

記錄 編號	6549
狀態	NC094FJU00255001
助教 查核	
索書 號	
學校 名稱	輔仁大學
系所 名稱	食品營養學系
舊系 所名 稱	
學號	492446115
研究 生 (中)	何皇滄
研究 生 (英)	HUANG-HU, HO
論文 名稱 (中)	蜂蜜酒釀造之研究
論文 名稱 (英)	Studies on the Making of Honey Wine
其他 題名	
指導 教授 (中)	陳雪娥
指導 教授 (英)	Hsueh-err Chen
校內 全文 開放 日期	

校外全文開放日期	
全文不開放理由	
電子全文送交國圖.	
國圖全文開放日期.	
檔案說明	
電子全文	
學位類別	碩士
畢業學年度	94
出版年	
語文別	中文
關鍵字(中)	蜂蜜 蜂蜜酒 熟成 餐中酒 苦味
關鍵字(英)	honey honey wine aging table wine bitter
摘要(中)	蜂蜜是台灣養蜂人家的主要收入來源，多以稀釋後直接飲用，而缺乏其他的加工產品，雖有市售蜂蜜酒，但均為蒸餾酒型式，釀造酒很少見。蜂蜜酒有發酵時間長、產生苦味及不易澄清等問題，不易釀製成高品質的餐中

酒。因此，本研究針對蜂蜜原料特性，探討發酵與熟陳條件，以釀製品質較佳的蜂蜜酒。將蜂蜜以水稀釋至 24°Brix，添加營養劑 (Berthold 之配方、實驗室改良配方、Fermaid KTM 及 Super food)，並以檸檬酸及酒石酸調整 pH 至 3.2，接種菌 (*S. cerevisiae* BCRC 21823、*S. bayanus* BCRC 21623、*C?te des Blancs* 及 *Lalvin 71B-1122*) 於 20°C 或 25°C 進行發酵，經 16°C 或 25°C 熟陳三個月後，探討蜂蜜來源、前處理、營養劑種類、菌種、發酵及熟成溫度等對蜂蜜酒品質之影響，並由品評找出適合蜂蜜酒的發酵條件。菌種選擇方面，蜂蜜發酵醪分別接入四種菌於 20°C 下進行發酵，新酒的成分不具差異性，熟成一個月後之品評結果以 *S. cerevisiae* BCRC 21823 及 *C?te des Blancs* 所釀造的蜂蜜酒風味品質較佳。選用此兩株酵母菌在不同溫度進行發酵，結果於 25°C 下的發酵速率較 20°C 快，經感官品評後以接種 *C?te des Blancs* 於 25°C 下釀造的蜂蜜酒具有較佳的風味品質。前處理影響發酵速率，以加熱處理後再分離上清液之前處理組發酵最慢需 25 天，而其他前處理組 15 天即可發酵結束，但是加熱處理分離上清液釀製之蜂蜜酒澄清度高，而且風味上不具雜味，因此為適合的前處理操作。不同營養劑的添加對發酵速率沒有顯著差異，但添加 Super food 能使酵母菌有效利用可發酵糖，轉換較多的酒精，酒精度可達 13 % v/v，然而經品評後，添加自行改良配方之營養劑釀製之蜂蜜酒感官品質較佳。不同蜂蜜來源之蜂蜜 (嘉義龍眼蜜、阿枝龍眼蜜、埔里龍眼蜜及埔里荔枝蜜)，其發酵速率及感官品質亦有不同，以嘉義龍眼蜜發酵速率最快需 20 天，但埔里龍眼蜜需長達 55 天；將熟成三個月後之蜂蜜酒進行品評後，感官排序以埔里荔枝蜜所釀製之蜂蜜酒為最佳。熟成溫度對於蜂蜜酒的成分影響不大，但隨著熟陳處理三個月，蜂蜜酒之澄清度上升且總酚含量下降。於 25°C 熟陳之褐變值明顯較 16°C 高，造成外觀上之品質較佳而非平淡無色。香氣方面，熟成溫度間不具顯著差異，但整體感則以 25°C 熟陳處理之蜂蜜酒較 16°C 佳。因此以埔里所產之荔枝蜂蜜配合最適的發酵條件，可釀造出品質較佳之蜂蜜酒。

摘要
(英)

Honey is the main income for beekeepers in Taiwan. Typically, honey consumption is based on watering down product, that other processed products are lacking. Although, certain honey wines are in the market, most of them are distilled, hardly made by brewing. Slow fermentation rate, bitter taste, as well as cloudiness development during storage are major concerns of honey wine, and those lead to a difficulty in brewing high quality table wines. Therefore, this study aimed to characterize various honeys, and to study the conditions of fermentation, and aging process for high quality products. Raw honey was diluted to 24°Brix by water. Mixture was added with nutrient additives such as additives used by Berthold, modified nutrient additives by our laboratory, Fermaid KTM and Super food, and the pH was then adjusted to 3.2 by citric acid and tartaric acid. The honey must was inoculated with yeast starters (*S. cerevisiae* BCRC 21823, *S. bayanus* BCRC 21623, *C?te des Blancs* and *Lalvin 71B-1122*), and fermented at 20°C or 25°C, respectively. The honey wine had been aged at 16°C or 25°C for 3 months. The influences of varieties of honey, pretreatments, nutrient additives, yeast strains, fermentation and aging temperatures, and on the quality of honey wine were studied. The conditions of fermentation for the optimal quality of honey wine were

