REFERENCES

Aguiar, A., Nascimento, R.A.d.A., Ferretti, L.P., Gonçalves, A.R., 2005. Determination of organic acids and ethanol in commercial vinegars. Bazilian journal of food technology 5° SIPAL, março.

Akamine, E.K., 1976. Postharvest control of endogenous brown spot in fresh Australian pineapples with heat. HortScience 11, 586-588.

Altschul, S.F., Madden, T.L., Schaffer, A.A., Zhang, J., Zhang, Z., Miller, W., Lipman, D.J., 1997. Gapped BLAST and PSI-BLAST: a new generation of protein database search programs. Nucleic acids research 25, 3389-3402.

Amerine, M.A., Kunkee, R.E., 1968. Microbiology of winemaking. Annual review of microbiology 22, 323-358.

Aquilanti, L., Santarelli, S., Silvestri, G., Osimani, A., Petruzzelli, A., Clementi, F., 2007. The microbial ecology of a typical Italian salami during its natural fermentation. International journal of food microbiology 120, 136-145.

Arias, C.R., Burns, J.K., Friedrich, L.M., Goodrich, R.M., Parish, M.E., 2002. Yeast species associated with orange juice: Evaluation of different identification methods. Applied and environmental microbiology 68, 1955-1961.

Arneborg, N., Siegumfeldt, H., Andersen, G.H., Nissen, P., Daria, V.R., Rodrigo, P.J., Glückstad, J., 2005. Interactive optical trapping shows that confinement is a determinant of growth in a mixed yeast culture. FEMS microbiology letters 245, 155-159.

Atputharajah, J.D., Widanapathiranat, S., Samarajeewa, U., 1986. Microbiology and biochemistry of natural fermentation of coconut palm sap. Food microbiology 3, 273-280.

Ayogu, T.E., 1999. Evaluation of the performance of a yeast isolate from Nigerian palm wine in wine production from pineapple fruits. Bioresource technology 69, 189-190.

Barnett, J.A., Payne, R.W., Yarrow, D., 2000. Yeasts: characteristics and identification, 3rd. Cambridge University Press, Cambridge, UK.

Bartholomew, D.P., Paull, R.E., Rohrbach, K.G., 2003. The pineapple: botany, production and uses. CABI Publishing, Wallingford, UK.

Bartolome, A.P., Rupbrez, P., Carmen, F., 1995. Pineapple fruit: morphological characteristics, chemical composition and sensory analysis of Red Spanish and Smooth Cayenne cultivars. Food chemistry 53 75-79.

Bell, D.J., Blake, J.D., Prazak, M., Rowell, D., Wilson, P.N., 1991. Studies on yeast differentiation using organic acid metabolites. Part 1. Development of methodology using high performance liquid chromatography. Journal of the institute of brewing 97, 297-305.

Bely, M., Stoeckle, P., Masneuf-Pomarède, I., Dubourdieu, D., 2008. Impact of mixed Torulaspora delbrueckii-Saccharomyces cerevisiae culture on high-sugar fermentation. International journal of food microbiology 122, 312-320.

Benda, I., 1981. Wine and brandy. In: G. Reed (ed). Prescott and dunn's industrial microbiology, pp. 293-402. AVI Technical Books Inc., Westport, Connecticut, USA.

Berovič, M., Pivec, A., Košmerl, T., Wondra, M., Čelan, Š., 2007. Influence of heat shock on glycerol production in alcohol fermentation. Journal of bioscience and bioengineering 103, 135-139.

Beuchat, L.R., Deak, T., 1996. Handbook of food spoilage yeasts, 1st. CRC Press, Inc., Boca Raton, FL, USA.

Bhatt, D.D., Vaughan, E.K., 1962. Preliminary investigation on biological control of grey mold (*Botrytis cinerea*) of strawberries. Plant disease reports 46, 342-345.

Bissell, P., Ewart, A., Sangtippawan, W., 1989. Loading concentrations for tartaric and malic acid for single column HPLC organic acid analysis. American journal of enology and viticulture 40, 316-319.

Blakeman, J.P., Fokkema, N.J., 1982. Potential for biological control of plant diseases on the phylloplane. Annual review of phytopathology 20, 167-192.

Bonetta, S., Bonetta, S., Carraro, E., Rantsiou, K., Cocolin, L., 2008. Microbiological characterisation of Robiola di Roccaverano cheese using PCR-DGGE. Food microbiology 25, 786-792.

Bosch-Fusté, J., Riu-Aumatell, M., Guadayol, J.M., Caixach, J., López-Tamames, E., Buxaderas, S., 2007. Volatile profiles of sparkling wines obtained by three extraction methods and gas chromatography–mass spectrometry (GC–MS) analysis. Food chemistry 105, 428-435.

Boulton, R., 1995. Red wine, In: A.G.H., Lea and J.R., Piggott (eds.) Fermented beverage production, pp.121-158. Academic & Professional, Glasgow, Scotland.

Boulton, B.R., Singleton, V.L., Bisson, L.F., Kunkee, R.E., 1997. Principles and practices of winemaking Chapman and Hall, New York, USA.

Bowman, P.I., Ahearn, D.G., 1975. Evaluation of the Uni-Yeast-Tek kit for the identification of medically important yeasts. Journal of clinical microbiology 2(4), 354-358.

Buchaille, L., Freydiere, A.M., Guinet, R., Gille, Y., 1988. Evaluation of six commercial systems for identification of medically important yeasts. European journal of clinical microbiology & infectious diseases 17, 479-488.

Budde, W.L., Eichelberger, J.W., 1979. Organics analysis using gas chromatography/mass spectrometry - a techniques & procedures manual. Ann Arbor Science Publishers, Inc., Michigan, USA.

Callens, K., De Smet, T., 1991. Pineapple liqueur wine: A fermentation technique. Special journal for graduated ceremony 5th, Rajamangala Institute of Technology 1, year 9, 103-109.

Camara, M.M., Diez, C., Torija, M.E., Cano, M.P., 1994. HPLC determination of organic acids in pineapple juices and nectars. Zeitschrift für lebensmittel-untersuchung und-forschung 198, 52-56.

Cárdenes-Perera, C.-D., Torres-Lana, Á., Alonso-Vargas, R., Moragues-Tosantas, M.-D., Emeterio, J.P.-S., Quindós-Andrés, G., Arévalo-Morales, M.-P., 2004. Evaluation of API ID 32C® and VITEK-2® to identify *Candida dubliniensis*. Diagnostic microbiology and infectious disease 50 219-221.

Carr, J.C., 1958. Lactic acid bacteria as spoilage organisms of fruit juice products. Journal of applied bacteriology 21, 267-271.

Castoria, R., de Curtis, F., Lima, G., Caputo, L., Pacifico, S., Cicco, V.D., 2001. *Aureobasidium pullulans* (LS-30) an antagonist of postharvest pathogens of fruits: study on its modes of action. Postharvest biology and technology 22, 7-17.

Cazes, J., 2005. Encyclopedia of chromatography, 2nd, vol.1, p.761. Taylor & Francis, New York, USA.

Chanrittisen, T., 2001. Winemaking learning, (no publisher), Thailand (In Thai).

Chen, C., Eisner, J.D., Kattar, M., Rassoulian-Barrett, L., Lafe, K., Yarfitz, S.L., Limaye, A.P., Cookson, B.T., 2000. Identification of medically important yeasts using PCR-based detection of DNA sequenced polymorphisms in the internal transcribed spacer 2 region of the rRNA genes. Journal of clinical microbiology 38, 2302-2310.

Chinnici, F., Spinabelli, U., Riponi, C., Amati, A., 2005. Optimization of the determination of organic acids and sugars in fruit juices by ion-exclusion liquid chromatography. Journal of food composition and analysis 18, 121-130.

Chuaychusri, S., Chumnian, T., Preeya, K., Parinyapan, P., 2005. Some characteristics of wine from local fruits in the upper-northern at various concentration with Swedish yeast, In: 1st International conference on fermentation technology for value agicultural products, p.53., 22-25 March 2005, Khon Kaen, Thailand.

Ciani, M., 1995. Continuous deacidification of wine by immobilized *Schizosaccharomyces pombe* cells: evaluation of malic acid degradation rate and analytical profiles. Journal of applied bacteriology 79(6), 631-634.

Ciani, M., Ferraro, L., 1996. Enhanced glycerol content in wines made with immobilized *Candida stellata* cells. Applied and environmental microbiology 62, 128-132.

Ciani, M., Maccarelli, F., 1998. Oenological properties of non-*Saccharomyces* yeasts associated with wine-making. World journal of microbiology and biotechnology 14, 199-203.

Ciani, M., Picciotti, G., 1995. The growth kinetics and fermentation behaviour of some non-Saccharomyces yeasts associated with wine making. Biotechnology letters 17, 1247-1250.

Ciani, M., Beco, L., Comitini, F., 2006. Fermentation behavior and metabolic interactions of multistarter wine yeast fermentations. International journal of food microbiology 108(2), 239-245.

Ciani, M., Fatichenti, F., Mannazzu, I., 2002. Yeasts in winemaking biotechnology. In: M. Ciani (ed.) Biodiversity and biotechnology of wine yeasts, pp.111-123. Research Signpost, Kerala, India.

Clarke, R.J., Bakker, J., 2004. Wine flavour chemistry. Blackwell Publishing Ltd., Oxford, UK.

Clemente-Jimenez, J.M., Mingorance-Cazorla, L., Martinez-Rodriquez, S., Heras-Vazquez, F.J.L., Rodriguez-Vico, F., 2004. Molecular characterization and oenological properties of wine yeasts isolated during spontaneous fermentation of six varieties of grape must. Food microbiology 21, 149-155.

Cocolin, L., Bisson, D.A., Mills, D.A., 2000. Direct profiling of the dynamics in wine fermentations. FEMS microbiology letters 189, 81-87.

Cocolin, L., Aggio, D., Manzano, M., Cantoni, C., Comi, G., 2002. An application of PCR-DGGE analysis to profile the yeast population in raw milk. International dairy journal 12, 407-411.

Coleman, M.C., Fish, R., Block, D.E., 2007. Temperature-dependent kinetic model for nitrogen-limited wine fermentations. Applied and environmental microbiology 73, 5875-5884.

Combina, M., Elıa, A., Mercado, L., Catania, C., Ganga, A., Martinez, C., 2005. Dynamics of indigenous yeast populations during spontaneous fermentation of wines from Mendoza, Argentina. International journal of food microbiology 99, 237- 243.

Constanti, M., Poblet, M., Arola, L., Mas, A., Gillamon, J.M., 1997. Analysis of yeast populations during alcoholic fermentation in a newly estrablished winery. American journal of enology and viticulture 48, 339-344.

Coton, E., Coton, M., Levert, D., Casaregola, S., Sohier, D., 2006. Yeast ecology in French cider and black olive natural fermentations. International journal of food microbiology 108, 130-135.

Davenport, R.R., 1976. Microbiology of aerial plant surfaces. In: C.H. Dickinson and T.F. Preece (eds.) Ecology of leaf surface microorganisms, pp.325. Academic Press, London, UK.

Davis, C.R., Lee, T.H., Fleet, G.H., 1986. Growth and metabolism of lactic acid bacteria during and after malolactic fermentactic fermentation of wines at different pH. Applied and environmental microbiology 51, 539-545.

De Villiers, A., Lynen, F., Crouch, A., Sandra, P., 2004. Development of a solid-phase extraction procedure for the simultaneous determination of polyphenols, organic acids and sugars in wine. Chromatographia 59(7/8), 403-409.

Deeraksa, S., Warasawas, P., Daengprok, W., Chanrittisen, T., 2005. A comparative study of mangosteen wine quality using natural microbial and pure yeast culture. In: Advancing food technology: bringing Thailand into the world's kitchen, pp.12-13., The 7th Agro-industrial conference, 22-24 June 2005, Bangkok international trade & exhibition centre, BITEC, Bangkok. Thailand.

Delfini, C., Costa, A., 1993. Effects of the Grape Must Lees and Insoluble Materials on the Alcoholic Fermentation Rate and the Production of Acetic Acid, Pyruvic Acid, and Acetaldehyde. American journal of enology and viticulture 44, 86-92.

Delfini, C., Formica, J.V., 2001. Wine microbiology: science and technology, pp.258-259. Dekker, New York, USA.

Demeter, L., D'Aquila, R., Weislow, O., Lorenzo, E., Erice, A., Fitzgibbon, J., Shafer, R., Richman, D., Howard, T.M., Zhao, Y., Fisher, E., Huang, D., Mayers, D., Sylvester, S., Arens, M., Sannerud, K., Rasheed, S., Johnson, V., Kuritzkes, D., Reichelderfer, P., Japour, A., 1998. Interlaboratory concordance of DNA sequence analysis to detect reverse transcriptase mutations in HIV-1 proviral DNA. Journal of virological methods 75, 93-104.

Demyttenaere, J.C.R., Dagher, C., Sandra, P., Kallithraka, S., Verhe, R., Kimpe, N.D., 2003. Flavour analysis of Greek white wine by solid-phase microextraction–capillary gas chromatography–mass spectrometry. Journal of chromatography A 985, 233-246.

Di Maro, E., Ercolini, D., Coppola, S., 2007. Yeast dynamics during spontaneous wine fermentation of the Catalanesca grape. International journal of food microbiology 117, 201-210.

Dicks, L.M.T., Dellaglio, F., Collins, M.D., 1995. Proposal to reclassify *Leuconostoc oenos* as *Oenococcus oeni* (corrig) gen. nov., comb. nov. International journal of systematic bacteriology 45(2), 395-397.

Domizio, P., Lencioni, L., Ciani, M., Blasi, S.D., Pontremolesi, C., Sabatelli, M.P., 2007. Spontaneous and inoculated yeast populations dynamics and their effect on organoleptic characters of Vinsanto wine under different process conditions. International journal of food microbiology 115, 281-289.

Dworschack, R.G., Wickerham, L.J., 1958. Production of extracellular invertase by the yeast, *Saccharomyces uvarum* NRRL Y-972. Archives of biochemistry and biophysics 76, 449-456.

Du-Toit, M., Pretorius, I.S., 2000. Microbial spoilage and preservation of wine: using weapons from nature's own arsenal, a review. South African journal for enology and viticulture 21, 74-96.

Dull, G.G., 1971. The pineapple: general. In: A.C. Hulme (ed.) The biochemistry of fruits and their products, vol. 2, pp.303-331. Academic Press, London, UK.

Egli, C.M., Ediger, W.D., Mitrakul, C.M., Henick-Kling, T., 1998. Dynamics of indigenous and inoculated yeast populations and their effects on the sensory character of Riesling and Chardonnay wines. Journal of applied microbiology 85, 779-789.

El-Zaatari, M., Pasarell, L., McGinnis, M.R., Buckner, J., Land, G.A., Salkin, I.F., 1990. Evaluation of the updated Vitek yeast identification data base. Journal of clinical microbiology 28, 1938-1941.

Elad, Y., Kohl, J., Fokkema, N.J., 1994. Control of infection and sporulation of Botrytis cinerea on bean and tomato by saprophytic bacteria and fungi. European journal of plant pathology 100, 315-336.

Elss, S., Preston, C., Hertzig, C., Heckel, F., Richling, E., Schreier, P., 2005. Aroma profiles of pineapple fruit (*Ananas comosus* [L.] Merr.) and pineapple products. LWT-food science and technology 38, 263-274.

Esteve-Zarzoso, B., Belloch, C., Uruburu, F., Querol, A., 1999. Identification of yeasts by RFLP analysis of the 5.8S rRNA gene and the two ribosomal internal transcribed spacers. International journal of systematic bacteriology 49, 329-337.

Ewart, A., 1995. White wine. In: G.H. Lea and J.R. Piggott (eds.) Fermented beverage production, pp. 95-120. Blackie Academic & Professional, Glasgow, Scotland.

Ezeronye, O.U., 2004. Nutrient utilization profile of *Saccharomyces cerevisiae* from palm wine in tropical fruit fermentation. Antonie van leeuwenhoek 86, 235-240.

Ezeronye, O.U., Okerentugba, P.O., 2000. Genetic and physiological variants of yeast selected from palm wine. Mycopathologia 152, 85-89.

