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關鍵字 (英)	rice batter, viscosity, leavened rice cake, texture, volume
摘要 (中)	<p>本研究主要探討米漿黏度與膨脹型米食體積與質地之相關性，並以發糕為膨脹米食樣本。首先選用 TNuS 19、TCS 17、TG 9 試製發糕，並擇一最適米種進行沸水沖入米漿；或用添加三仙膠（xanthan gum）及麵粉取代部份白米等增稠方法。經處理後之米糊，分別測定比重、黏度與擴散黏度值，並利用質地輪廓分析及官能品評，測定發糕之硬度、內聚性、膠性及彈性等，再分別探討米糊黏度與發糕體積及質地之相關性。結果顯示，米種會影響發糕品質。以同屬高直鏈澱粉含量、硬凝膠的秈米：TNuS 19 與 TCS 17 所製之發糕，體積皆大，質地鬆軟，又以 TNuS 19 效果最佳，故 TNuS 19 為製作發糕之最適米種。至於低直鏈澱粉含量、軟凝膠之粳米：TG 9，發糕體積小，質地黏膩，並不適合發糕製作。以 TNuS 19 所製傳統之發糕米糊，黏度約 362 c.P.，經這些加工處理，黏度皆增加 3~10 倍。添加 0.2 % 三仙膠，黏度值上升 10 倍（約 3700 c.P.），發糕體積及裂紋均最大，質地鬆軟細緻，且老化速率最慢，為大眾喜愛，品質最佳。其餘三種處理，沖沸水者，黏度上升 4 倍（約 1500 c.P.），質地亦鬆軟，品質次佳；20 % 麵粉取代者，米糊上升 3 倍（約 1100 c.P.），為上升幅度最小者，所製發糕顏色黃，質地雖軟，但不受大眾喜愛。此外，米糊黏度與發糕體積與比體積具正相關（$r = 0.72-0.89$），但與發糕質地具部分相關。又布氏黏度計所測得之米糊黏度（c.P.）與簡易擴散黏度計測定 30 s、60 s 流動距離之相關性皆高（$r = -0.95$），故未來可提供業界量產時，以簡易型擴散黏度計測量米糊黏度，預測及提高此類產品品質。</p>
摘要 (英)	<p>The correlation between batter viscosity, and volume or texture of rice leavened cake was studied. Rice samples of TCS17, TNuS19 and TG9 were used to make rice leaven cakes, and the most adequate rice was selected to process batter viscosity-increasing treatments. Increasing of batter viscosity was accomplished by adding boiling water into slurry, pre-gelatinizing the rice slurry in an 80 °C water bath for 20 min, adding xanthan gum, or replacing 20 %(w/w) rice by wheat flour. Density, viscosity and flow properties were determined using Brookfield viscometer and Bostwick consistometer, production of bubble was observed by hot stage microscopy. Also, hardness, cohesiveness, gumminess, resilience of the final products were analyzed by Texture Profile Analysis (TPA) and sensory evaluation. Results indicated that quality of rice leaven cake was affected by rice variety. Rice leaven cakes from rice (both TNuS 19 and TCS 17) with high amylose content and hard consistency showed greater volume and softer texture, and leavened rice cake made from TNuS 19 had the best qualities. Conversely, TG 9 rice, characterized as low amylose content and soft gel consistency, was not appropriate to make rice leaven cake, according to the smaller volume and higher adhesive of its final product. Among the three varieties studied, the TNuS 19 was the most suitable sample for producing leavened rice cakes, however, the viscosity of batter from this</p>

rice was low. The viscosity could be increased 3-10 folds after viscosity-increasing treatment. Ten-fold of viscosity-increasing was achieved in the presence of 0.2 % xanthan gum, this lead to the highest volume and largest crack, smaller pores on surface, softer texture, and slower staling rate, thus, the best quality was obtained. The addition of boiling water to slurry, viscosity of batter was found to increase 4-fold. The highest crack starting temperature, the longer lag time, and soft texture of leavened rice cake were observed, the quality was second to the best. Using 20 % wheat flour to replace rice, 3-fold increasing in batter viscosity was observed. Quality of this product was found to be soft texture and light yellow appearance. The staling rate was slower than that of control, and resulted in product of poor quality. Moreover, the correlation coefficients between viscosity and volume or specific volume of rice leaven cake were 0.72-0.89. This reveals that the greater viscosity the larger volume of leavened rice cake. However, no significant correlation between viscosity and texture parameters was found. Correlations between batter viscosity determined by Brookfield viscometer and flow distance measured by Bostwick consistometer for 30 s/60 s were high($r=-0.95$). Conclusively, the present study provides a reference for industrial production evaluation of leavened rice cake through the determination of viscosity, volume and texture.

論
文
目
次

目錄頁次壹、前
 言.....1 貳、文獻回
 顧.....3 影響米漿黏度與米
 食品質之因子.....3 一、稻
 米.....3 1. 品
 種.....3 2. 組
 成.....7 1) 直鏈澱
 粉.....7 2) 蛋白
 質.....8 3) 脂
 質.....10 3. 穀粉粒
 徑.....11 4. 儲藏時
 間.....11 二、添加
 物.....12 1. 食用
 膠.....12 2. 乳化
 劑.....13 3. 油
 脂.....16 4. 澱
 粉.....17 三、加工條
 件.....17 1. 浸漬條
 件.....17 2. 磨粉方
 法.....20 1) 乾
 磨.....20 2) 半乾
 磨.....22 3) 溼
 磨.....22 3. 預糊化處
 理.....24 1) 糊化程
 度.....25 2) 水份含
 量.....25 3) 溫度與時

