaminated rice ball may grow to large amount and cause food poisoning.

室溫貯存時間（小時）
Duration of storage at ambient temperatures (hours)

0 to 2	2 to 4	>4
可放入雪櫃留待稍後食用 Can be kept refrigerated for final use later	時限屆滿前食用 Use within the time limit	丟棄 Discard

時間 / 溫度控制的替代方案
ALTERNATIVES TO TIME/TEMPERATURE CONTROL

- 時間 / 溫度控制是控制微生物在容易變壞的即食食品中生長的常用方法
- 改良配料或加入食物添加劑以改變食物的物理參數（如酸鹼值和水活性等）可作為抑制微生物生長的控制措施
  - 讓飯糰可在攝氏四度以上存放一段時間
- 這些控制措施均應加以驗證，以確定是否足以控制相關危害

- Time/temperature control is commonly used to control microbial growth of perishable ready-to-eat food
- The modification of ingredients or addition of food additive in order to change the physical parameters (such as pH and water activity) can be used as control measures for limiting microbial growth
  - Rice balls could be kept at temperatures above 4°C for a certain period of time
- These control measures should be validated to see if they are sufficient to control relevant hazards

生長或產生毒素
Growth or toxin production

酸鹼值 pH	最低 Min.	最適 Optimum	最高 Max.
蠟樣芽孢桿菌 *B. cereus*	5	6 – 7	8.8
金黃葡萄球菌產生毒素 *S. aureus* toxin production	4.5	7 – 8	9.6

(Source : ICMSF)

建議
RECOMMENDATIONS

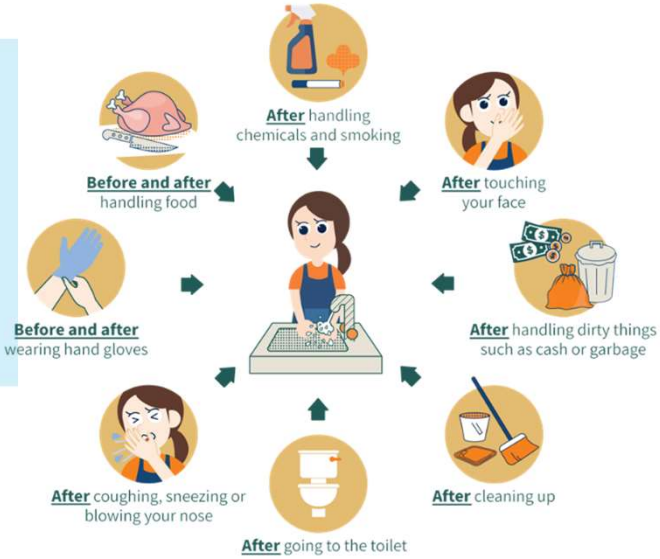
給公眾的建議
ADVICE TO PUBLIC

- 購買包裝飯糰後應盡早食用
- 應遵從包裝上的指示貯存預先包裝飯糰，並於“此日期或之前食用”日期前食用
- 如非立即食用，包裝飯糰應以攝氏四度或以下冷藏

- Consume packaged rice balls as soon as possible after purchase
- Follow the storage instructions on the packaging of pre-packaged rice ball carefully and consume the rice ball before the use-by date
- Refrigerate packaged rice ball at 4°C or below if they are not to be consumed immediately

給業界的建議
ADVICE TO TRADE

- 為員工提供以下設施：梘液、感應式或非觸式設計水龍頭(例如腳踏或手肘操作)、持續供應的清潔自來水(天氣寒冷時提供暖水可鼓勵洗手)、用於抹乾雙手的即棄紙巾，以及免觸式有蓋垃圾桶
- 食物處理人員應接受適當的訓練，學懂如何正確配製飯糰和避免飯糰受污染
  - 以正確的方法洗手和妥為更換即棄手套