Farkaš, J., 1988. Technology and biochemistry of wine. Gordon and Breach Science Publishers, Montreux, Switzerland.

Fernandez-Espinar, M.T., Esteve-Zarzoso, B., Querol, A., Barrio, E., 2000. RFLP analysis of the ribosomal internal transcribed spacers and the 5·8S rRNA gene region of the genus *Saccharomyces*: a fast method for species identification and the differentiation of flor yeasts. Antonie van leeuwenhoek 78, 87-97.

Fernandez-Espinar, M.T., Martorell, R., De Llanos, R., Querol, A., 2006. Molecular methods to identify and characterize yeasts in foods and beverages. In: A. Querol and G.H. Fleet (eds.), Yeasts in foods and beverages, pp.55-82. Springer, Berlin, Germany.

Ferraro, L., Fatichenti, F., Ciani, M., 2000. Pilot scale vinification process using immobilized *Candida stellata* cells and *Saccharomyces cerevisiae*. Process biochemistry 35(10), 1125-1129.

Fischer, S.G., Lerman, L.S., 1979. Length-independent separation of DNA restriction fragments in two-dimensional gel electrophoresis. Cell 16, 191-200.

Fleet, G.H., 1990. Growth of yeast during wine fermentation. Journal of wine research 1, 211-223.

Fleet, G.H., 1998. Microbiology of alcoholic beverages. In: B.J. Wood (ed) Microbiology of fermented foods, vol.1, 2nd, pp. 217-262 Blackie Academic & Professional, London, UK.

Fleet, G.H., 1999. Microorganisms in food ecosystems. International journal of food microbiology 50, 101-117.

Fleet, G.H., 2001. Wine. In: M.P. Doyle, L.R. Beuchat and T.J. Montville (eds.) Food microbiology fundamentals and frontiers, 2nd, pp.747-772. ASM press, Washington, DC., USA.

Fleet, G.H., 2003a. Yeast interactions and wine flavour. International journal of food microbiology 86, 11 - 22.

Fleet, G.H., 2003b. Yeast in fruit and fruit products. In: T. Boekhout and V. Robert (eds) Yeasts in food, beneficial and detrimental aspects, Averhoffstra Be 10, pp. 267-288. B. Behr's Verlag GmbH & Co., Hamburg, Germany.

Fleet, G.H., 2008. Wineyeasts for the future. FEMS yeast research 8, 979-995.

Fleet, G.H., Heard, G.M., 1993. Yeast-growth during fermentation. In: G.H. Fleet (ed.) Wine microbiology and biotechnology, pp.27-54. Harwood Academic Publishers, Chur, Switzerland.

Fleet, G.H., Lafon-Lafourcade, S., Ribéreau-Gayon, P., 1984. Evolution of yeasts and lactic acid bacteria during fermentation and storage of Bordeaux wines. Applied and environmental microbiology 48, 1034-1038.

Fleet, G.H., Prakitchaiwattana, C., Beh, A.L., Heard, G., 2002. The yeast ecology in wine grapes. In: M. Ciani (ed.) Biodiversity and biotechnology of wine yeasts, pp.1-17. Research Signpost, Kerala, India.

Fontana, C., Vignolo, G., Cocconcelli, P.S., 2005. PCR-DGGE analysis for the identification of microbial populations from Argentinean dry fermented sausages. Journal of microbiological methods 63, 254-263.

Fricker-Hidalgo, H., Lebeau, B., Kervroedan, P., Faure, O., Ambroise-Thomas, P., Grillot, R., 1995. Auxacolor, a new commercial system for yeast

identification: evaluation of 182 strains comparatively with ID 32C. Annales de biologie clinique (Paris) 53, 221-225.

Fricker-Hidalgo, H., Vandapel, O., Duchesne, M.A., Mazoyer, M.A., Monget, D., Lardy, B., Lebeau, B., Freney, J., Ambroise-Thomas, P., Grillot, R., 1996. Comparison of the new API Candida system to the ID 32C system for identification of clinically important yeast species. Clinical microbiolology 34, 1846-1848.

Gao, C., Fleet, G.H., 1995. Degradation of malic and tartaric acids by high density cell suspensions of wine yeasts. Food microbiology 12, 65-71.

Garber, R.C., Turgeon, B.G., Selker, E.U., Yoder, O.C., 1988. Organization of ribosomal RNA genes in the fungus *Cochliobolus heterostrophus*. Current genetics 14(6), 573–582.

Garruti, D.S., Franco, M.R.B., da Silva, M.A.A.P., Janzantti, N.S., Alves, G.L., 2006. Assessment of aroma impact compounds in a cashew apple-based alcoholic beverage by GC-MS and GC-olfactometry. LWT-food science and technology 39(4), 373-378.

Gilliland, S.E., Speck, M.L., 1977. Use of the Minitek system for characterizing lactobacilli. Applied and environmental microbiology 33(6), 1289-1292.

Giudici, P., Pulvirenti, A., 2002. Molecular methods for identification of wine yeasts. In: M. Ciani (ed.) Biodiversity and biotechnology of wine yeasts, pp.35-52. Research Signpost, Kerala, India.

Gonzalez-Ramos, D., Cebollero, E., Gonzalez, R., 2008. A recombinant *Saccharomyces cerevisiae* strain overproducing mannoproteins stabilizes wine against protein haze. Applied and environmental microbiology 74, 5533-5540.

Gortner, W.A., Dull, G.G., Krauss, B.H., 1967. Fruit development, maturation, ripening and senescence: a biochemical basis for Horticultural Terminology. HortScience 2, 141-144.

Goto, S., 1980. Changes in the wild yeast flora of sulphited grape musts. Journal of institute of enology and viticulture Yamanashi University 15, 29-32.

Graf, B., Adam, T., Zill, E., Göbel, U.B., 2000. Evaluation of the VITEK 2 system for rapid identification of yeasts and yeast-like organisms. Journal of clinical microbiology 38, 1782-1785.

Granchi, L., Bosco, M., Vicenzini, M., 1999. Rapid detection and quantification of yeast species during spontaneous wine fermentation by PCR-RFLP analysis of the r DNA ITS region. Journal of applied microbiology 87, 949-956.

Guerzoni, E., Marchetti, R., 1987. Analysis of yeast flora associated with grape sour rot and of the chemical disease markers. Applied and environmental microbiology 53, 571-576.

Guillamón, J.M., Sabaté, J., Barrio, E., Cano, J., Querol, A., 1998. Rapid identification of wine yeasts species based on RFLP analysis of the ribosomal internal transcribed spacer (ITS) region. Archives of microbiology 169, 387-392.

Gutierrez, J., Martin, E., Lozano, C., Coronilla, J., Nogales, C., 1994. Evaluation of the ATB 32C, automicrobic system and API 20C using clinical yeast isolates. Annales de biologie clinique (Paris) 52, 443-446.

Guymon, J.F., Crowell, E.A., 1972. GC-separated brandy components derived from French and American oaks. American journal of enology and viticulture 23, 114-120.

Head, I.M., Saunders, J.R., Pickup, R.W., 1997. Microbial evolution, diversity, and ecology: a decade ribosomal RNA analysis of uncultivated microorganisms. Microbial ecology 35, 1-21.

Heard, G.M., Fleet, G.H., 1985. Growth of natural yeast flora during the fermentation of inoculated wines. Applied and environmental microbiology 50, 727-728.

Henick-Kling, T., 1995. Control of malo-lactic fermentation in wine: energetics, flavour modification and methods of starter culture preparation. Journal of applied bacteriology (Symposium Supplement) 79, 29S-37S.

Henschke, P.A., 1997. Wine yeast. In: F.K. Zimmermann and K.D. Entian (eds.) Yeast sugar metabolism, pp. 527-560. Tachnomic publishing, Inc., Lancaster, Pennsylvania, USA.

Heras-Vázquez, F.J., Mingorance-Cazorla, L., Clemente-Jiménez, J.M., Rodríguez-Vico, F., 2003. Identification of yeast species from orange fruit and juice by RFLP and sequence analysis of the 5.8S rRNA gene and internal transcribed spacers. FEMS yeast research 3, 3-9.

Herjavec, S., Majdak, A., Tupajic, P., Redepovic, S., Orlic, S., 2003. Reduction in acidity by chemical and microbiological methods and their effect on Moslavac wine quality. Food technology and biotechnology 41 231-236

Herraiz, T., Reglero, G., Herraiz, M., Martin-Alvarez, P.J., Cabezudo, M.D., 1990. The influence of the yeast and type of culture on the volatile composition of wines fermented without sulfur dioxide. American journal of enology and viticulture 41, 313- 318.

Hussain, Z., Stoakes, L., Stevens, D.L., Schieven, B.C., Lannigan, R., Jones, C., 1986. Comparison of the MicroScan system with the API Staph-Ident system for

species identification of coagulase-negative staphylococci. Journal of clinical microbiology 23, 126-128.

Jackson, R.S., 2000. Wine science: principles, practice, perception, 2nd, pp.232-280. Academic Press, California, USA.

Jeromel, A., Herjavec, S., Orlić, S., Redžepović, S., Wondra, M., 2008. Changes in volatile composition of Kraljevina wines by controlled malolactic fermentation. Journal of central European agriculture 9, 363-372.

Jurado, J.M., Ballesteros, O., Alcazar, A., Pablos, F., Martın, M.J., Vılchez, J.L., Navalon, A., 2007. Characterization of aniseed-flavoured spirit drinks by headspace solid-phase microextraction gas chromatography-mass spectrometry and chemometrics. Talanta 72, 506-511.

Khan, W., Augustyn, O.P.H., van der Westhuizen, T.J., Lambrechts, M.G., Pretorius, I.S., 2000. Geographic distribution and evaluation of *Saccharomyces cerevisiae* isolated from vineyards in the warmer, in-land regions of the Western Cape in South Africa. South African journal for enology and viticulture 21, 17-31.

Kunkee, R.E., Amerine, M.A., 1977. Yeasts in wine-making. In: A.H. Rose and J.S. Harrison (eds) The yeasts, vol. 3, pp 5-81. Academic Press, London, UK.

Kunkee, R.E., Bisson, L.F., 1993. Wine-making yeasts. In: J.S. Harrison and A.H. Rose (eds.) The yeasts: yeast technology, vol.5, 2nd, pp.69-127. Academic press, London, UK.

Kurtzman, C.P., Fell, J.W., 1998. The yeasts, a taxonomic study, 4th. Elsevier Science B.V., Amsterdam, The Netherlands.

Kurtzman, C.P., Robnett, C.J., 1998. Identification and phylogeny of ascomycetous yeasts from analysis of nuclear large subunit (26S) ribosomal DNA partial sequences. Antonie van leeuwenhoek 73, 331-371.

Kuruwanna, P., 2003. Wine, p.15. Kaseatsart University Press, Bangkok, Thailand (In Thai).

Lafon-Lafourcade, S., Ribéreau-Gayon, P., 1984. Developments in the microbiology of wine production. In: M.E. Bushell (ed) Progress in industrial microbiology, vol.19, modern applications of traditional biotechnologies, pp.1-45. Elsevier Publishing Co., Oxford, UK.

Lambrechts, M.G., Pretorious, I.S., 2000. Yeast and its importance to wine aroma: a review. South African journal for enology and viticulture 21, 97-129.

Land, G.A., Salkin, I.F., el-Zaatari, M., McGinnis, M.R., Hashem, G., 1991. Evaluation of the Baxter-MicroScan 4-hour enzyme-based yeast identification system. Journal of clinical microbiology 29(4), 718-722.

Leathers, T.D., 2005. Pullulan. In: A. Steinbücheland and S.K. Rhee (eds) Polysaccharides and polyamides in the food Industry: properties, production, and patents, vol.1, pp.387-422. WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim, Germany.

Lee, L.G., Connell, C.R., Woo, S.L., Cheng, R.D., McArdle, B.F., Fuller, C.W., Halloran, N.D., Wilson, R.K., 1992. DNA sequencing with dye-labeled terminators and T7 DNA polymerase: effect of dyes and dNTPs on incorporation of dye terminators and probability analysis of termination fragments. Nucleic acids research 20, 2471-2483.

Leibinger, W., Breuker, B., Hahn, M., Mendgen, K., 1997. Control of post harvest pathogens and colonization of the apples surface by antagonistic microorganisms in the field. Phytopathology 87, 1103-1110.

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. American journal of enology and viticulture 47, 206-216.

Lin, C.C.S., Fung, D.Y.C., Cox, N.A., 1987. Conventional and rapid methods for yeast and rapid methods for yeast identification. Critical reviews in microbiology 14(4), 273-289.

Ling, T.K.W., Tam, P.C., Liu, Z.K., Cheng, A.F.B., 2001. Evaluation of VITEK 2 rapid identification and susceptibility testing system against gram-negative clinical isolates. Journal of clinical microbiology 39, 2964-2966.

Looney, W.J., Gallusser, A.J., Modde, H.K., 1990. Evaluation of the ATB 32 A system for identification of anaerobic bacteria isolated from clinical specimens. Journal of clinical microbiology 28, 1519-1524.

López-Tamames, E., Puig-Deu, M.A., Teixeira, E., Buxaderas, S., 1996. Organic acids, sugars, and glycerol content in white winemaking products determinated by HPLC: relationship to climate and varietal factors. American journal of enology and viticulture 47, 193-198.

López, R., Lapeña, A.C., Cacho, J., Ferreira, V., 2007. Quantitative determination of wine highly volatile sulfur compounds by using automated headspace solid-phase microextraction and gas chromatography-pulsed flame photometric detection: Critical study and optimization of a new procedure. Journal of chromatography A 1143, 8-15.

Magyar, I., Panyik, I., 1989. Biological deacidification of wine with *Schizosaccharomyces pombe* entrapped in Ca-alginate gel. American journal of enology and viticulture 40(4), 233-240.

Maicas, S., Gil, J.-V., Pardo, I., Ferrer, S., 1999. Improvement of volatile composition of wines by controlled addition of malolactic bacteria. Food research international 32, 491-496.

Mannazzu, I., Clementi, F., Ciani, M., 2002. Strategies and criteria for the isolation and selection of autochthonous starters. In: M. Ciani (ed.) Biodiversity and biotechnology of wine yeasts, pp.19-33. Research Signpost, Kerala, India.

Martinez, J., Millan, C., Ortega, J.M., 1989. Growth of natural flora during the fermentation of inoculated musts from 'Pedro Ximenez' grapes. South African journal for enology and viticulture 10, 31-35.

Martini, A., 1993. Origin and domestication of the wine yeast *Saccharomyces cerevisiae*. Journal of wine research 3, 165-176.

Martini, A., Ciani, M., Scorzetti, G., 1996. Direct enumeration and isolation of wine yeasts from grape surfaces. American journal of enology and viticulture 47, 435-440.

Martorell, P., Fernandez-Espinar, M.T., Querol, A., 2005. Molecular monitoring of spoilage yeasts during the production of candied fruit nougats to determine food contamination sources. International journal of food microbiology 101, 293- 302.

Martorell, P., Stratford, M., Steels, H., Fernández-Espinar, M.T., Querol, A., 2007. Physiological characterization of spoilage strains of *Zygosaccharomyces bailii* and *Zygosaccharomyces rouxii* isolated from high sugar environments. International journal of food microbiology 114, 234-242.

McFeeters, R.F., 1993. Single-injection HPLC analysis of acids, sugars and alcohols in cucumber fermentations. Journal of agricultural and food chemistry 41, 1439-1443.

McGowan, K.L., Mortensen, J.E., 1993. Identification of clinical yeast isolates by using the Microring YT. Journal of clinical microbiology 31, 185-187.

Mingorance-Cazorla, L., Clemente-Jimenez, J.M., Martinez-Rodriguez, S., Heras-Vazquez, F.J.L., 2003. Contribution of different natural yeasts to the aroma of two alcoholic beverages. World journal of microbiology and biotechnology 19, 297-304.

Mora, J., Barbas, J.I., Mulet, A., 1990. Growth of yeast species during the fermentation of musts inoculated with *Kluyveromyces thermotolerans* and *Saccharomyces cerevisiae*. American journal of enology and viticulture 41, 156-159.