achieved by sensory evaluation in this study. Selection of yeast strains was accomplished by inoculating individual 4 strains in honey must, and fermented at 20°C. No significant difference was noticed among young wines, however, vinified by *S. cerevisiae* BCRC 21823 and C?te des Blancs wine samples had better sensory quality after one month aging. These two strains were then selected for the following fermentation, and the results revealed greater fermentation rate was related to process temperature, moreover, wine vinified by C?te des Blancs at 25°C was characterized with the best flavor quality from sensory evaluation. The fermentation rate was found in association with the different pretreatments. Separation of precipitate from heat treatment must result in the slowest fermentation rate of 25 days, but the others pretreatments took 15 days. The use of heat treatment and separate precipitate lead to the wine with greatest clarity and pure of flavor among pretreatments, thus this process was an adequate pretreatment for making honey wine. The inclusion of nutrient additives showed no significant difference in fermentation rate, but the addition of Super food allowed yeast strain to convert more fermentation sugar to alcohol up to 13 % (v/v). From the sensory test, the wine with nutrient additive formulated by our laboratory imparted better sensory characteristics. The fermentation rate and sensory quality were associated with the varieties of honey (including longan honey from Chiayi, A-CHIH, Puli and lichee honey from Puli), that the longan honey from Chiayi exhibited the fastest fermentation rate of 20 days, and those from Puli 55 days. The honey wine made of Puli lichee was ranked the best by sensory evaluation after 3 months aging. The aging temperatures didn' t affect the honey wine compositions, but the aging duration favored the clarity and caused the decrease of total phenol. The extent of browning during aging was greater at 25°C than 16°C, what be beneficial to impart a better visual acceptance. The aging temperatures showed no significant difference in aroma perception, but overall sensory quality of honey wine aged at 25°C was characterized better than those at 16°C. Therefore, high quality of honey wine is processed from the Puli lichee honey under the fermentation condition developed in this study.