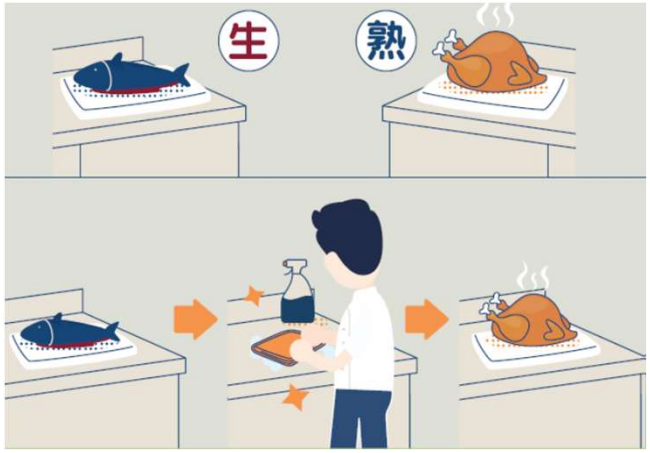


- Food establishments should provide the following items at the washing basin for their staff: liquid soap, tap with sensor or non-touch design (e.g. operated with foot or elbow), a continuous supply of clean running water (warm water can encourage hand washing in cold weathers), disposable tissues for drying hands and rubbish bin with a hands-free lid
- Food handlers should receive proper training to enable them to prepare rice balls properly and prevent contamination of rice balls
  - Wash hands with a correct hand washing method and change disposable gloves properly

給業界的建議
ADVICE TO TRADE

- 預先計劃製作飯糰的時間或次序，以免容易變壞的配料 / 即食配料存放在室溫下過久
- 生的食物配製區與處理即食食品的區域應盡可能分隔開。如需在同一配製區處理生食、熟食及即食食品，有關區域每次使用後均須徹底消毒
- 已包裝即食配料(如適用)開封前應把包裝抹淨和抹乾，以減低交叉污染的風險

- The schedule or sequence of rice balls preparation should be planned so that perishable ingredients to avoid leaving perishable/ready-to-eat ingredients under ambient conditions for too long
- The preparation areas for raw food should be separated from areas for handling of ready-to-eat food, as far as possible. If raw, cooked and ready-to-eat ingredients need to be handled in the same preparation area, disinfect the area thoroughly between uses
- For packaged ready-to-eat ingredients, where appropriate, wipe clean and dry the packaging before opening to minimise potential cross-contamination



給業界的建議
ADVICE TO TRADE

- 食物業商戶如選擇在室溫下陳列飯糰，陳列時間不應超過四小時，當中須計及在攝氏4度至60度下運送、貯存或配製飯糰的全部時間
- 抑制微生物生長使飯糰能在攝氏四度以上存放一段時間的控制措施應加以驗證，以確定是否足以控制相關危害
- 應提供貯存條件方面的建議，以便消費者以安全的方式處理飯糰

- If food businesses choose to display rice balls at ambient temperature, they should display the rice balls for no longer than 4 hours, taking into account all durations during transport, storage or preparation of rice balls between 4°C and 60°C
- Control measures for limiting microbial growth so that the rice balls could be kept at temperatures above 4°C for a certain period of time, should be validated to see if they are sufficient to control relevant hazards
- Recommendations on storage conditions should be provided for the safe handling of rice balls by consumers

研究局限
LIMITATIONS

- 由於市面上的飯糰種類繁多，而且菜單選項亦會改變，因此只涵蓋了選定的類型
- 儘管樣本是成對收集的，但同一類型的個別飯糰的微生物質素可能會有差異，樣本的最初微生物含量可能不同
- 有別於在一套控制良好的實驗室條件下進行的挑戰測試，即把預先設定數量的細菌均勻地接種在食物上在本研究中，細菌很可能不平均地分佈在飯團樣本中

- Due to the wide variety of rice balls available in the market and the changing menu options, only selected types were covered
- Although samples were collected in pairs, there could be variation in microbiological quality among individual rice ball of the same type, where the initial loads could be different for the sample pair
- Unlike a challenge test under a set of well-controlled laboratory conditions where a pre-defined number of bacteria is inoculated evenly onto the food, in this study, bacteria were likely unevenly distributed in the rice ball samples

結論
CONCLUSION

- 飯糰的微生物質素整體令人滿意；即食配料通常會預先製作，作為飯糰的餡料。製造商在處理這些即食配料時，應遵從良好衞生規範
- 數個曾置於室溫下後的模擬樣本所含的微生物增加了逾十倍，然而並沒有安全問題，飯糰亦屬容易變壞的即食食品，應採取時間 / 溫度控制
- 改良配料或加入食物添加劑以改變食物的酸鹼值和水活性等物理參數可作為抑制微生物生長的控制措施，這些控制措施均應加以驗證

- The overall microbiological quality of rice balls was satisfactory; ready-to-eat ingredients are usually prepared in advance for enclosure in rice balls, manufacturers should follow the GHPs when handling these ready-to-eat ingredients
- More than ten-fold increase in microbial count was noted in a few simulated samples after being kept under ambient conditions, although no safety concern was identified. Rice ball also belongs to perishable ready-to-eat foods, and time/temperature control should be adopted
- Modification of ingredients or the addition of food additive in order to change the physical parameters of food can be used as control measures. Nevertheless, these control measures should be validated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謝謝

Thank you