Moreira, N., Mendes, F., Hogg, T., Vasconcelos, I., 2005. Alcohols, esters and heavy sulphur compounds production by pure and mixed cultures of apiculate wine yeasts. International journal of food microbiology 103, 285-294.

Moreira, N., Mendes, F., Guedes de Pinho, P., Hogg, T., Vasconcelos, I., 2008. Heavy sulphur compounds, higher alcohols and esters production profile of *Hanseniaspora uvarum* and *Hanseniaspora guilliermondii* grown as pure and mixed cultures in grape must. International journal of food microbiology 124, 231-238.

Morrissey, W.F., Davenport, B., Querol, A., Dobson, A.D.W., 2004. The role of indigenous yeasts in traditional Irish cider fermentations. Journal of applied microbiology 97, 647-655.

Mortimer, R., Polsinelli, M., 1999. On the origins of wine yeast. Research in microbiology 150, 199 -204.

Moruno, E.G., Delfini, C., Pessione, E., Giunta, C., 1993. Factors affecting acetic acid production by yeasts in strongly clarified grape musts. Microbios 74, 249-256.

Mrak, E.M., McClung, L.S., 1940. Yeasts occurring on grapes and in grape products in California. Journal of bacteriology 40, 395-400.

Muir, D.B., Pritchard, R.C., 1997. Use of the BioMerieux ID 32C yeast identification system for identification of aerobic actinomycetes of medical importance. Journal of clinical microbiology 35, 3240-3243.

Muyzer, G., Smalla, K., 1998. Application of denaturing gradient gel electrophoresis (DGGE) and temperature gradient gel electrophoresis (TGGE) in microbial ecology. Antonie van leeuwenhoek 73, 127-141.

Myers, R.M., Maniatis, T., Lerman, L.S., 1987. Detection and localization of single base changes by denaturing gradient gel-electrophoresis. Methods in enzymology 155, 501-527.

Nielsen, M.K., Arneborg, N., 2007. The effect of citric acid and pH on growth and metabolism of anaerobic *Saccharomyces cerevisiae* and *Zygosaccharomyces bailii* cultures. Food microbiology 24, 101–105.

Nissen, P., Arneborg, N., 2003. Characterization of early deaths of non-*Saccharomyces* yeasts in mixed cultures with *Saccharomyces* cerevisiae. Archives of microbiology 180, 257-263.

Nissen, P., Nielsen, D., Arneborg, N., 2003. Viable Saccharomyces cerevisiae cells at high concentrations cause early growth arrest of non-*Saccharomyces* yeasts in mixed cultures by a cell–cell contact-mediated mechanism. Yeast 20, 331-341.

Okunowo, W.O., Okotore, R.O., Osuntoki, A.A., 2005. The alcoholic fermentative efficiency of indigenous yeast strains of different origin on orange juice. African journal of biotechnology 4, 1290-1296.

O'Donnell, K., 1993. *Fusarium* and its near relatives. In: D.R. Reynolds and J.W. Taylor (eds.) Fungal systematics; the fungal holomorph: mitotic, meiotic and pleomorphic speciation, pp. 225-223. CAB International, Wallingford, UK.

Panchal, C.J., 1990. Yeast strain selection. Marcel Dekker, Inc, New York, USA.

Parker, L.T., Deng, Q., Zakeri, H., Carlson, C., Nickerson, D.A., Kwok, P.Y., 1995. Peak height variations in automated sequencing of PCR products using Taq dye-terminator chemistry. BioTechniques 19, 116-121.

Pennington, N.L., Baker, C.W., 1990. Sugar, a user's guide to sucrose, pp.56-57. Van Nostrand Reinhold, New York, USA.

Pérez-Nevado, F., Albergaria, H., Hogg, T., Girio, F., 2006. Cellular death of two non-*Saccharomyces* wine-related yeasts during mixed fermentations with *Saccharomyces cerevisiae*. International journal of food microbiology 108(3), 336-345.

Pfaller, M.A., Preston, T., Bale, M., Koontz, F.P., Body, B.A., 1988. Comparison of the Quantum II, API Yeast Ident, and AutoMicrobic systems for identification of clinical yeast isolates. Journal of clinical microbiology 26(10), 2054-2058

Pfeiffer, P., Radler, F., 1985. High performance liquid chromatographic determination of organic acids, sugars, glycerin and alcohol in wine on a cation exchange resin. Zeitschrift für lebensmittel-untersuchung und-forschung 181, 24-27.

Povhe-Jemec, K., Cadez, N., Zagorc, T., Bubic, V., Zupec, A., Raspor, P., 2001. Yeast population dynamics in five spontaneous fermentations of Malvasia must. Food microbiology 18, 247-259.

Prakitchaiwattana, C., 2005. Investigation of yeasts associated with Australian wine grapes using cultural and molecular methods, Ph.D. Thesis. Food Science and Technology, School of Chemical Engineering and Industrial Chemistry, Faculty of Engineering. The University of New South Wales, New South Wales, Australia.

Prakitchaiwattana, C.J., Fleet, G.H., Heard, G.M., 2004. Application and evaluation of denaturing gradient gel electrophoresis to analyze the yeast ecology of wine grapes. FEMS yeast research 4, 865-877.

Prasopwatana, P., 1988. Multicolumn fermenter in continuous vinegar production from pineapple wine. Thesis. Chemical Technology, Science, Chulalongkorn University, Bangkok, Thailand. (In Thai).

Pretorius, I.S., 2000. Tailoring wine yeast for the new millennium: novel approaches to the ancient art if winemaking. Yeast 16, 675-729.

Pretorius, I.S., 2003. The genetic analysis and tailoring of wine yeasts. In: J.H. de Winde (ed.) Functional genetics of industrial yeasts, pp.99-134. Springer-Verlag, Delft, The Netherlands.

Querol, A., Barrio, E., Huerta, T., Ramon, D., 1992. A comparative study of fidderent methods of yeast strain characterization. Systematic applied microbiology 15, 439-446.

Radler, F., 1993. Yeasts-metabolism of organic acids. In: Wine microbiology and biotechnology, G.H. Fleet (ed.), pp.165-182. Harwood Academic Publishers, Chur, Switzerland.

Radler, F., Yanissis, C., 1972. Weinsäureabbau bei Milchsäurebakterien. Archives of microbiology 82, 219-238.

Ramani, R., Gromadzki, S., Pincus, D.H., Salkin, I.F., Chaturvedi, V., 1998. Efficacy of API 20C and ID 32C systems for Identification of common and rare clinical yeast isolates. Journal of clinical microbiology 36, 3396-3398.

Randazzo, C.L., Vaughan, E.E., Caggia, C., 2006. Artisanal and experimental Pecorino Siciliano cheese: microbial dynamics during manufacture assessed by culturing and PCR-DGGE analyses. International journal of food microbiology 109, 1-8.

Rankine, B.L., 1989. Making good wine: a manual of winemaking practices for Australia and New Zealand. Sun Books, Melbourne, Australia.

Rapp, A., Güntert, M., Almy, J. 1985. Identification and significance of several sulfur-containing compounds in wine. American journal of enology and viticulture 36(3), 219-221.

Rappe, M.S., Giovannini, S.J., 2003. The uncultured microbial majority. Annual review of microbiology 57, 369-394.

Reed, G., Nagodawithana, T.W., 1991. Yeast technology. Van Nostrand Reinhold, New York, USA.

Rementeria, A., Rodrigueza, J.A., Cadavala, A., Amenabarb, R., Muguruzab, J.R., Hernandoa, F.L., Sevillaa, M.J., 2003. Yeast associated with spontaneous fermentations of white wines from the "Txakoli de Bizkaia" region (Basque Country, North Spain). International journal of food microbiology 86, 201-207.

Ribeiro, L.H., Freitas, A.M.C., da Silva, M.D.R.G., 2008. The use of headspace solid phase microextraction for the characterization of volatile compounds in olive oil matrices. Talanta 77(1), 110-117.

Ribeiro, J.S., Augusto, F., Salva, T.J.G., Thomaziello, R.A., Ferreira, M.M.C., 2009. Prediction of sensory properties of Brazilian Arabica roasted coffees by headspace solid phase microextraction-gas chromatography and partial least squares. Analytica chimica acta 634, 172-179.

Ribéreau-Gayon, P., Glories, Y., Manjean, A., Dubourdieu, D., 2000. Handbook of enology: the chemistry of wine stabilization and treatments, vol. 2. John Wiley and Sons Ltd, Chichester, England.

Ribéreau-Gayon, P., Dubourdieu, D., Donéche, B., Lonvaud, A., 2006. Handbook of enology: the microbiology of wine and vinifications, vol. 1, 2nd, pp.53-77. John Wiley and Sons, Ltd., Chichester, England.

Riu-Aumatell, M., Bosch-Fuste, J., Lopez-Tamames, E., Buxaderas, S., 2006. Development of volatile compounds of cava (Spanish sparkling wine) during long ageing time in contact with lees. Food chemistry 95, 237-242.

Riu-Aumatell, M., Castellari, M., López-Tamames, E., Galassi, S., Buxaderas, S., 2004. Characterisation of volatile compounds of fruit juices and nectars by HS/SPME and GC/MS. Food chemistry 87, 627-637.

Rodrigues, F., Caldeira, M., Câmara, J.S., 2008. Development of a dynamic headspace solid-phase microextraction procedure coupled to GC–qMSD for evaluation the chemical profile in alcoholic beverages. Analytica chimica acta 609, 82-104.

Rohm, H., Lechner, F., Lehner, M., 1990. Evaluation of the API ATB 32C system for the rapid identification of food borne yeasts. International journal of food microbiology 11, 215-224.

Rojas, V., Gil, J.V., Pinaga, F., Manzanares, P., 2001. Studies on acetate ester production by non-*Saccharomyces* wine yeasts. International journal of food microbiology 70, 283-289.

Rojas, V., Gil, J.V., Pinaga, F., Manzanares, P., 2003. Acetate ester formation in wine by mixed cultures in laboratory fermentations. International journal of food microbiology 86, 181-188.

Romano, P., 2002. Role of apiculate yeasts on organoleptic characteristics of wine. In: M. Ciani (ed.) Biodiversity and biotechnology of wine yeasts, pp.99-110. Research Signpost, Kerala, India.

Romano, P., Suzzi, G., 1990. Anidride solforosa e lieviti del mosto. Vini d'Italia 32, 31-36.

Romano, P., Suzzi, G., Comi, G., Zironi, R., Maifren, M., 1997. Glycerol and other fermentation products of apiculate wine yeasts. Journal of applied microbiology 82, 615-818.

Romano, P., Marchese, R., Laurita, C., Saleano, G., Turbanti, L., 1999. Biotechnological suitability of *Saccharomycodes ludwigii* for fermented beverages. World journal of microbiology and biotechnology 15, 451-454.

Romano, P., Fiore, C., Paraggio, M., Caruso, M., Capece, A., 2003. Function of yeast species and strains in wine flavour. International journal of food microbiology 86, 169-180.

Ruengrongpanya, T., 1996. A comparison of yeasts in pineapple-wine fermentation. Science Project. Microbiology, Faculty of Science, Chulalongkorn University, Bangkok, Thailand. (In Thai).

Rychlik, M., Schieberle, P., Grosch, W., 1998. Compilation of odor thresholds, odor qualities and retention indices of key food odorants. Deutsche

Forchungsanstalt für Lebensmittelchemie and Institut für Lebensmittelchemie der Technische Universität München, Garching, Germany.

Sabate, J., Cano, J., Esteve-Zarzoso, B., Guillamon, J.M., 2002. Isolation and identification of yeasts associated with vineyard and winery by RFLP analysis ribosomal genes. Microbiological research 157, 1-8.

Saerens, S.M.G., Delvaux, F., Verstrepen, K.J., Van Dijck, P., Thevelein, J.M., Delvaux, F.R., 2008. Parameters affecting ethyl ester production by Saccharomyces cerevisiae during fermentation. Applied and environmental microbiology 74(2), 454-461.

Salkin, I.F., Schadow, K.H., Bankaitis, L.A., McGinnis, M.R., Kemna, M.E., 1985. Evaluation of Abbott Quantum II yeast identification system. Journal of clinical microbiology 22(3), 442-444.

Salkin, I.F., Land, G.A., Hurd, N.J., Goldson, P.R., McGinnis, M.R., 1987. Evaluation of YeastIdent and Uni-Yeast-Tek yeast identification systems. Journal of clinical microbiology 25(4), 624-627.

Sánchez-Palomo, E., Diaz-Maroto, M.C., Perez-Coello, M.S., 2005. Rapid determination of volatile compounds in grapes by HS-SPME coupled with GC–MS. Talanta 66, 1152-1157.

Saradhuldhat, P., Paull, R.E., 2007. Pineapple organic acid metabolism and accumulation during fruit development. Scientia horticulturae 112, 297-303.

Schreier, P., 1979. Flovor composition of wines: A review. Critical reviews in food science and nutrition 12, 59-111.

Schütz, M., Gafner, J., 1993. Analysis of yeast diversity during spontaneous and induced alcohol fermentations. Journal of applied bacteriology 75, 551-558.

Scorzetti, G., Fell, J.W., Fonseca, A., Statzell-Tallman, A., 2002. Systematics of basidiomycetous yeasts: a comparison of large subunit D1/D2 and internal transcribed spacer rDNA regions. FEMS yeast research 2, 495-517.

Serrano, E., Beltrán, J., Hernández, F., 2009. Application of multiple headspace-solid-phase microextraction followed by gas chromatography–mass spectrometry to quantitative analysis of tomato aroma components. Journal of chromatography A 1216, 127-133.

Shankland, G.S., Hopwood, V., Forster, R.A., Evans, E.G., Richardson, M.D., Warnock, D.W., 1990. Multicenter evaluation of Microring YT, a new method of yeast identification. Journal of critical microbiology 28, 2808-2810.

Shaw, P.E., Wilson, C.W., Hansen, R.W., 1987. H.p.l.c. Determination of trace levels of succinic acid in orange juice from Freeze-damaged and undamaged fruit. Journal of the science of food and agriculture 41, 153-158.

Shimazu, Y., Watanabe, M., 1981. Effects of yeast strains and environmental conditions on formation of organic acids in must during fermentation. Journal of fermentation technology 59, 27-32.

Siebert, T.E., Smyth, H.E., Capone, D.L., Neuwöhner, C., Pardon, K.H., Skouroumounis, G.K., Herderich, M.J., Sefton, M.A., Pollnitz, A.P., 2005. Stable isotope dilution analysis of wine fermentation products by HS-SPME-GC-MS. Analytical and bioanalytical chemistry 381, 937-947.

Silvestri, G., Santarelli, S., Aquilanti, L., Beccaceci, A., Osimani, A., Tonucci, F., Clementi, F., 2007. Investigation of the microbial ecology of ciauscolo, a traditional italian salami, by culture-dependent techniques and PCR-DGGE. Meat science 77, 413-423.

Singleton, V.L., 1965. Chemical and physical development of the pineapple fruit. I. Weight per fruitlet and other physical attributes. Journal of food science 30, 98.

Singleton, V.L., Gortner, W.A., 1965. Chemical and physical development of the pineapple fruit. II. Carbohydrate and acid constituents. Journal of food science 30, 19-23.

Soles, R.M., Ough, C.S., Kunkee, R.E., 1982. Ester concentration differences in wine fermented by various species and strains of yeasts. American journal of enology and viticulture 33, 94-98.

Solieri, L., Landi, S., Vero, L.D., Giudici, P., 2006. Molecular assessment of indigenous yeast population from traditional balsamic vinegar. Journal of applied microbiology 101, 63-71.

Soufleros, E.H., Petridis, D., Lygerakis, M., Mermelas, K., Boukouvalas, G., Tsimitakis, E., 2001. Instrumental analysis of volatile and other compounds of Greek kiwi wine; sensory evaluation and optimisation of its composition. Food chemistry 75(4), 487-500.

Srisajjalertwaja, A., 1991. Complete continuous process of vinegar production from pineapple juice. Thesis. Chemical Technology, Faculty of Science, Chulalongkorn University, Bangkok, Thailand. (In Thai).