論文 目次	大綱 頁次 第一章、前言.....1
	第二章、文獻回顧.....3
	一、蜂蜜簡介.....3
	二、蜂蜜酒釀造.....3
	三、影響蜂蜜釀造酒品質之因素.....5
	(1)蜂蜜原料.....5
	(2)原料之加熱前處理.....9
	(3)酵母菌.....12
	a. 酵母菌代謝產生的主要成分.....12
	b. 影響酵母菌生長之因素.....16
	i. 營養需求.....16
	ii. 酵母菌種.....17
iii. 菌?處理.....17	
iv. 發酵溫度.....17	

度	19 (4)熟陳作
用	22 (5)澄清處
理	24 a.轉
桶	24 b.安定處
理	24 c.澄清
劑	25 i.帶正電性澄清
劑	25 ii.帶負電性澄清
劑	27 d.過
濾	27 第三章、材料與方
法	28 一、實驗材
料	28 二、儀器設
備	29 三、實驗架
構	30 四、蜂蜜酒的釀製
流程	31 五、物化分
析	34 (一)、測定方
法	34 (二)、釀酒過程中成分測
定之項目	46 六、感官品評分
析	47 七、統計分
析	49 第四章、結果與討
論	50 一、菌種選
擇	51 二、發酵溫
度	61 三、不同前處
理	70 四、不同營養
劑	78 五、不同原料來
源	86 第五章、結
論	100 第六章、參考文
獻	102 表目錄 頁次 表一、
台灣的主要及次要蜜源植物表	4 表二、蜂蜜
之中國國家標準	7 表三、市售蜂蜜
之維生素及礦物質含量	8 表四、市售的蜂蜜成
成分分析	10 表五、市售蜂蜜產品中還
原糖及羥甲基糠醛的含量	11 表六、葡萄酒中各種酵母之酯
類生成量	14 表七、酵母菌對葡萄酒中含硫化合
物生成之影響	18 表八、澄清劑之使用範
圍	26 表九、龍眼蜂蜜發酵醪之成
分分析	51 表十、接種不同菌種之蜂蜜酒熟
陳一個月後之成分分析	58 表十一、接種不同菌種於不同溫度發
酵熟陳一個月後之成分分	
析	67 表十二、接種
不同菌種於不同溫度發酵熟陳一個月後之感官排	
序	68 表十三、不同
前處理之蜂蜜酒熟陳一個月後之成分分析	75 表十四、不同前處
理之蜂蜜酒熟陳一個月後之感官排序	77 表十五、添加不同營養
劑之蜂蜜酒熟陳一個月後之成分分析	84 表十六、添加不同營養劑之

蜂蜜酒熟陳一個月後之感官分析.....85	表十七、不同蜂蜜來源之組成.....87
表十八、蜂蜜酒熟成過程中 pH、可滴定酸、揮發性酸及酒精度之變化.....92	表十九、蜂蜜酒熟成過程中總酚及澄清度之變化.....94
表二十、蜂蜜酒熟成過程中 L, a, b 及褐變值之變化.....95	表二十一、不同蜂蜜來源之蜂蜜酒於 16°C 熟陳三個月之感官排序.....96
表二十二、不同蜂蜜來源之蜂蜜酒於 25°C 熟陳三個月之感官排序.....97	表二十三、比較不同熟陳溫度之荔枝蜂蜜酒熟陳三個月之感官排序.....99
圖目錄 頁次	圖一、市售蜂蜜之生產流程.....6
圖二、酵母菌在發酵期間產生之主要風味成分的產生途徑.....13	圖三、比較接種 10 % 及 0.4 % 菌於苜蓿蜜的發酵速率.....20
圖四、不同溫度之發酵過程中菌數的變化.....21	圖五、不同溫度對苜蓿蜜發酵速率之影響.....23
圖六、蜂蜜酒製造流程圖.....30	圖七、20°C 發酵期間不同菌種對蜂蜜酒醪發酵速率之影響.....53
圖八、20°C 發酵期間不同菌種對蜂蜜酒醪 pH 之影響.....54	圖九、20°C 發酵期間不同菌種對蜂蜜酒醪可滴定酸之影響.....55
圖十、20°C 發酵期間不同菌種對蜂蜜酒醪揮發性酸之影響.....56	圖十一、接種不同酵母菌發酵之蜂蜜酒經熟陳一個月後之平均 感官排序.....60
圖十二、不同菌種及發酵溫度對蜂蜜酒醪發酵速率之影響.....62	圖十三、不同菌種及發酵溫度對蜂蜜發酵期間揮發性酸 之影響.....63
圖十四、不同菌種及發酵溫度對蜂蜜發酵期間 pH 之影響.....65	圖十五、不同菌種及發酵溫度對蜂蜜發酵期間可滴定酸 之影響.....66
圖十六、25°C 發酵期間不同前處理對蜂蜜酒醪發酵速率之影響.....71	圖十七、25°C 發酵期間不同前處理對蜂蜜酒醪 pH 之影響.....72
圖十八、25°C 發酵期間不同前處理對蜂蜜酒醪可滴定酸之影響.....73	圖十九、25°C 發酵期間不同前處理對蜂蜜酒醪揮發性酸之影響.....74
圖二十、25°C 發酵期間不同營養劑對蜂蜜酒醪發酵速率之影響.....79	圖二十一、25°C 發酵期間不同營養劑對蜂蜜酒醪可滴定酸之影響.....80
圖二十二、25°C 發酵期間不同營養劑對蜂蜜酒醪 pH 之影響.....81	圖二十三、25°C 發酵期間不同營養劑對蜂蜜酒醪揮發性酸 之影響.....82
圖二十四、不同蜂蜜來源之蜂蜜發酵醪於 25°C 發酵期間發酵 速率之變化.....88	圖二十五、不同蜂蜜來源之蜂蜜發酵醪於 25°C 發酵期間 pH 之變

	<p>化……………89 圖二十六、不同蜂蜜來源之蜂蜜發酵醪於 25°C 發酵期間可滴 定酸之變化</p> <p>化……………90 圖二十七、不同蜂蜜來源之蜂蜜發酵醪於 25°C 發酵期間揮發 性酸之變化</p> <p>化……………91 附錄 頁次 附錄一、20°C 下比重與酒精度對照表……………114 附錄二、比重及抽出物含量之對照圖……………115 附錄三、還原糖及總糖滴定計算對照表……………116 附錄四、蜂蜜酒差異性排序法品評問卷……………117</p>