間	.....	26	4. 攪拌方
式	.....	30	5. 置放條
件	.....	33	參、試驗設
計	.....	34	肆、材料與方
法	.....	35	一、實驗材
料	.....	35	1. 主要材
料	.....	35	2. 添加
物	.....	35	二、米穀粉製
備	.....	36	三、發糕製
作	.....	36	四、米穀粉理化性質測
定	.....	36	1. 基本成份分
析	.....	36	1) 水
份	.....	36	2) 粗蛋白
質	.....	36	2. 直鏈澱粉含
量	.....	38	3. 糊化溫
度	.....	38	4. 凝膠展延
度	.....	38	5. 粒徑大
小	.....	38	五、黏度值測
定	.....	39	1. 布氏黏
度	.....	39	2. 簡易型擴散黏
度	.....	39	六、米糊加熱變化測
定	.....	39	1. 顯微影像觀
察	.....	39	2. 升溫速率及裂紋開始產生的
溫度	.....	39	3. 糊化
度	.....	39	4. 糊化溫
度	.....	39	七、發糕品質測
定	.....	39	1. 水
份	.....	39	2. 水活
性	.....	40	3. 體積、比體積與膨脹
率	.....	40	4. 物
性	.....	40	5. 官能品
評	.....	40	八、統計分
析	.....	41	伍、結果與討
論	.....	42	一、稻米之理化特
性	.....	42	1. 直鏈澱粉含
量	.....	42	2. 粗蛋白
質	.....	42	3. 凝膠展延
度	.....	42	4. 糊化溫度與熱
焓	.....	43	二、米種對米漿（糊）性質及
發糕品質之影響	.....	45	1. 米漿（糊）黏度及比
重	.....	45	2. 發糕品
質	.....	45	1) 體積與比體
積	.....	45	2) 質地輪廓分
析	.....	46	3) 老化速

率	47	三、增稠處理對米漿理化
性質及發糕品質之影響	52	1. 米漿黏度及比
重	52	2. 米漿(糊)之熱性
質	53	1) 示差掃描熱分
析	53	2) 升溫速
率	57	3) 裂紋開始溫度與時
間	57	4) 氣泡產生情
形	60	(1) 氣泡面積變
化	60	(2) 氣泡大小分
佈	61	3. 發糕品
質	65	1) 水分及水活
性	65	2) 體積與外
觀	65	3) 質地剖面分
析	67	4) 官能品
評	68	5) 老化速
率	68	四、米糊黏度與發糕品質
之相關性	75	1. 布氏黏度值與擴散黏度
值	75	2. 米糊黏度與發糕體積、比體積、膨脹
率	75	3. 米糊黏度與發糕質
地	75	陸、結
論	77	柒、參考文
獻	79	表目錄 頁次 表
一、台灣主要秈、粳稻品種之理化性質	4	表二、米
種對產品品質之影響(一)	5	表三、米種對產
品品質之影響(二)	6	表四、米種及儲存時間
對製作發酵型米製品品質之影響	9	表五、三仙膠對米漿及發糕品
質之影響	14	表六、添加食用膠對麵包品質之影
響	15	表七、乳化劑及大豆油對米穀粉及米食品
質之影響	18	表八、油脂與水量對米製品品質之影
響	19	表九、浸漬條件對米製品品質之影
響	21	表十、磨粉方法對米製品品質之影
響	23	表十一、米漿預糊化處理時間對碗粿質地
之影響	27	表十二、加熱(80°C)時間對米漿糊化度、熱分
析及肉圓品質之影響	28	表十三、預糊化粿糰含量對米苔目質地之影響
表十三、預糊化粿糰含量對米苔目質地之影響	29	表十四、攪拌方式與置放時間對米蛋糕與發糕品質之影響
表十四、攪拌方式與置放時間對米蛋糕與發糕品質之影響	31	表十五、
攪拌方式對米製品品質之影響	32	表十六、發糕
之配方	35	表十七、稻米之理
化特性	44	表十八、米種對米糊性
質及發糕性質之影響	48	表十九、米種對發糕物性之
影響	49	表二十、米種對發糕貯存期間硬
度變化之影響	50	表二十一、加工條件對發糕米糊比
重、黏度及流動距離之影響	54	表二十二、加工方式對米糊之澱粉熱性
質之影響	56	表二十三、加工條件對米糊升溫速率及裂紋

	<p>開始溫度、時間 之影響.....59 表二十四、米糊加熱過程中之氣泡粒徑變化.....62 表二十五、加工方式對發糕水分、水活性及體積之影響.....66 表二十六、加工方式對發糕質地之影響.....70 表二十七、加工條件對發糕官能品評特性之影響.....71 表二十八、加工條件對室溫貯存（25℃）發糕硬度之影響.....72 表二十九、黏度值、流動距離與發糕質地間之相關係數.....76 圖目錄 頁次 圖一、發糕製程及實驗架構流程圖.....37 圖二、米種對發糕老化速率之影響.....50 圖三、米種對發糕外觀之影響.....51 圖四、TNuS 19 米穀粉及米糊示差掃描熱分析圖.....55 圖五、加工條件對米糊溫度之影響.....58 圖六、米糊加熱氣泡變化之顯微影像.....63 圖七、100℃米糊氣泡粒徑分佈.....64 圖八、加工方式對發糕老化速率之影響.....73 圖九、加工方式對發糕外觀之影響.....74</p>
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<p>論 文 頁 數</p>	<p>91</p>
<p>附 註</p>	
<p>全 文 點 閱 次 數</p>	
<p>資 料 建 置 時 間</p>	

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