St Germain, G., Beauchesne, D., 1991. Evaluation of the MicroScan rapid yeast identification panel. Journal of clinical microbiology 29(10), 2296-2299.

Stringini, M., Comitini, F., Taccari, M., Ciani, M., 2008. Yeast diversity in crop-growing environments in Cameroon. International journal of food microbiology 127, 184-189.

Sturm, K., Koron, D., Stampar, F., 2003. The composition of fruit of different strawberry varieties depending on maturity stage. Food chemistry 83, 417-422.

Thammarat, P., 1978. Investigation the efficiency of yeast culture in palm wine and strains selection for alcoholic fermentation. Thesis. Microbiology, Faculty of Science, Kasetsart University, Bangkok, Thailand. (In Thai).

Thomas, D.S., Davenport, R.R., 1985. *Zygosaccharomyces bailii*- a profile of characteristics and spoilage activities. Food microbiology 2, 157-169.

Tofalo, R., Chaves-López, C., Fabio, F.D., Schirone, M., Felis, G.E., Torriani, S., Paparella, A., Suzzi, G., 2009. Molecular identification and osmotolerant profile of wine yeasts that ferment a high sugar grape must. International journal of food microbiology 130, 179-187.

Tomlins, K.I., Baker, D.M., McDowell, I.J., 1990. HPLC method for the analysis of organic acids, sugars, and alcohol in extracts of fermenting cocoa beans. Chromatographia 29 557-561.

Uhlig, H., Linsmaier-Bednar, E.M., 1998. Lysis of microbial cellwalls. In: U. Helmut (ed.), Industrial enzymes and their applications, pp.397-400. John Wiley & Sons, Inc., New York, USA.

Urtubia, A., Ricardo, P.-C.J., Meurens, M., Agosin, E., 2004. Monitoring large scale wine fermentations with infrared spectroscopy. Talanta 64, 778-784.

Van der Westhuizen, T., Augustyn, O., Khan, W., Pretorius, I.S., 2000a. Geographical distribution of Indigenous *Saccharomyces cerevisiae* strains isolated from vineyard in the coastal regional of the Western Cape in South Africa. South African journal for enology and viticulture 21, 3-9.

Van der Westhuizen, T., Augustyn, O., Khan, W., Pretorius, I.S., 2000b. Seasonal variation of indigenous *Saccharomyces cerevisiae* strains isolated from

vineyard of the Western Cape in South Africa. South African journal for enology and viticulture 21, 10-15.

Vas, G.Y., Koteleky, K., Farkas, M., Dobo, A., Vikey, K., 1998. Fast screening method for wine headspace compounds using solid-phase microextraction (SPME) and capillary GC technique. American journal of enology and viticulture 49, 100-104.

Viana, F., Gil, J.V., Genoves, S., Valles, S., Manzanares, P., 2008. Rational selection of non-*Saccharomyces* wine yeasts for mixed starters based on ester formation and enological traits. Food microbiology 25, 778- 785.

Walker, T., Morris, J., Threlfall, R., Main, G., 2002. pH modification of Cynthiana wine using cationic exchange. Journal of agricultural and food chemistry 50, 6346-6352.

White, T.J., Bruns, T., Lee, S., Taylor, J., 1990. Amplification and direct sequencing of fungal ribosomal RNA genes for phylogenetics. In: M.A. Innis, D.H. Gelfalnd, J.J. Sninsky and T.T. White (eds.), PCR protocols, A guide to methods and applications, pp.315-320. Academic Press, San Diego, USA.

Whiting, G.C., 1976. Organic acid metabolism of yeasts during fermentation of alcoholic beverages-a review. Journal of the institute of brewing 82, 84-92.

Wongwantanee, S., 1992. Improvement of alcohol production from pineapple juice by recycling yeast cells in continuous column fermenter. Thesis. Biotechnology, Chulalongkorn University, Bangkok, Thailand. (In Thai).

Yanagida, F., Ichinose, F., Shinohara, T., Goto, S., 1992. Distribution of wild yeasts in white grape varieties of central Japan. Journal of general and applied microbiology 38, 501-504.

Yang, V.A., Clausen, C.A., 2004. Antifungal metabolites of lactobacilli. In: Proceedings from the woodframe housing durability and disaster issues conference. Forest Products Society, Madison, WI, 4-6 October 2004, Aladdin Resort & Casino, Las Vegas, Nevada, USA.

Zironi, R., Romano, P., Suzzi, G., Battistutta, F., Comi, G., 1993. Volatile metabolites produced in wine by mixed and sequential cultures of *Hanseniaspora guilliermondii* or *Kloeckera apiculata* and *Saccharomyces cerevisiae*. Biotechnology letters 15, 235-238.

Zoecklein, B.W., Fugelsang, K.C., Gump, B.H., Nury, F.S., 1995. Wine analysis and production. Chapman & Hall, New York, USA.

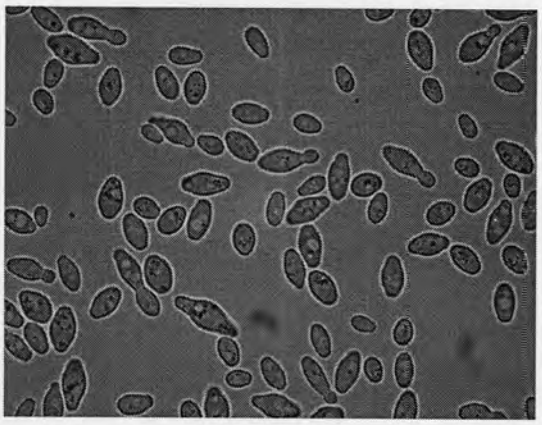
Zott, K., Miot-Sertier, C., Claisse, O., Lonvaud-Funel, A., Masneuf-Pomarede, I., 2008. Dynamics and diversity of non-Saccharomyces yeasts during the early stages in winemaking. International journal of food microbiology 125, 197-203.

APPENDICES

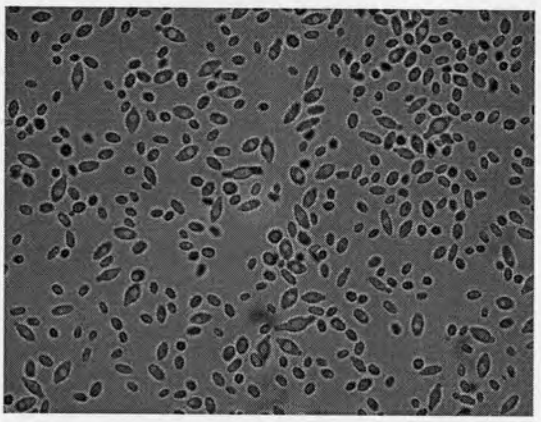
APPENDIX A

CELL MORPHOLOGY OF YEAST ISOLATES (×1,000)

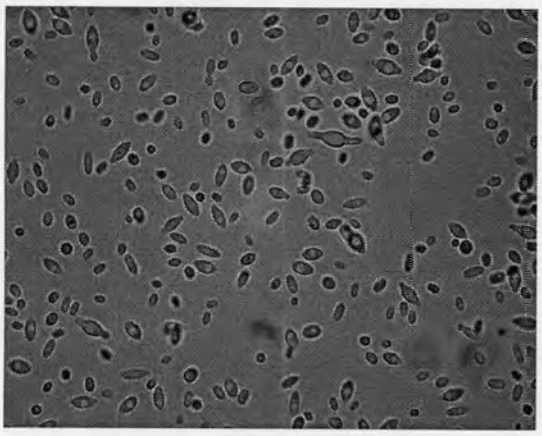
S'codes ludwigii (Sl)



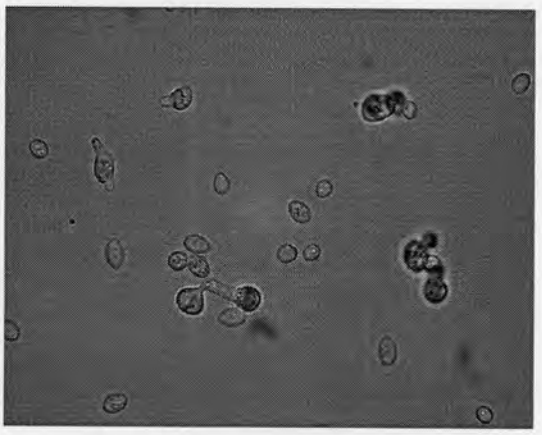
*H. uvarum*1 (Hu1)



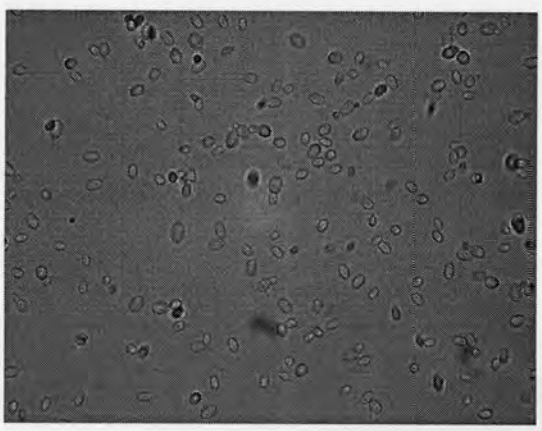
*H. uvarum*2 (Hu2)



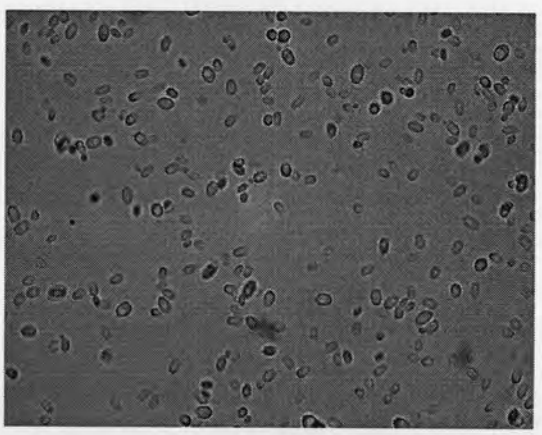
Z. bailii (Zb)



Candida sp.1 (Cs1)

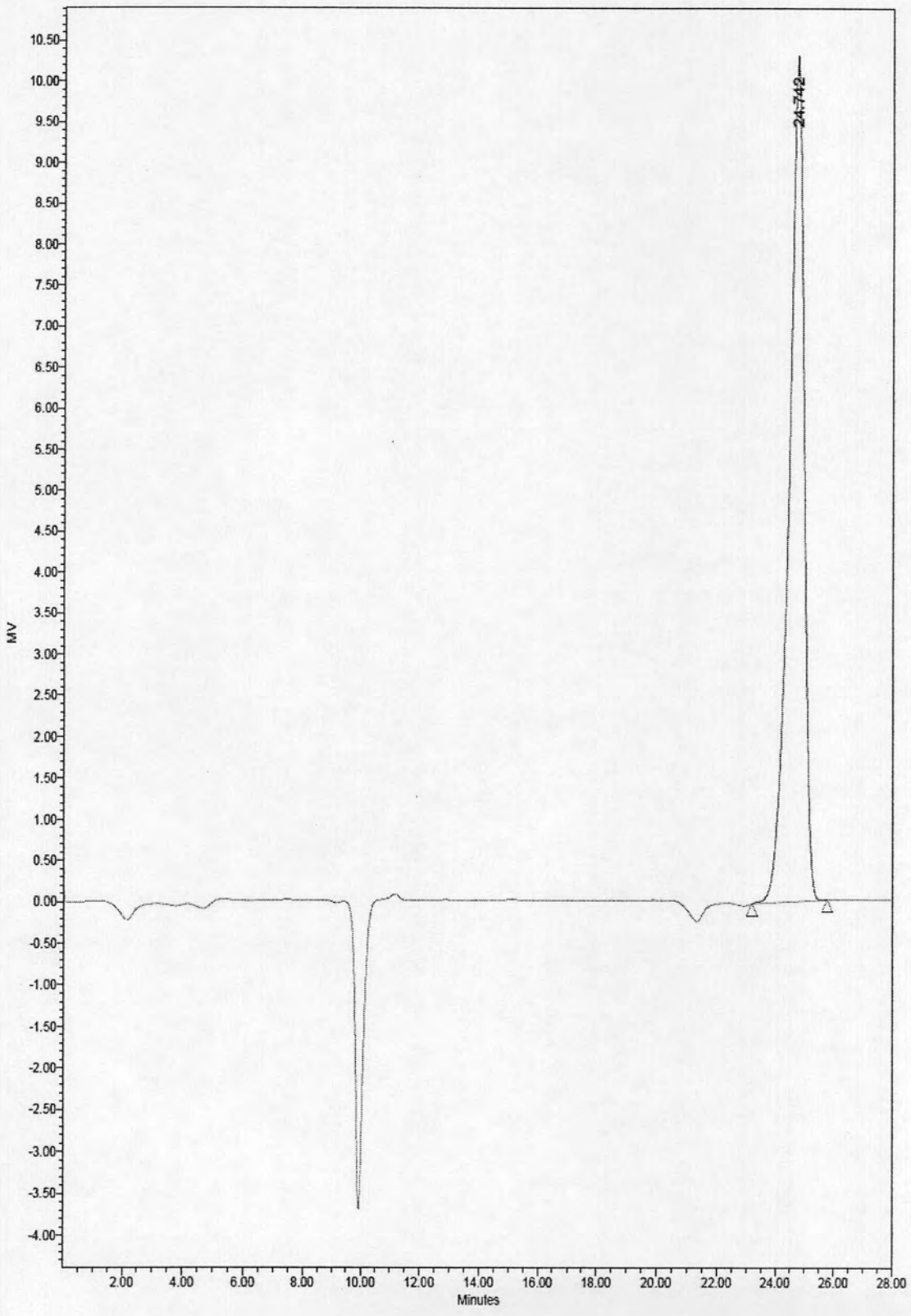


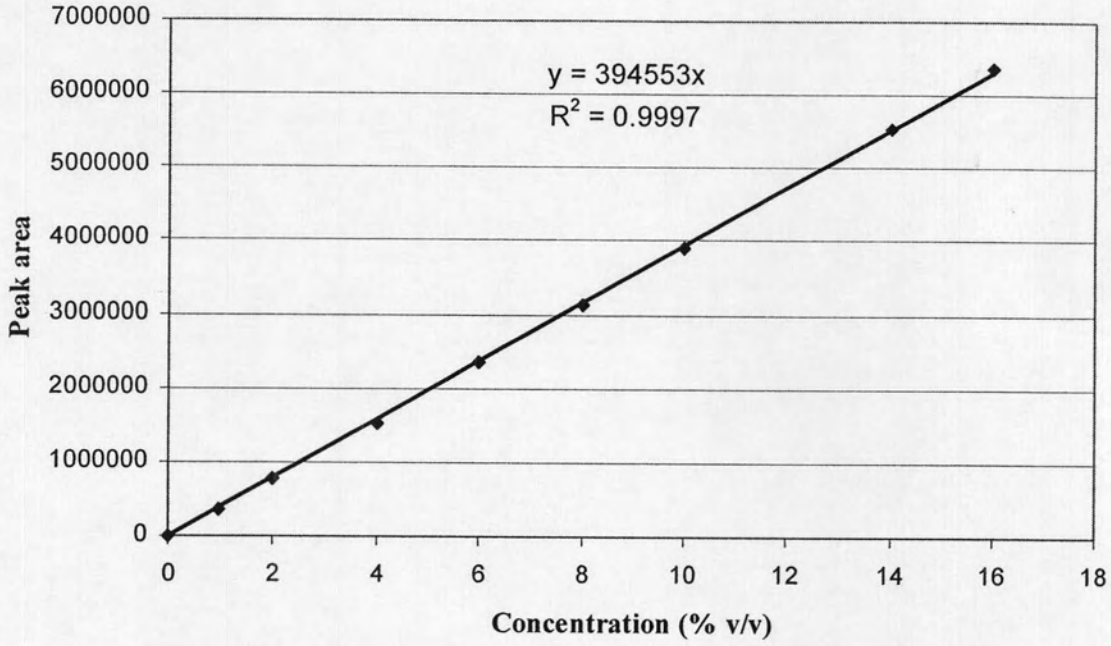
Candida sp.2 (Cs2)