<p>參考 文獻</p>	<p>方清居。1997。蜂蜜發酵之酵母篩選及添加劑影響研究。農林廳蠶蜂業改良場專題討論 pp 142-147。冉亦文。1990。葡萄酒的陳熟與安定。製酒科技專論彙編 12：1-14。安奎、何鎧光。1997。蜂蜜。養蜂學 pp228-256。華香園。臺北市。行政院經濟部中央標準局。1999。中國國家標準。行政院農委會。2002。農業統計年報。何國震。1980。養蜂學 pp 276-284。福建科學技術出版社。吳登楨、吳添金。1997。蜂蜜及水果發酵飲料製作之探討。農林廳蠶蜂業改良場專題討論 pp 126-141。吳登楨、吳添金。1999a。結晶蜜與蜂蜜酒之加工。苗栗區農業專訊 11:14-15。吳登楨、吳添金。1999b。蜂蜜酒發酵釀製之研究。苗栗區農業專訊 11:6。李元震。1996。葡萄酒混濁之處理。製酒科技專論彙編 18:122-131。李建興。2002。龍眼蜂蜜甜酒及蒸餾酒之研發。大葉大學食品工程學系碩士論文。林世斌。2001。蜂蜜酒及蜂蜜醋釀造實驗。國立宜蘭技術學院農業推廣委員會農業推廣報告 pp 10。林讚峰。1994。酵母菌對酒類香氣生成之貢獻。製酒科技專論彙編 (16):1-24。胡鳳綬。1988。酒類中之香氣成分。製酒科技專論彙編 10:139-174。胡鳳綬。1993。酒中之酯類香氣成分。製酒科技專論彙編 15:311-315。倪德全。1982。酵母菌的有機酸生成及利用。製酒科技專論彙編 4:78-91。凌勝豐。1983。百香果之檢驗標準之研究。台灣大學園藝所碩士論文。根元茂、工本健一、薄中隆。1978。釀協 73(1):25。張世揚。1982。蜂蜜的成分。科學農業 30(7/8):350-355。張世揚。1986。基礎養蜂學。淑馨出版社。張世揚。1994。蜂蜜的採收與保鮮。蜂蜜處理與加工訓練班講義 D 1-2。蠶蜂業改良場編印。張景輝、游銅錫、林麗雲、張基郁。1998。龍眼花及龍眼蜂蜜中重要香氣成分之探討。中國農業化學會誌 36(6)：589-597。陳世璧、袁澤良。1988。蜂蜜產品保鮮、加工和利用。北京科學普及出版社 pp 4-14。陳其潮。1997。百花之精釀成蜜。食品資訊 133:44-52。陳運照。1993。蜂產品消費小百科系列 1 - 如何辨別蜂蜜的真假好壞 pp 17。台灣省蠶蜂業改良場。陳蕙蓉。1990。番石榴果汁之澄清加工。國立台灣大學食品科技研究所碩士論文。黃文誠。1985。蜂蜜釀酒 pp 74。北京農業出版社。黃村能、冉亦文。1987。金香和奈加拉葡萄酒比較試驗。酒類試驗所研究年報。p.117-124。溫惠美、陳景川、陳淑華。1995。市售蜂蜜之品質調查。藥物食品分析 3(4):295-306。歐陽港生。1991。中國傳統蒸餾酒的色香味及品評。製酒科技專論彙編 13: 67-78。鄭元春、蔡振聰、安奎。1996。臺灣蜜源植物之調查研究。博物館年刊 29：117- 155。台灣省立博物館。謝豐國。1989。養蜂技術訓練高級班講義。蠶蜂業改良場。Adams SL, Niesen GV. 1963a. Honey Beverage and Process for Making It. US. Pat. 3,100,705. Adams SL,</p>

Niesen GV. 1963b. Beverage from Honey and Process for Making It. US. Pat. 3,100,706. Amerine MA, Berg HW, Kunkee RE, Ough CS, Singleton VL, Webb AD. 1980. The Technology of Wine Making. 4th ed. Connecticut : AVI. Amerine MA. 1981. "Wine Production Technology in the United state" . ACS Society. Washington D.C. p. 46-51, 137-139. Anuna MI, Akpapunam MA. 1995. Effect of temperature and time on the quality of pineapple wines obtained from must fermented with Raffia-Wine and Up-Wine yeast strains. Discovery and Innovation. 7(2):143-149. AOAC. 1984. Official methods of analysis. 14th ed. Association of Official Analytical Chemists. Washington D. C., USA. Aragon P, Atienza J, Climent MD. 1998. Influence of clarification, yeast type, and fermentation temperature on the organic acid and higher alcohols of malvasia and muscatel wine. Am J Enol Vitic. 49(2): 211-219. Banat FA, Al-Bashir B, Al-Asheh S, Hayajneh O. 2000. Adsorption of phenol by bentonite. Environmental Pollution. 