

The recovery of pigment and sugar from molasses

王偉祺、陳齊聖

E-mail: 8809507@mail.dyu.edu.tw

ABSTRACT

Molasses contains many nutrient substance. For example, It contain carbohydrates、mineral、nitrogenous compounds Molasses contains caramelization pigment in fermentation or food making process. The pigment often making waste water for the environment. By the reason, the research is to try various methods by the resins chromatography to separate pigment and sugar. For example, change the ion electric、loading、flow rate、pH and concentration of the resins. The result support, the 50W-X8 type resin has the best separation ratio(the flow loading 1mL、pH4.0、mixing dilution ratio 1:0.5、flow rate of 1mL/min). The recovery pigment and sugar by the decrease pressure concentration. The result support, pigment and sugar recovery were attained (55.02% and 72.16%). Key word: Molasses、Caramlization pigment、Chromatography、Ion exchange resin.

Keywords : Molasses ; Caramlization pigment ; Chromatography ; Ion exchange resin

Table of Contents

封面內頁 簽名頁 授權書.....	iii 中文摘要.....
.....v 英文摘要.....	.vi 誌謝.....
.....vii 目錄.....	.viii 圖目錄.....
.....xi 表目錄.....	.xiii 第一章緒論.....
.....1 第二章文獻回顧 2.1甘蔗製糖與糖蜜生成.....	2 2.2糖蜜之成
分割析.....	5 2.4糖蜜之利用
與環境保護.....	8 2.5.1廢液因子...
.....8 2.5.2廢液處理.....	10 2.5.3層析分離.....
.....11 2.5.4層析理論.....	13 第三章 材料與方法 3.1實驗材料.....
.....22 3.2實驗設備.....	22 3.3糖蜜溶液之前
處理.....	23 3.4陽離子交換樹脂之活性.....
.....23 3.4陽離子交換樹脂之活性.....	23 3.5活性碳之活比
之保存.....	24 3.6層析管之充填.....
.....24 3.6層析管之充填.....	24 3.7層析管內容物
.....25 3.8篩選樹脂.....	25 3.8.1樹脂特性...
.....25 3.9實驗設計與測定.....	26 3.9.1最適分離之pH值
設計.....	27 3.9.2最適分離之糖蜜體積量設計.....
.....27 3.9.2最適分離之糖蜜體積量設計.....	27 3.9.3最適分離之濃度設計.....
.....27 3.9.4最適分離之流速設計.....	28 3.9.5糖蜜分離液所含色素之測定.....
.....28 3.9.6糖蜜分離液所含糖分之測定.....	29 3.9.7糖蜜色素與糖分體積差之測定.....
.....29 3.9.8糖蜜色素與糖分回收之測定.....	29 第四章 結果與討論 4.1 C-249型陽離子樹脂.....
.....31 4.1.1最適分離之pH值探討.....	31 4.1.2最適分離之糖蜜體積量探討.....
.....31 4.1.3最適分離之濃度探討	32 4.1.4最適分離之流速探討
.....32 4.1.4最適分離之流速探討	33 4.2 SKIB型陽離子樹脂
.....33 4.2 SKIB型陽離子樹脂	34 4.2.1最適分離之pH值探討
.....34 4.2.1最適分離之pH值探討	35 4.2.2最適分離之糖蜜體積量探討
.....35 4.2.2最適分離之糖蜜體積量探討	36 4.2.3最適分離之濃度探討
.....36 4.2.3最適分離之濃度探討	37 4.2.4最適分離之流速探討
.....37 4.2.4最適分離之流速探討	38 4.3 50W-X8型陽離子樹脂
.....38 4.3 50W-X8型陽離子樹脂	39 4.3.1最適分離之pH值探討
.....39 4.3.1最適分離之pH值探討	40 4.3.2最適分離之糖蜜體積量探討
.....40 4.3.2最適分離之糖蜜體積量探討	41 4.3.3最適分離之濃度探討
.....41 4.3.3最適分離之濃度探討	42 4.3.4最適分離之流速探討
.....42 4.3.4最適分離之流速探討	43 4.4 糖蜜層析分離回收之探討
.....43 4.4 糖蜜層析分離回收之探討	44 4.4.1最佳層析分離條件
.....44 4.4.1最佳層析分離條件	45 4.4.2色素與糖分回收率之探討
.....45 4.4.2色素與糖分回收率之探討	46 第五章 結論與展望 5.1結論
.....46 第五章 結論與展望 5.1結論	72 5.2展望
.....72 5.2展望	73 參考文獻 77

REFERENCES

- 1.吳光丞(民79)，臺灣味精工業之現況與未來展望，生物產業，1(1)，頁28-42。
- 2.林信一、歐陽橋暉(民74)，污泥厭氣消化操作影響因子及消化著沼氣利用之研究，國立中央大學土木工程學研究所研究報告。
- 3.許瑞後、蔡明朝(民52)，蔗汁及糖蜜化學成分之分析，糖試報告，51:頁255-258。
- 4.陳世璉(民82)，工業減廢在台糖，台灣糖業工司，頁987-988。
- 5.莊文壽(民81)，離子交換技術探討，核研技刊，5:頁57-69。
- 6.中國技術服務社(民81)，廢水處理單元設計及異常對策，頁207，經濟部工業局工業污染防治技術服務團出版，台北。
- 7.曾四恭、朱威(民77)，去除味精廢醪中色度物質之研究，中國土木水利工程學會第十三屆廢水處理技術研討會論文集，頁226-237。
- 8.張為獻(民81)，高等食品化學，六版，頁27，華香園出版社，台北市。
- 9.郭賢良(民61)，製糖副產品化學，頁23-29，徐氏基金會，台北市。