APPENDIX B

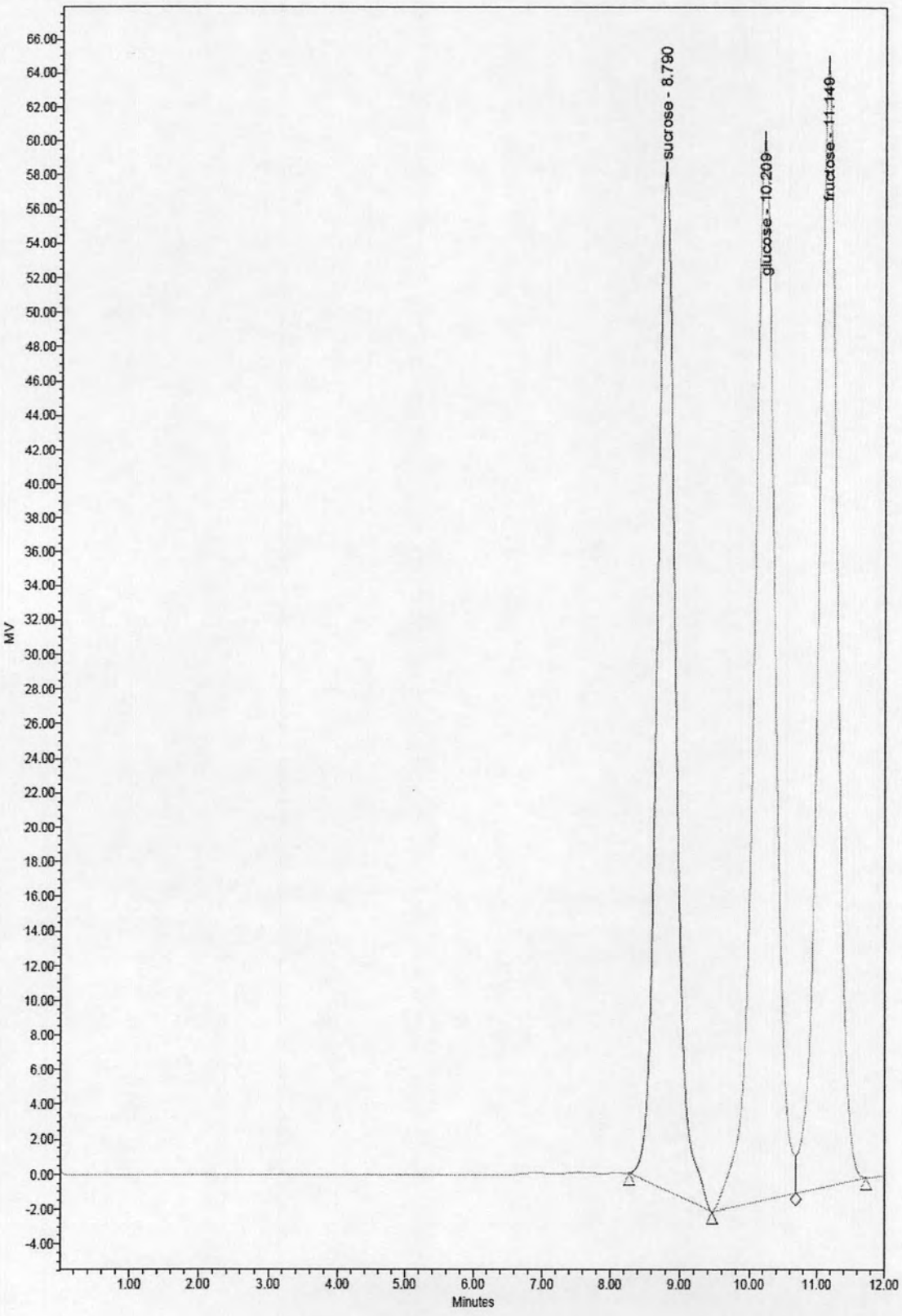
CHROMATOGRAM AND STANDARD CURVE OF STANDARD ETHANOL




y = 394553x
R2 = 0.9997
Peak area
7000000
6000000
5000000
4000000
3000000
2000000
1000000
0
0
2
4
6
8
10
12
14
16
18
Concentration (% v/v)

APPENDIX C

CHROMATOGRAM AND STANDARD CURVE OF STANDARD SUGARS



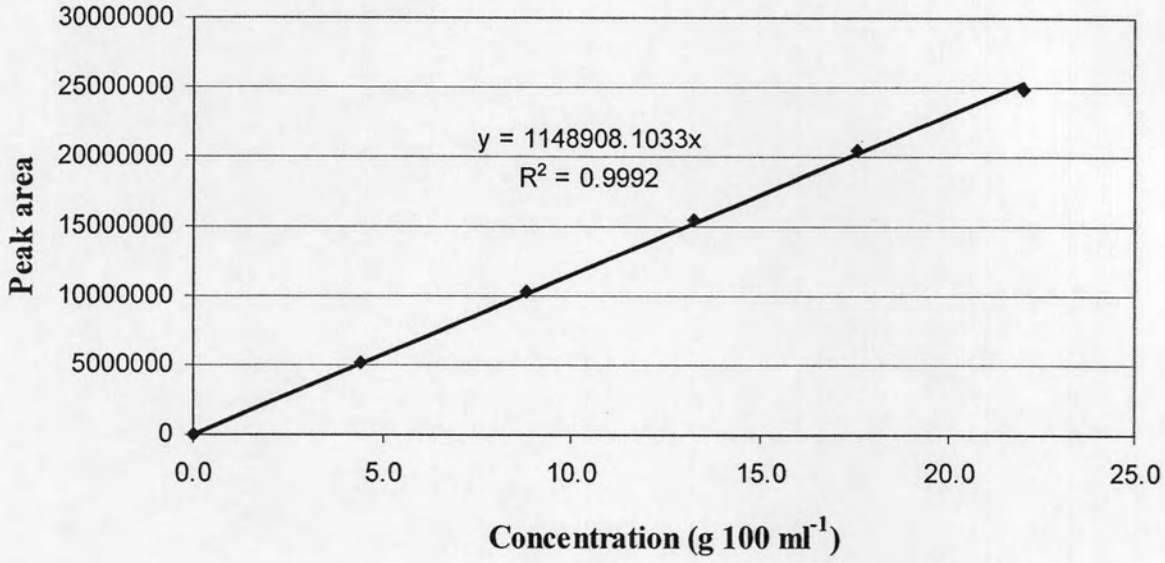


Figure C.1 Standard curve of sucrose

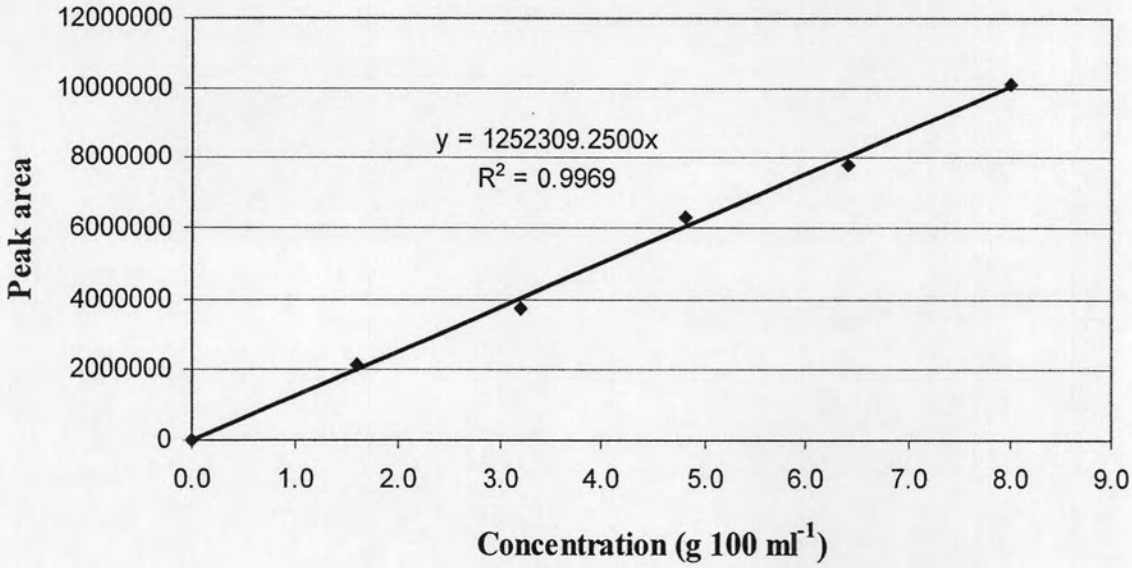


Figure C.2 Standard curve of glucose

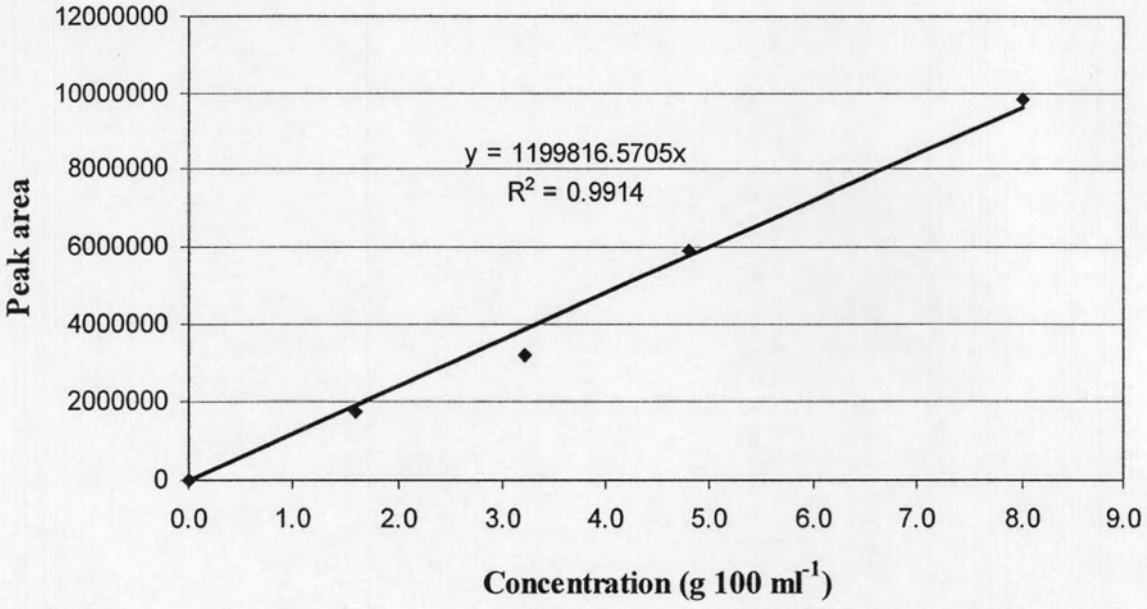
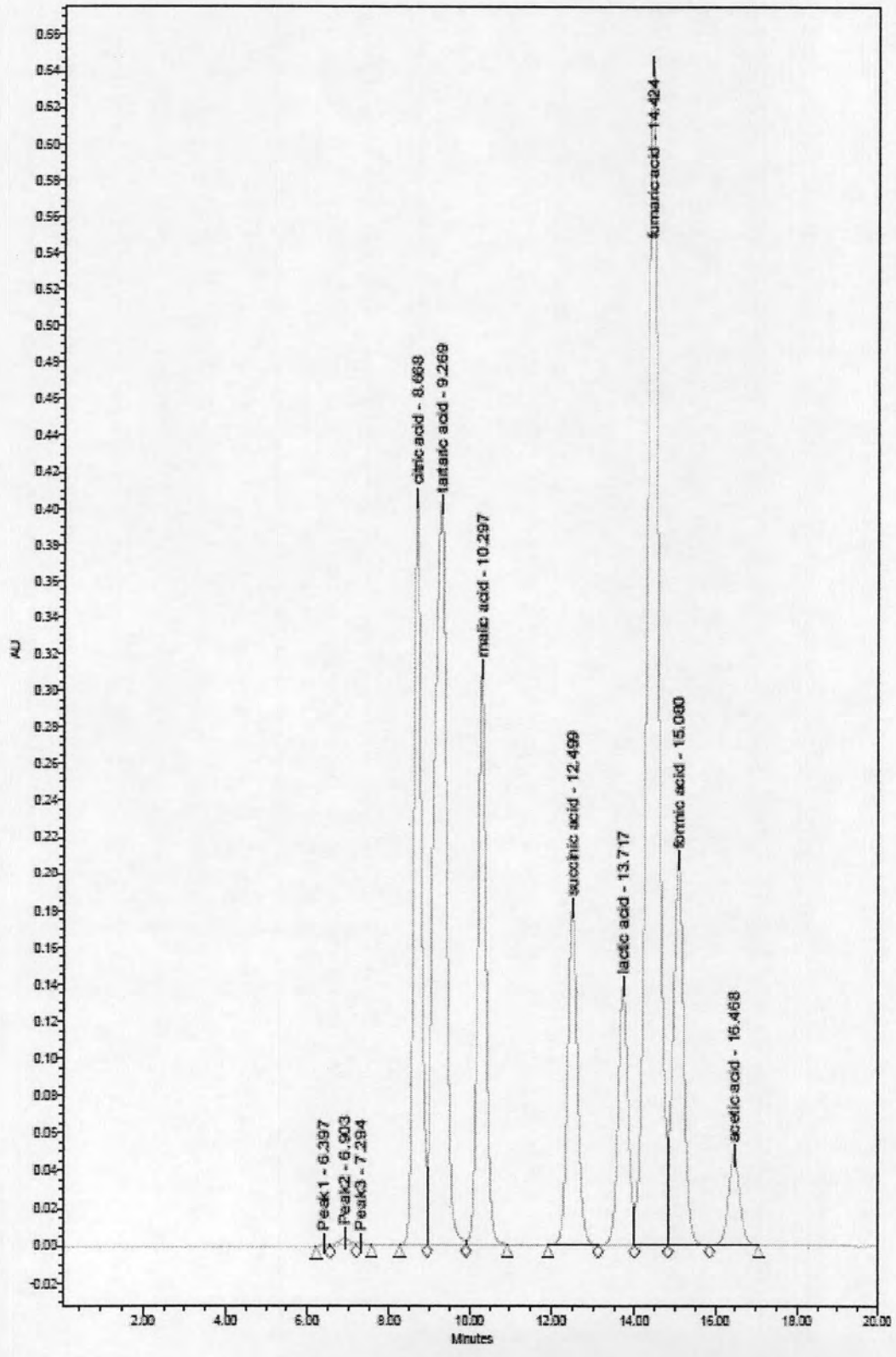