107:391-398. Beltran G, Novo M, Roz?s, Mas A, Guillam?n JM. 2004. Nitrogen catabolite repression in *Saccharomyces cerevisiae* during wine fermentations. FEMS Yeast res. 4:625-632. Benda I. 1982. Wine and brandy. In: Reed G. (Ed.), Prescott and Dunn' s Industrial Microbiology. Avi Technical Books, Westport. p.292-402. Bergeret G, DeCastro JA. 1943. Honey wine. Revta Asoc Ing Agron Montev. 15:60-70. Berthold R. 1997. A new concept in mead making. Am Bee J. 137(10):729-731. Bertullo WA, Etchandy AM. 1943. A comparative study of the fermentation of honey must using wine yeasts and bee yeasts. Retva Asoc Ing agron Montev. 15:71-73. Boulton RB, Singleton VL, Bisson LF, Kundee RE. 1995. "Principles and Practices of Winemaking" . Chapman & Hall, New York. Brandolini V, Romano P, Maietti A, Caruso M, Tedeschi P, Mazzotta D. 2002. Automated multiple development method for determination of glycerol produced by wine yeasts. World J Microbiology and Biotechnology. 18:481-485. Cabaroglu T, Canbas A, Baumes R, Bayonove C, Lepoutre JP, G?nata Z. 1997. Aroma composition of a white wine of *Vitis vinifera* L. cv. Emir as affected by skin contact. J Food Sci. 62:680-683. Casey GP, Magnus CA, Ingledew WM. 1984. High gravity brewing: effects of nutrition on yeast composition, fermentative ability and alcohol production. Applied Environmental Microbiology. 48:639. Castelli T. 1941. Temperature chimismo dei blastomiceti. Ann Microbiol. 2(1):103-108. Charpentier C, Feuillat M. 1993. Yeast Autolysis. In" Wine Microbiology and Biotechnology" . Fleet GH. Harwood Academic, Switzerland. p. 27-54. Chen SH. 1986. Pollen morphology of Formosan cultivated plants I. fruit plants. J Taiwan museum. 39(2):43-60. Ciesielski T. 1925. Miodosytnictwo. Wydawnictwo Ksiegarni Gubrynowicza, Lw?w. Crowther RF. 1960. Mead. Rep Hort Exp Stn Prod Lab Vineland. 98: 101. Fabian FW. 1935. The use of honey in making fermented drinks. Fruit Prod J Am Fd Mfr. 14:363-366. Fleet GH, Heard GM. 1993. Yeasts: growth during fermentation. In: Fleet GH. (Ed.), Wine Microbiology and Biotechnology. Harwood Academic, Chur, Switzerland. p.27-54. Fleet GH. 1990. Growth of yeasts during wine fermentations. J Wine Res. 1:211-223. Fraile P, Garrido J, Ancin C. 2000. Influence of a *Saccharomyces cerevisiae* selected strain in the volatile composition of ros? wines. Evolution during fermentation. J Agri Food Chem.