10. 楊思廉(民82), 工業化學概論, 頁431-443, 五洲出版社, 台北。 11. 楊肇政、鄭阿全(民77)污染防治, 頁245-250, 高立出版社, 台北市。 12. 劉至一(民86), 糖蜜之回收與利用, 大葉大學食品工程研究所 碩士論文, 頁24。 13.簡相堂(民78), 分解糖蜜色素之微生物的篩選與應用, 科學與技術, 21(10), 頁37-41。 14.臺灣省政府農林廳(民81), 臺灣農業年報, 頁10。 15.Baker, B. P. (1975) Cane Molasses in Animal Feeding. In Composition. Properties and uses of molasses. United Molasses Trading Co. London, 36-43. 16.Benzing-Puride, L. M., J. A. Ripmeseter and C. I. Ratcliffe. (1985) Effects of temperature on maillard reaction products. *J. Agric. Food Chem.*, 33, 31-33. 17.Brouwer, R.(1965) Ion absorption and transport in plants. *Ann. Rev. Plant Physiology*, 16, 241. 18.Chase, H. A.(1984) Prediction of the performance of preparative affinity chromatography. *J. Chromatogr*, 179-202. 19.Franco A. A.(1982) Plant assimilation and nitrogen cycling. *Plant and Soil*, 67, 1-13. 20.Fries, W. and Walker, R. W.(1978) The evaluation of ion exchange resins for sugar decolorization, *Tech.*, 37-45. 21.Foutch, G.(1992) Ion Exchange: Resin degradation effects in mixed-bed ion exchange, *Ultrapure water*, 3,29-32. 22.Gomyo, T., H. Kato, K. Vdaka, M. Horikoshi and M. Fujimak (1972) Chemical studies on melanoidins. Part3.*Agric. Biol. Chem.*, 36(1), 125-132. 23.Gottlieb, M. C.(1991) Choose the right C/I resin, *Water Technology*, 40-43. 24.Guiuchon, G. and Colin, H.(1986) Theoretical concepts and optimization in preparative scale liquid chromatography *Chromatogr. Forum*, 21-28. 25.Holmes, R. L.(1938) Preliminary studies on the correlation of cane juices analyses and soil analyses. *Proc. 6th Cong. ISSCT*, 314-319. 26.Homma, S., Tomura, T. and Fujimak, M.(1982) Fractionation of nondialyzable melanoidin into components by electrofocusing electrophoresis. *Agric. Biol. Chem.*, 46(7), 1791-1796. 27.Janson, J. C. and Hedman, P.(1987) On the optimization of process chromatography of proteins. *Biotechnol. Prog.*, 9-13. 28.Kawamori, Y.(1991) Treatment and effective use of fermentation waste water. *Bioindustry*, 2(1), 85-104. 29.Lee, F. A.(1983) Basic food chemistry 2nd Ed., AVI. 291-301. 30.Masschelein, W. J.(1982) Ozonation manual for water and wastewater treatment. John Wiley & Sons Ltd., 248-252. 31.McGarvey, F. X. and Ziarkowski, S. M. (1990) Choosing the right resin, A Review of the factors that affect selection, *Water Technology*, 29-33. 32.Meade, G. P.(1963) Cane sugar handbook, 9th Ed. 267-284. Wiley, New York. 33.Meade and Chen, (1986) Cane sugar Handbook 10th Ed. 34.Mura, M., Terasawa, N. and Homma, S. (1992) Screening of microorganisms to decolorize a model melanoidin and the chemical properties of a microbially treated melanoidin. *Biosci. Biochem.* 56(8), 1182-1187. 35.Owen, R. F.(1985) Food Chemistry Carbohydrates. Marcel Dekker, Inc. Press, 96. 36.Paturan (1969) By Products Mauritius Rep. 37.Piattelli, M., R. A. NICOLAUS (1961) The structure of melanins and melanogenesis-1. *Tetrahedron*, 15, 66-75. 38.Preston, C. A.(1974) Sugar Cane as basis for beef production in the tropics., 15th Congress ISSCT. 1985-1987. 39.Snyder, L. R. and Kirland, J. J. (1979) Introduction to modern liquid chromatography. 2nd Ed., Wiley Interscience, New York, 40.Teraswa. N., Murata, M. and Homma, S.(1991) Separation of model melanoidin into components with copper chelating. Sepharose 6B column chromatography and comparison of chelating activity. *Agric. Biol. Chem.* 55(6), 1507-1514. 41.Valance, L. G. and Leverington, K. C.(1951) The Improvement of soil by the application of molasses and sweet sorghum residues, *Cane Growers Qgurt Bull*, 14, 107-110. 42. Weber, W. J.(1972) Chemical oxidation: Physicochemical processes for water quality control. Wiley-Interscience, Canada, 363-411.