Figure C.3 Standard curve of fructose

APPENDIX D

CHROMATOGRAM AND STANDARD CURVE OF STANDARD ORGANIC ACIDS



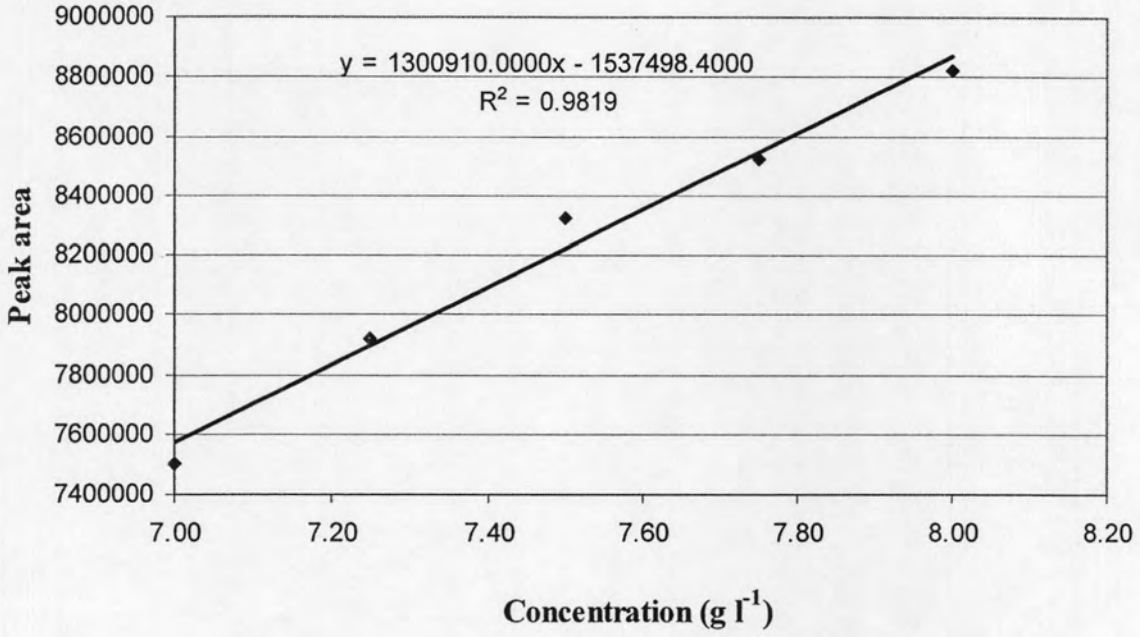


Figure C.1 Standard curve of citric acid

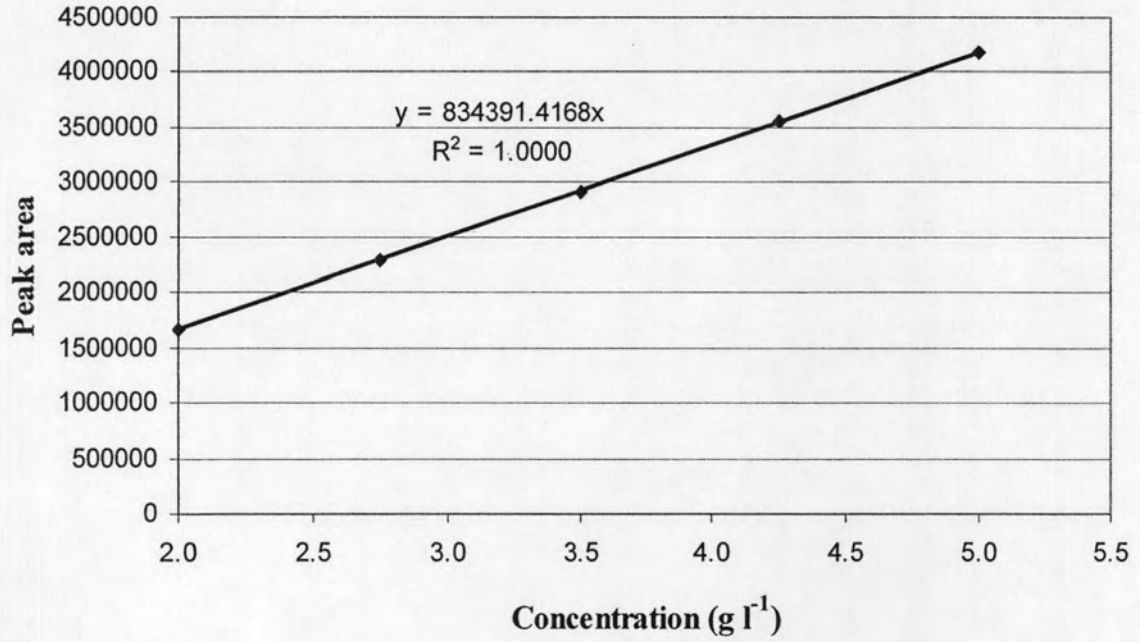


Figure C.2 Standard curve of malic acid

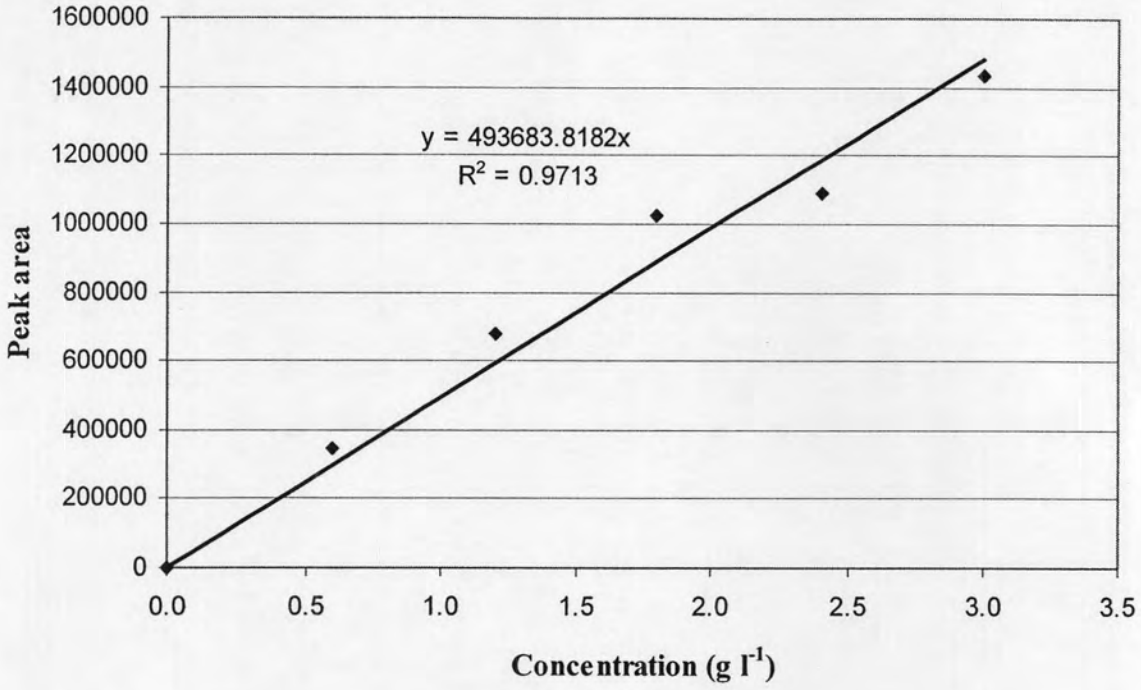


Figure C.3 Standard curve of succinic acid

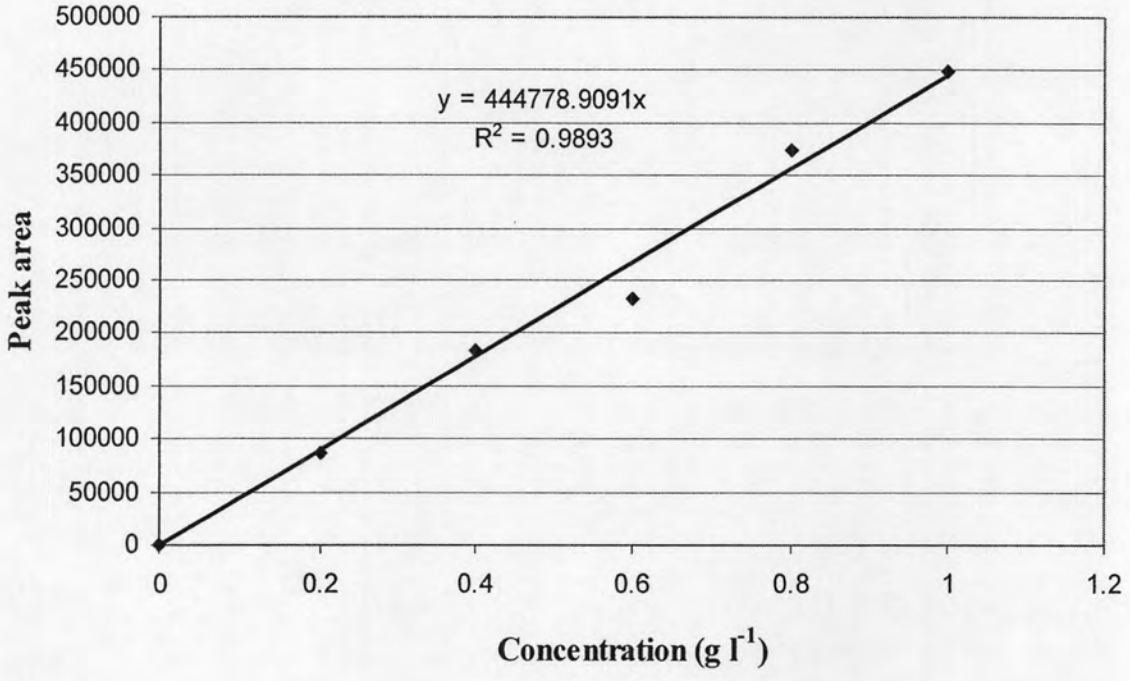


Figure C.4 Standard curve of lactic acid

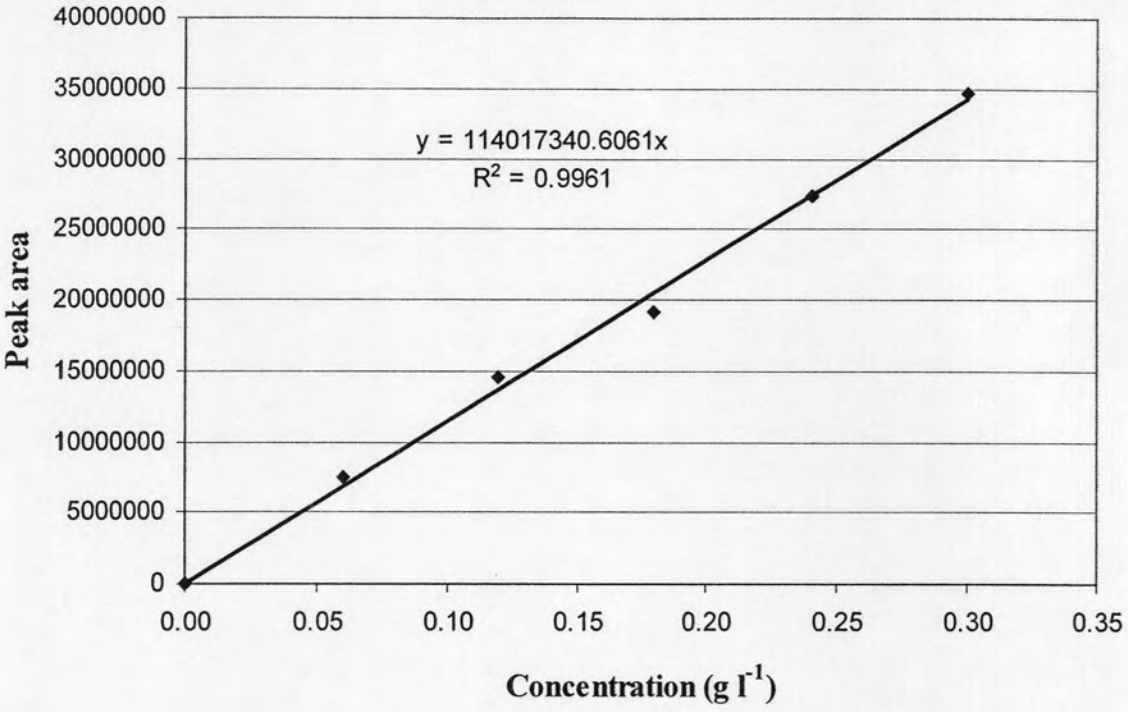


Figure C.5 Standard curve of fumaric acid

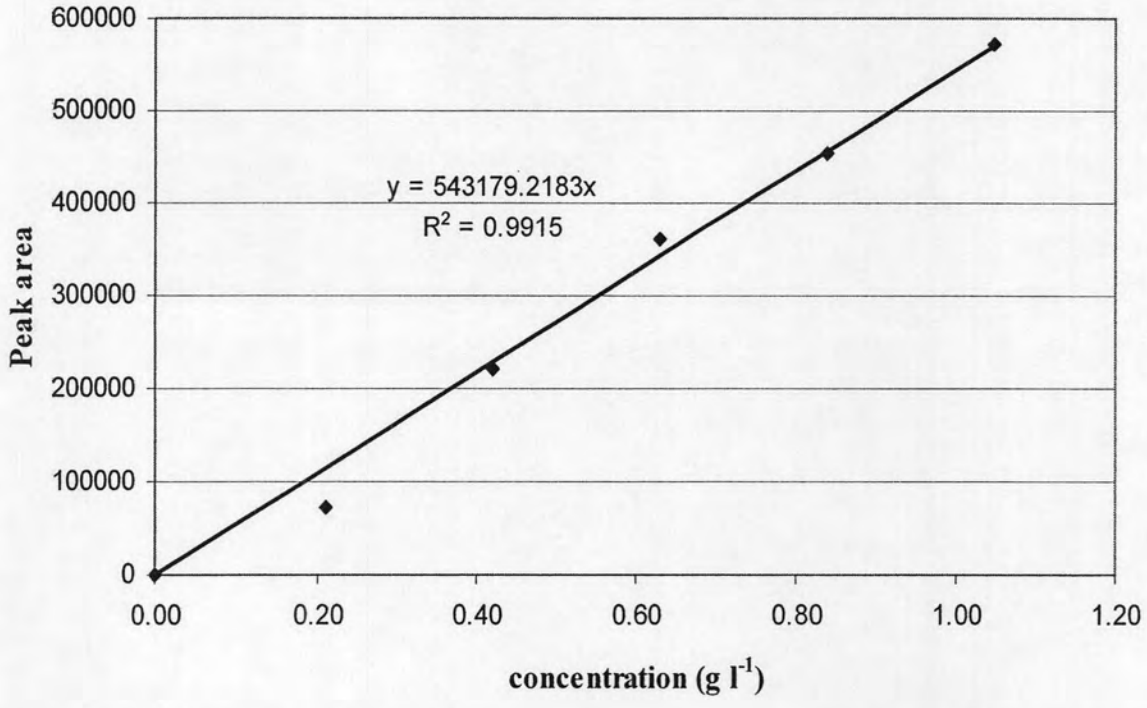


Figure C.6 Standard curve of acetic acid

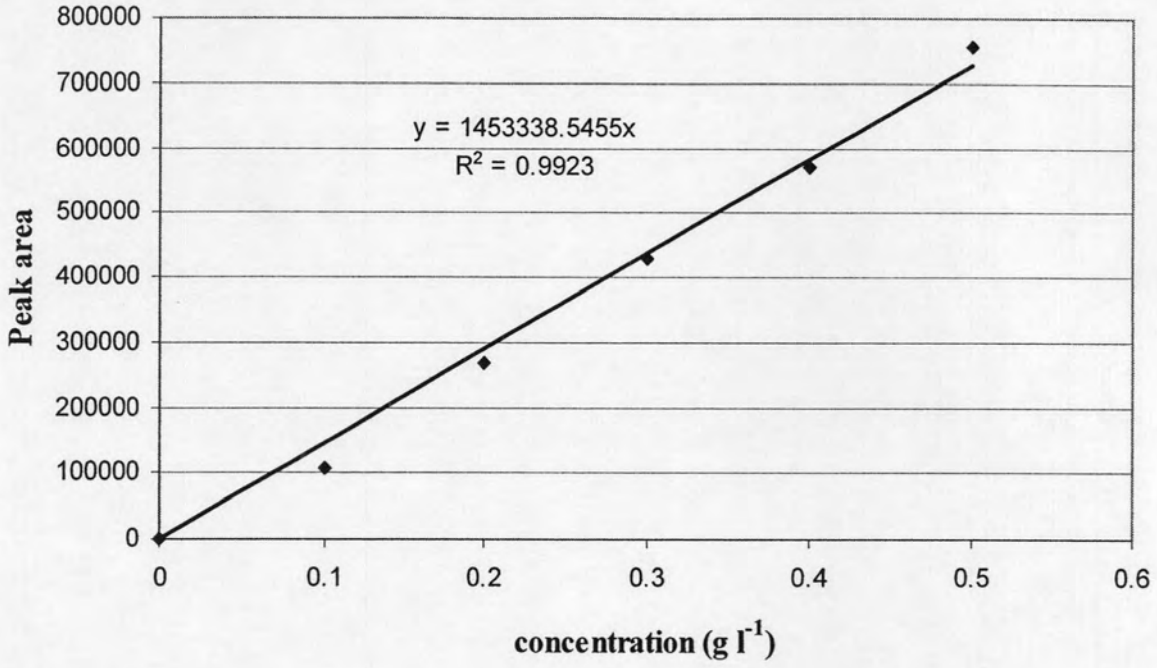


Figure C.7 Standard curve of tartaric acid

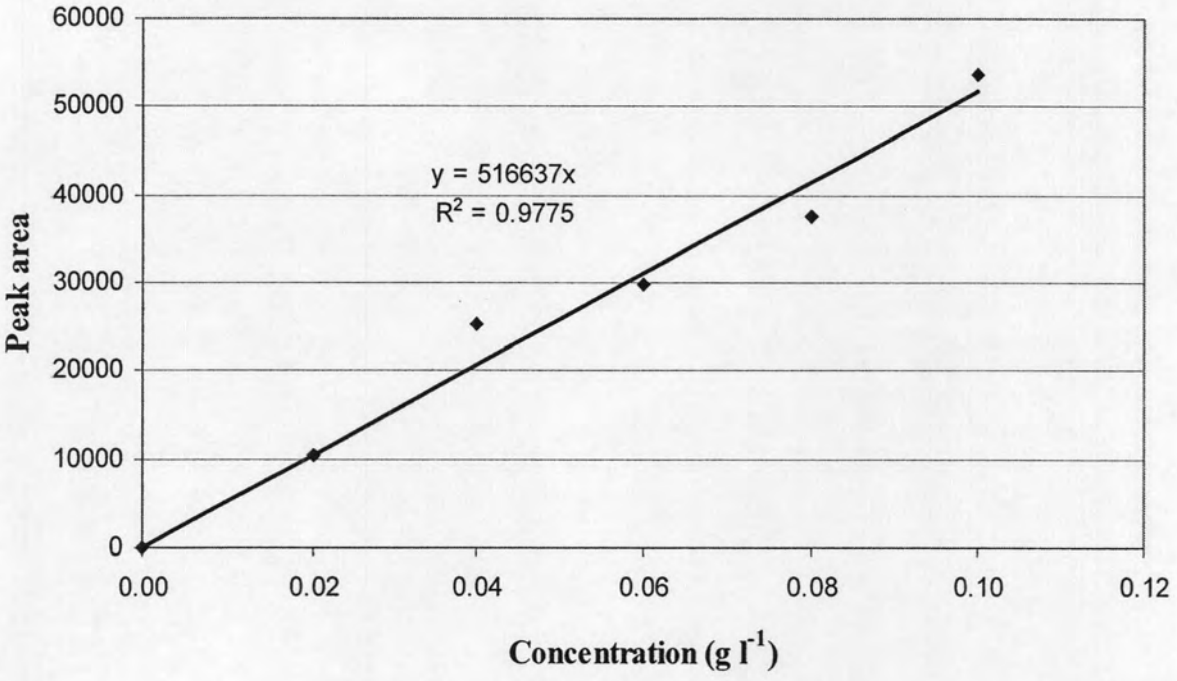


Figure C.8 Standard curve of formic acid

APPENDIX E

VOLATILE COMPOUNDS ANALYSIS OF FERMENTED PINEAPPLE JUICES

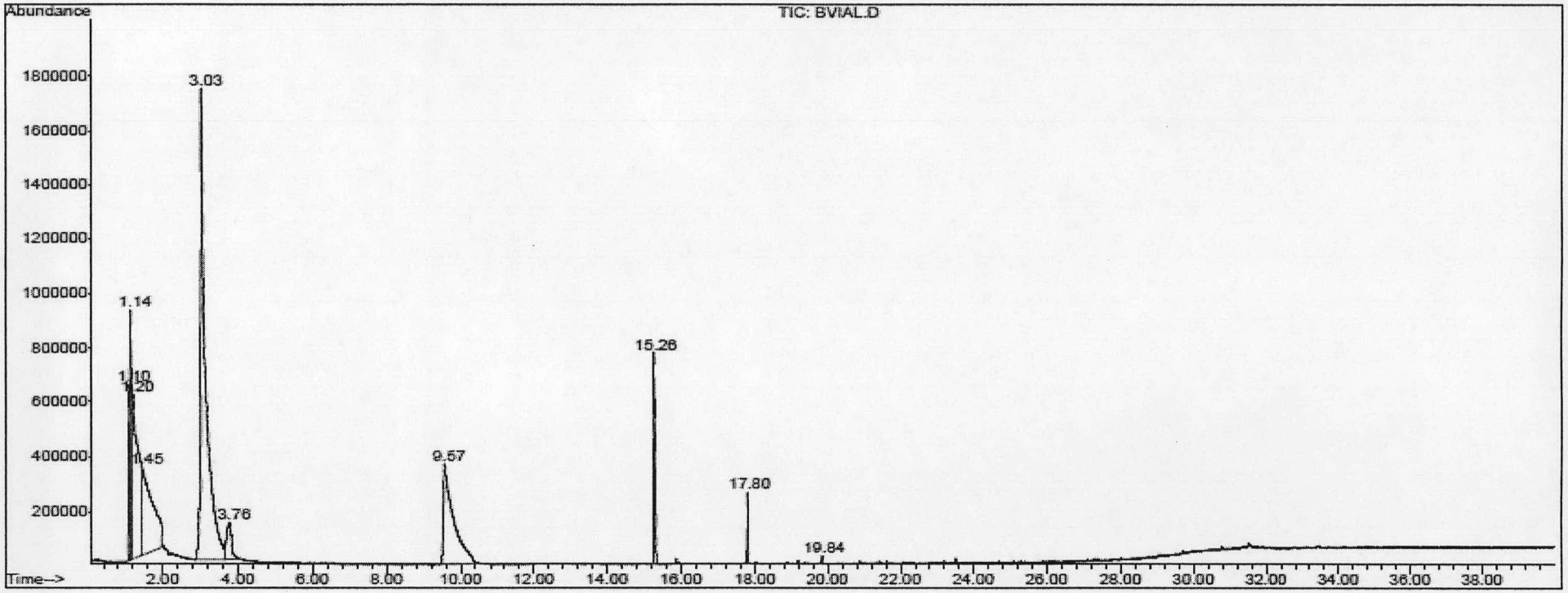


Figure E.1 The volatile compounds chromatogram of empty vial

Table E.1 The volatile compounds of empty vial

Order	RT (min)	Common name	Ref#	CAS#	% Area	Aroma description
1	3.03	Octamethylcyclotetrasiloxane	244216	000556-67-2	36.107	-
2	1.14,1.20	N-(p-Anisidinomethyl)-4-methylphthalimide	244992	000000-00-0	22.013	-
3	1.10,1.45	Ethyl 1-hexyl-4-hydroxy-2(1H)-oxo-3-quinolinecarboxylate	268306	000000-00-0	17.402	-
4	9.57	2,6,10,14-Tetramethylpentadecane	211498	001921-70-6	16.290	-
5	15.26	16-oxosalutaridine	290871	094707-61-6	4.192	-
6	3.77	Ammonia	15	007664-41-7	3.162	-
7	17.80	11H-Dibenzo[b,e][1,4]diazepin-11-one, 5,10-dihydro-5-[3-(methylamino)propyl]-	227028	013450-70-9	0.757	-