48(5):1789-1798. Gao L, Girard B, Mazza G, Reynolds AG. 1997. Simple and polymeric anthocyanins and color characteristics of Pinot Noir wines from different vinification processes. *J Agric Food Chem.* 45:2003-2008. Gardner N, Rodrigue N, Champagne CP. 1993. Combined effects of sulfites, temperature, and agitation time on production of glycerol in grape juice by *Saccharomyces cerevisiae*. *Applied Envir Microb.* 59(7):2022-2028. Girard B, Kopp TG, Reynolds AG, Cliff MA. 1997. Influence of vinification treatments on aroma constituents and sensory descriptors of Pinot noir wines. *Am J Enol Vitic.* 48:198-206. Herraiz T, Reglero G, Herraiz M, Martin-Alvarez PJ, Cabezudo MD. 1990. The influence of the yeast and type of culture on the volatile composition of wines fermented without sulfur dioxide. *Am J Enol Vitic.* 41:313-318. Houtman AC, Marais J, Du Plessis CS. 1980. Factors affecting the reproducibility of fermentation of grape juice and of the aroma composition of wines: I. Grapes maturity, sugar, inoculum concentration, aeration, juice turbidity and ergosterol. *Vitis.* 19:37-54. Hsu JC, Heatherbell DA. 1987. Heat-unstable proteins in wine. I. Characterization and removal by bentonite fining and heat treatment. *Am J Eno Viti.* 38(1):11-16. Jarczyk A, Wzorek W. 1977. Fruit and Honey Wines. In: *Economic Microbiology.* Vol. II. Rose RH. Ed. London: Academic press. p. 413-418. Karagiannis S, Lanaridis P. 2000. The effect of various vinification parameters on the development of several volatile sulfur compounds in Greek white wines of the cultivars Batiki and Muscat of Hamburg. *Am J Enol Vitic.* 50(3):334-342. Kime RA, McLellan MR, Lee CY. 1991. An improved method of mead production. *Am Bee J.* 131(5):394-395. Kime RM, Morse RA, Steinkraus KH. 1998. Mead: history, current technology and prospects. *Am Bee J.* 138(2):121-123. Kruger E, Bielig HJ. 1976. Betriebs-und Qualitätskontrolle in Brauerei and alkoholfreier Getränkeindustrie. p.310. In Verlag Paul Parey. Berlin und Hamburg, West Germany. Lafon-Lafourcade S. 1983. Wine and brandy. In: Rehm HJ, Reed G. (Eds.), *Food and Feed Production with Microorganisms. Biotechnology.* 5:81-163. Lambrechts MG, Pretorius IS. 2000. Yeast and its importance to wine aroma. *South African J Enol Vitic.* 21:97-129. Lamikanra O, Inyang ID. 1988. Temperature influence on Muscadine wine protein characteristic. *Am J Enol Vitic.* 39:113-116. Lea AGH, Piggott JR. 1995. *Fermented Beverage Production.* Blackie Academic and Professional. UK. p.175-179. Lema C, Garcia-Jares C, Orriols I, Angulo L. 1996. Contribution of *Saccharomyces* and non-*Saccharomyces* populations to the production of some components of Albariño wine aroma. *Am J Enol Vitic.* 47:206-216. Majewski T. 1959. *Miód Pszczeli.* Wydawnictwo Przemysłu Lekkiego i Spożywczego, Warszawa. Malan C, Marletto O. 1974. Blastomiceti da mieli di diversi origini e provenienze. *Annali del' Accademia di Agricoltura di Torino.* 116:1-18. Marais J. 1986. Effect of storage time and temperature of the volatile composition and quality of South African *Vitis vinifera* L. cv. Colombar wines. In "The shelf life of foods and beverages" Elsevier Amsterdam. U.S.A. Margalit Y. 1997. *Concepts in wine chemistry.* The Wine Appreciation Guild p.447. San Francisco, CA. Maugent J. 1964. Hydromel. *Annls Abeille.* 7:165-179. Morquin M. 1962. *L' Apiculteur.* 106(7 - 8):147 Morse RA. 1953. The fermentation of diluted honey. Cornell University, Ithaca:Thesis. Morse RA. 1980. *Making Mead : History,*

Recipes, Methods and Equipment. Wicwas Press, Cheshire, CT. Nagodawithana TW, Castellano C, Steinkraus KH. 1974. Effect of dissolved oxygen, temperature, initial cell count and sugar concentration on the viability of *Saccharomyces cerevisiae* in rapid fermentations. *Applied Microbiol.* 28:383. Nyk?nen L. 1986. Formation and occurrence of flavor compounds in wine and distilled alcoholic beverages. *Am J Enol Vitic.* 37(1):84-96. Oezilgen M, Celik M, Bozoglu TF. 1991. Kinetics of spontaneous wine production. *Enzyme and Microb Tech.* 13(3):252-256. Ough CS, Amerine MA, Sparks TC. 1969. Studies with controlled fermentation. XI. Fermentation temperature effects on acidity and pH. *Am J Enol Vitic.* 20:127-139. Ough CS, Amerine MA. 1961. Studies with controlled fermentation. VI. Effects of temperature and handling on rates, composition and quality of wines. *Am J Enol Vitic.* 12:117-128. Ough CS, Amerine MA. 1988. *Methods for Analysis of Musts and Wines.* 2d ed. Wiley and Sons, New York. Ough CS. 1966. Fermentation rates of grape juice. III. Effects of initial ethyl alcohol, pH and fermentation temperature. *Am J Enol Vitic.* (17):74. Pascal D, Margaret C, Marjorie K, Benoit G, John H. 2000. Effect of two commercial malolactic cultures on the chemical and sensory properties of chancellor wines vinified with different yeasts and fermentation temperatures. *Am J Enol Vitic.* 51(1):42-48. Patrizia R, Giovanna S, Luca T, Mario P. 1994. Acetaldehyde production in *Saccharomyces cerevisiae* wine yeast. *FEMS Micro Letters.* 118(3):213-218. Pomeranz Y, Meloan CE. 1971. *Food analysis laboratory manual.* Westport, Connecticut : AVI publishing Co. Popova EE. 1961. *Medovye Vina.* Piscepromizdat, Moskva. Proestos C, Bakogiannis A, Psarianos C, Koutinas AA, Kanellaki M, Komaitis M. 2005. High performance liquid chromatography analysis of phenolic substances in Greek wines. *Food Control.* 16:319-323. Rankine BC, Bridson DA. 1971. Glycerol in Australian wines and factors influencing its formation. *Am J Enol Vitic.* 22:6-17. Rankine BC. 1967. Formation of higher alcohols by wine yeasts and relationship to taste thresholds. *J Sci Food Agric.* 18: 584-589. Rapp A. 1998. Volatile flavour of wine: correlation between instrumental analysis and sensory perception. *Nahrung.* 43:351-363. Reynolds A, Cliff M, Girard B, Kopp TG. 2001. Influence of fermentation temperature on composition and sensory properties of Semillon and Shiraz wines. *Am J Enol Vitic.* 52(3):235-240. Rib?reau-Gayon P, Dubourdiou D, Don?che B, Lonvand A. 2000. *Handbook of enology. The microbiology of wine and vinification.