8	19.84	2-(3',5'-Ditrifluoromethylphenyl)-1,1,3,3-tetramethylguanidine	277727	121648-79-1	0.078	-

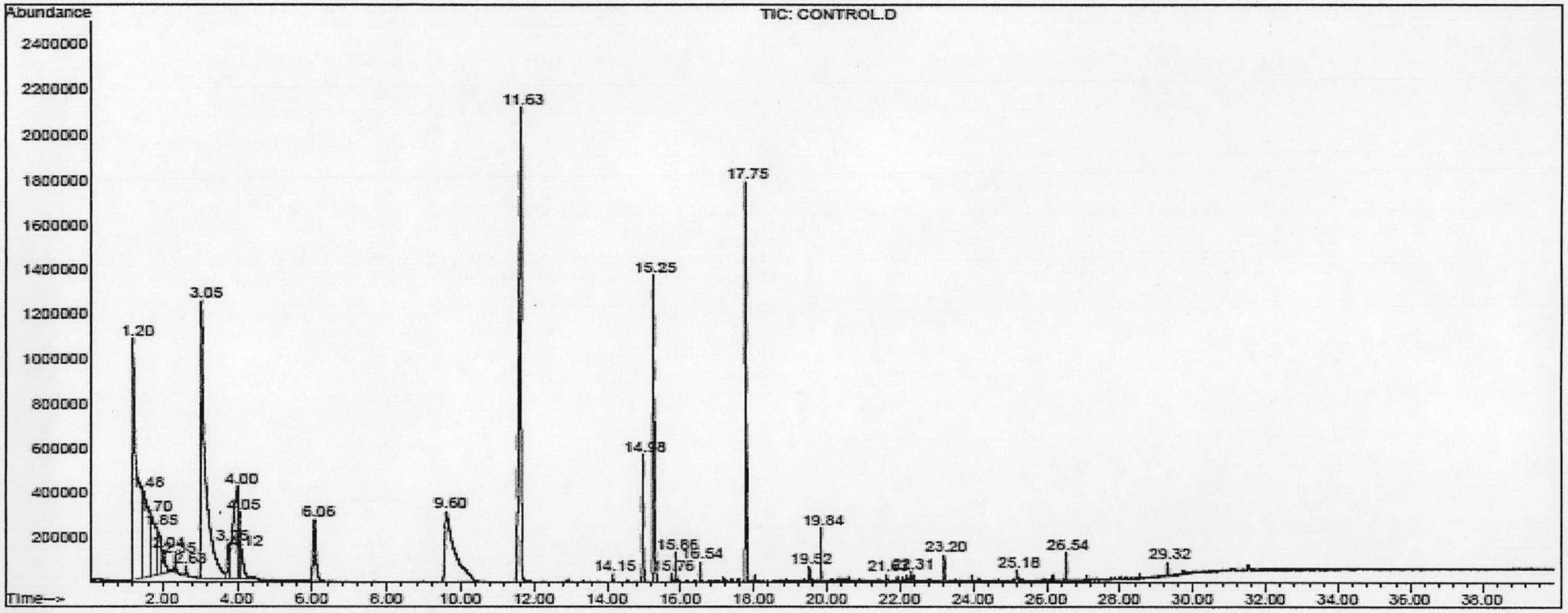


Figure E.2 The volatile compounds chromatogram of prepared pineapple juice before inoculation

Table E.2 Major volatile compounds of prepared pineapple juice before inoculation

Order	RT (min)	Common name	Ref#	CAS#	% Area	Aroma description
1	11.63	Ethyl hexanoate	40244	000123-66-0	15.456	Fruity[1]
2	6.06	1-Butanol, 3-methyl-, acetate	26563	000123-92-2	2.392	Banana-like[1,2]
3	4.05,4.12	Ethyl 2-methylbutanoate	26431,26432	007452-79-1	2.308	Fruity[1]
4	14.98	Isobutyl hexanoate	76573	000105-79-3	1.920	-
5	2.04	Ethyl acetate	4588	000141-78-6	0.775	Solvent-like, fruity[1]
6	3.75	Ethyl butanoate	16466	000105-54-4	0.726	Fruity[1]
7	26.54	2,4-Di-tert-butylphenol	124423	000096-76-4	0.285	-
8	2.35	Ethanol	296	000064-17-5	0.278	Ethanol-like[1]
9	16.54	Ethyl octanoate	76354	000106-32-1	0.238	Fruity, fatty[1]
10	29.32	Benzyl benzoate	133595	000120-51-4	0.194	-
11	2 63	Ethyl propanoate	9247	000105-37-3	0.161	Fruity[1], Sweet, ethereal, fruity[3]
12	19.51	Ethyl decanoate	115400	000110-38-3	0.153	Oily, fruitly, floral[3]
13	14.15	3-Hexen-1-ol, acetate, (Z)-	38001	003681-71-8	0.116	Herbaceous[3]
14	15.76	Nonanal	38522	000124-19-6	0.100	Tallowy, fruity[1]
15	25.19	Nonanoic acid	57726	000112-05-0	0.089	Nutty odour[3]

1= Rychlik, Schieberle and Grosch (1998); 2= Jackson (2000), 3=Clarke and Bakker (2004)

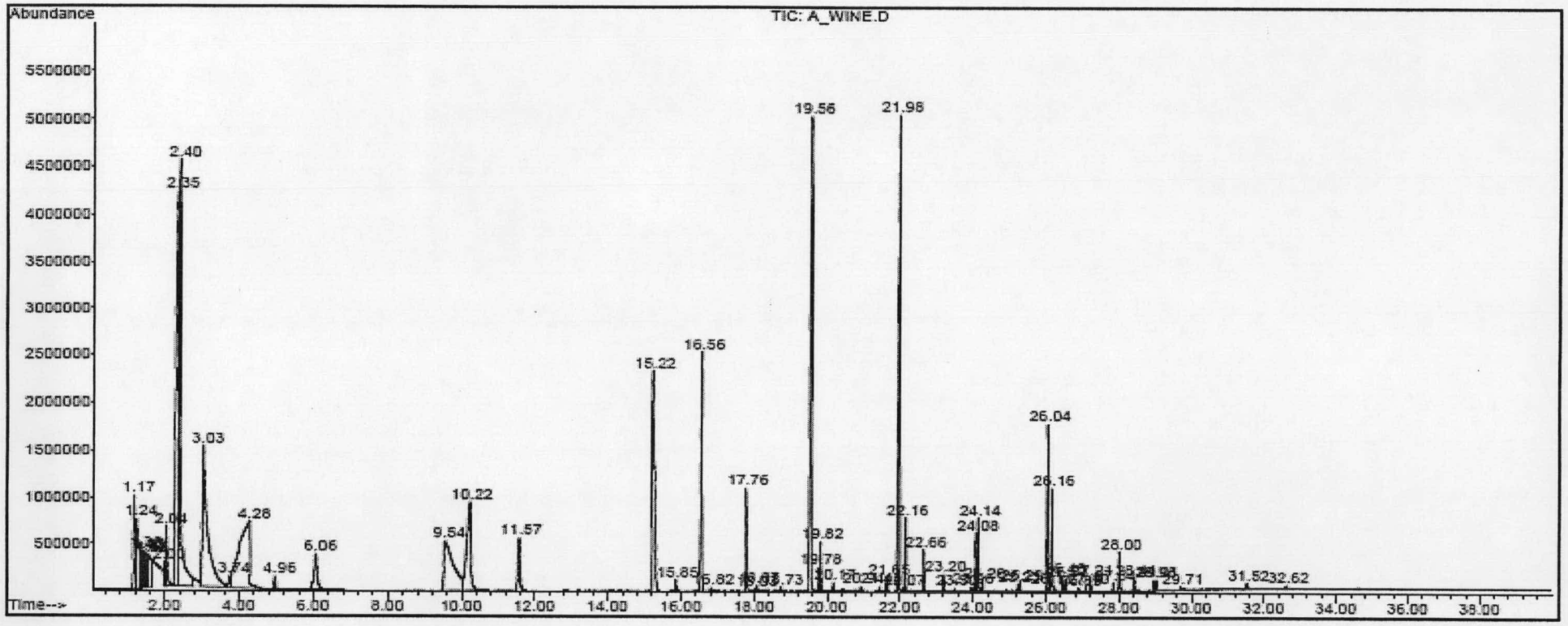


Figure E.3 The volatile compounds chromatogram of pineapple wine inoculated with *S. cerevisiae*

Table E.3 Major volatile compounds of pineapple juice inoculated with *S. cerevisiae*