* Wiley. West Sussex, England. Romano P, Fiore C, Paraggio M, Caruso M, Capece A. 2003. Function of yeast species and strains in wine flavour. *Int J Food Microbiol.* 86:169-180. Romano P. 1997. Metabolic characteristics of wine strains during spontaneous and inoculated fermentation. *Food Tech Biotech.* 35(4):255-260. Rose AH. 1977. *History and Scientific Basis of Alcoholic Beverage Production.* In: *Economic Microbiology.* Vol. I. Rose AH. Ed. London : Academic press. p.10-40. Sa-Correia I, Uden VN. 1983. Temperature profiles of ethanol tolerance: Effects of ethanol on the minimum and maximum temperatures for growth of *Saccharomyces cerevisiae* and *Kluyveromyces fragillis.* *Biotechnol Bioeng.* 25:1665-1667. Schepartz AI, Subers MH. 1966. Catalase in honey. *J Api Res.* 5(1):37-43. Schramm K. 2003. *The Compleat Meadmaker.* A Division of the

	<p>Association of Brewers. Brewers Publication. Schreier P. 1979. Flavour composition of wines: a review. <i>CRC Crit. Rev. Food Sci. Nutr.</i> 12:59-111. Siddiqui IR. 1970. The sugars of honey. <i>Adv. Carbohydr. Chem. Biochem.</i> 25:285-309. Singleton VL and Ough CS. 1962. Complexity of flavor and blending of wines. <i>J Food Sci.</i> 27: 189-196. Somers TC, Ziemelis G. 1972. Interpretations of ultraviolet absorption in white wines. <i>J Sci Food Agric.</i> 23:441-453. Steinkraus KH, Morse RA. 1966. Factors influencing the fermentation of honey in mead product. <i>J Api Res.</i> 5(11):17-20. Suarez JA, I?igo B. 1990. <i>Microbiologia Enologica: fundamentos de vinificaci?n.</i> Madrid: Ediciones Mundi Prensa. Torija MJ, Roz?s N, Poblet M, Guillam?n MJ, Mas A. 2003. Effects of fermentation temperature on the strain population of <i>Saccharomyces cerevisiae</i>. <i>Int J Food Microbiol.</i> 80:47-53. Tosi E, Ciappini M, R? E, Lucero H. 2002. Honey thermal treatment effects on hydroxymethylfurfural content. <i>Food Chem.</i> 77:71-74. Troost G. 1985. <i>Tecnolog?a de la vinificaci?n.</i> In <i>Tecnolog?a del vino.</i> p.125-135. Virginia DM, George KM, Hennie JJV. 2003. Transcriptional profiling of wine yeast in fermenting grape juice: regulatory effect of diammonium phosphate. <i>Fems Yeast Res.</i> 3:269-287. Warwickshire H. 1952. Notes on making mead. <i>Br Bee J.</i> 80:634. Weiss KC, Bisson LF. 2002. Effect of bentonite treatment of grape juice on yeast fermentation. <i>Am J Enol Vitic.</i> 53(1): 28-36. White JW, White JR. 1978. Honey. <i>Adv food Res.</i> 24:287-374. White JW. 1976. "Honey" a comprehensive survey. <i>Eva Crane.</i> p.157-168. Wootton M, Weekes GC, Lee TH. 1983. Sugar utilization and glycerol and ethanol production during mead fermentation. <i>Food Tech in Australia.</i> 35(5):252-255. Wzorek W, Chruszczyk A. 1972. <i>Przemysl Fermentacyjny i Rolny.</i> 16(12):11. Zoecklein BW, Fugelsang KC, Gump BH, Nury FS. 1990. <i>Production Wine Analysis.</i> New York : Van Nostrand Reinhold.</p>
論文 頁數	118
附註	
全文 點閱 次數	
資料 建置 時間	
轉檔 日期	
全文 檔存 取記 錄	
異動 記錄	M admin Y2008.M7.D3 23:18 61.59.161.35