Order	RT (min)	Common name	Ref#	CAS#	% Area	Aroma description
1	2.35,2.40	Ethanol	304	000064-17-5	22.223	Ethanol-like[1]
2	19.56	Ethyl decanoate	115400	000110-38-3	8.787	Oily, fruitly, floral[3]
3	21.98	Ethyl dodecanoate	157256	000106-33-2	8.191	Oily, fruitly, floral[3]
4	10.22	Isoamylalcohol	4960	000000-00-0	4.636	Malty[1]
5	16.55	Ethyl octanoate	76354	000106-32-1	3.199	Fruity, fatty[1]
6	26.04	Ethyl hexadecanoate	231384	000628-97-7	1.823	-
7	1.37,1.41	Acetaldehyde	204	000075-07-0	1.535	Pungent, fruity[1]
8	11.57	Ethyl hexanoate	40243	000123-66-0	1.336	Fruity[1]
9	6.06	Isoamyl acetate	26567	000123-92-2	1.316	Banana-like[1,2]
10	1.99,2.04	Ethyl acetate	4587,4589	000141-78-6	1.315	Solvent-like, fruity[1]
11	26.16	Decanoic acid	76310	000334-48-5	1.106	Soap-like, fruity[1]
12	24.14	Octanoic Acid	40185	000124-07-2	0.793	Sweaty[1]
13	22.16	Pentadecanoic acid, 3-methylbutyl ester	176833	002306-91-4	0.736	Fruity[1]
14	24.08	Ethyl tetradecanoate	195472	000124-06-1	0.587	-
15	28.00	Dodecanoic acid	115375	000143-07-7	0.558	-
16	22.66	2-Phenylethanol	19944	000060-12-8	0.393	Honey-like, spicy[1]
17	19.78	Isoamyl octanoate	136210	002035-99-6	0.248	Fruity[1]
18	3.74	Ethyl butanoate	16461	000105-54-4	0.224	Fruity[1]
19	4.96	Isobutyl alcohol	2109	000078-83-1	0.208	Ethereal, fruity[3]
20	26.46	Glycerin	5460	000056-81-5	0.198	-

1= Rychlik, Schieberle and Grosch (1998); 2= Jackson (2000), 3=Clarke and Bakker (2004)

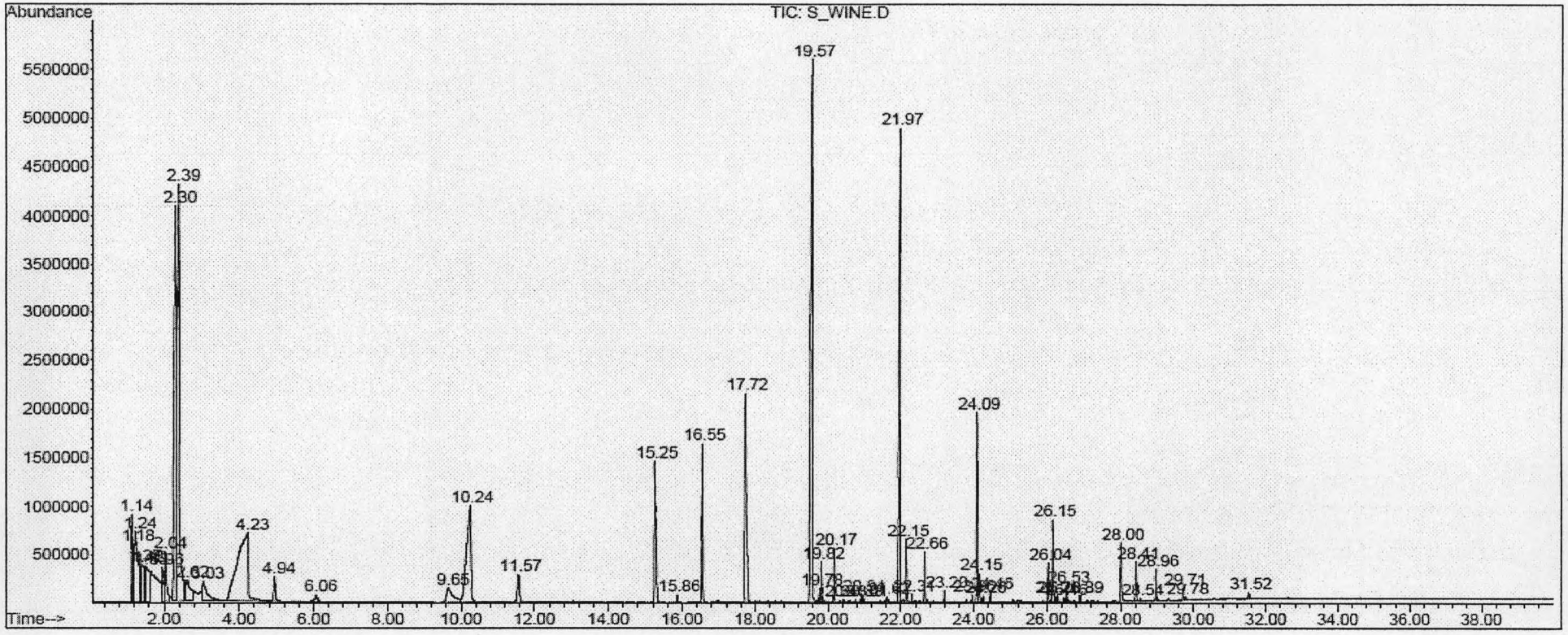


Figure E.4 The volatile compounds chromatogram of pineapple wine inoculated with *S'codes ludwigii*

Table E.4 Major volatile compounds of pineapple juice inoculated with *S'codes ludwigii*

Order	RT (min)	Common name	Ref#	CAS#	% Area	Aroma description
1	2.30,2.39, 2.62	Ethanol	304	000064-17-5	25.943	Ethanol-like[1]
2	19.57	Ethyl decanoate	115400	000110-38-3	13.349	Oily, fruitly, floral[3]
3	21.97	Ethyl dodecanoate	157256	000106-33-2	8.303	Oily, fruitly, floral[3]
4	10.24	Isoamylalcohol	4960	000000-00-0	5.942	Malty[1]
5	24.09	Ethyl tetradecanoate	195478	000124-06-1	2.317	-
6	16.55	Ethyl octanoate	76354	000106-32-1	2.133	Fruity, fatty[1]
7	1.96,2.04	Ethyl acetate	4588,4589	000141-78-6	1.918	Solvent-like, fruity[1]
8	1.42	Acetaldehyde	204	000075-07-0	1.069	Pungent, fruity[1]
9	26.16	Decanoic acid	76310	000334-48-5	1.014	Soap-like, fruity[1]
10	28.00	Dodecanoic acid	115375	000143-07-7	1.006	-
11	11.57	Ethyl hexanoate	40243	000123-66-0	0.829	Fruity[1]
12	22.15	Pentadecanoic acid, 3-methylbutyl ester	176833	002306-91-4	0.659	Fruity[1]
13	20.17	Ethyl 9-decenoate	112676	000000-00-0	0.608	-
14	4.94	Isobutyl alcohol	2109	000078-83-1	0.568	Ethereal, fruity[3]
15	22.66	2-Phenylethanol	19944	000060-12-8	0.537	Honey-like, spicy[1]
16	28.41	Linoleic acid ethyl ester	258929	000544-35-4	0.464	-
17	26.04	Ethyl hexadecanoate	231384	000628-97-7	0.447	-
18	24.15	Octanoic acid	40186	000124-07-2	0.376	Sweaty[1]
19	28.96	Ethyl linolenate	256727	001191-41-9	0.359	-
20	6.06	1-Butanol, 3-methyl-, acetate	26563	000123-92-2	0.280	Banana-like[1,2]

1= Rychlik, Schieberle and Grosch (1998); 2= Jackson (2000), 3=Clarke and Bakker (2004)

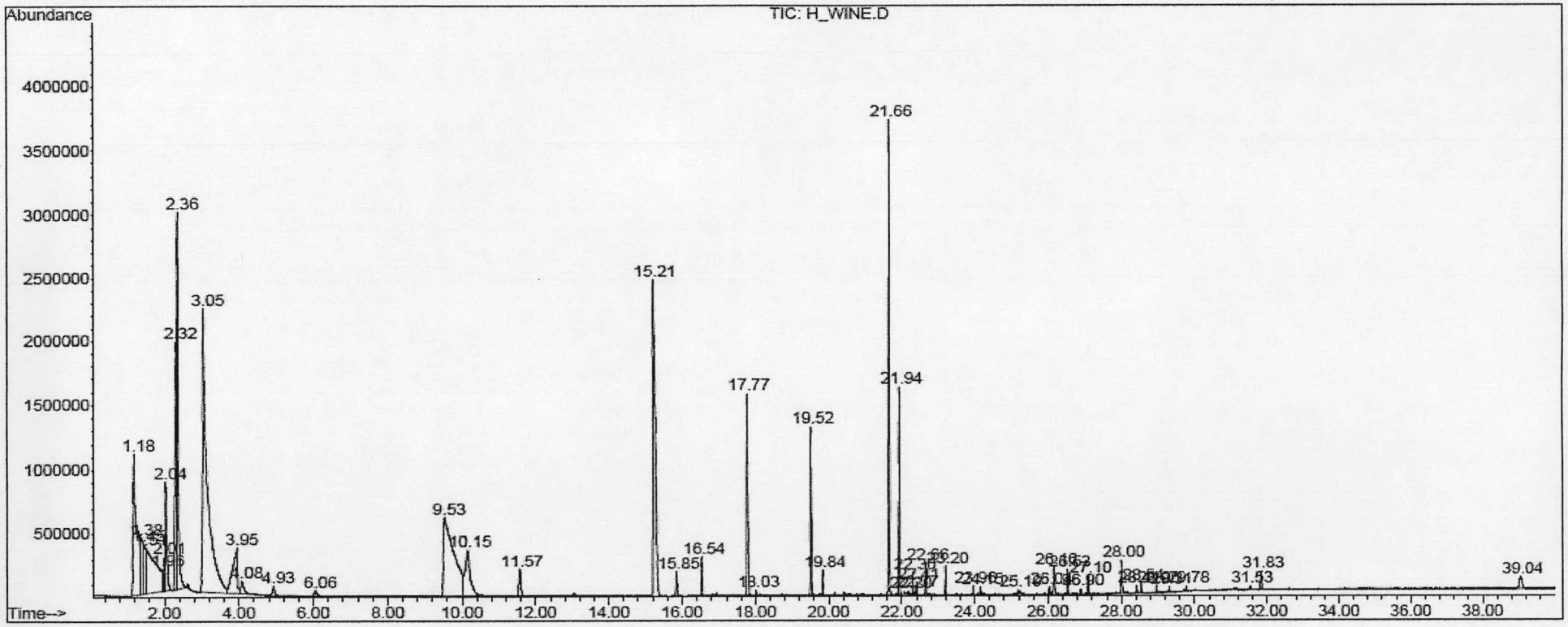


Figure E.5 The volatile compounds chromatogram of fermented pineapple juice inoculated with *H. uvarum*1

Table E.5 Major volatile compounds of pineapple juice inoculated with *H. uvarum*1

Order	RT (min)	Common name	Ref#	CAS#	% Area	Aroma description
1	2.32,2.36	Ethanol	296	000064-17-5	12.782	Ethanol-like[1]
2	21.66	2-Phenylethyl acetate	64369	000103-45-7	6.003	Flowery, fruity[1]
3	1.97,2.01,2.04	Ethyl acetate	4588,4589,4590	000141-78-6	2.618	Solvent-like, fruity[1]
4	21.94	Ethyl dodecanoate	157256	000106-33-2	2.410	Oily, fruitly, floral[3]
5	19.52	Ethyl decanoate	115400	000110-38-3	1.875	Oily, fruitly, floral[3]
6	11.57	Ethyl hexanoate	40244	000123-66-0	0.766	Fruity[1]
7	4.07	Butanoic acid, 2-methyl-, ethyl ester	26431	007452-79-1	0.601	Fruity[1]
8	16.54	Ethyl octanoate	76354	000106-32-1	0.504	Fruity, fatty[1]
9	28.00	Dodecanoic acid	115375	000143-07-7	0.501	-
10	39.04	1H-Indole-3-ethanol, acetate (ester)	119109	013137-14-9	0.460	-
11	26.16	Decanoic acid	76310	000334-48-5	0.390	Soap-like, fruity[1]
12	22.66	2-Phenylethanol	19944	000060-12-8	0.336	Honey-like, spicy[1]
13	23.20	Cyclodecane	36581	000293-96-9	0.327	-
14	4.93	Isobutyl alcohol	2109	000078-83-1	0.275	Ethereal, fruity[3]
15	26.53	2,4-Di-tert-butylphenol	124425	000096-76-4	0.262	-
16	22.30	Butyl Butyryl Lactate	138189	007492-70-8	0.246	-
17	27.10	Cyclohexadecane	152028	000295-65-8	0.213	-
18	6.06	Isoamyl acetate	26565	000123-92-2	0.198	Banana-like[1,2]
19	22.41	Phenylethyl propionate	83442	000122-70-3	0.136	-
20	23.96	Isopropyl tetradecanoate	213939	000110-27-0	0.112	-

1= Rychlik, Schieberle and Grosch (1998); 2= Jackson (2000), 3=Clarke and Bakker (2004)

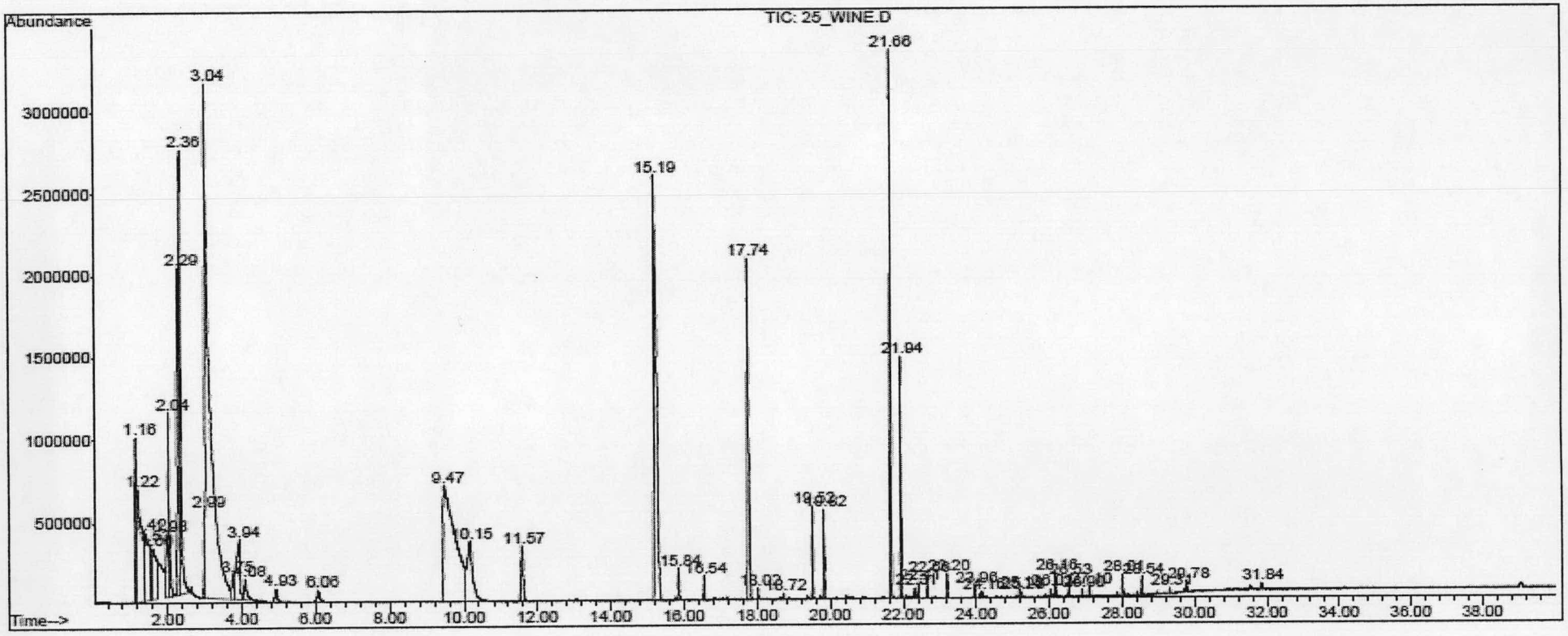


Figure E.6 The volatile compounds chromatogram of fermented pineapple juice inoculated with *H. uvarum*2

Table E.6 Major volatile compounds of pineapple juice inoculated with *H. uvarum*2

Order	RT (min)	Common name	Ref#	CAS#	% Area	Aroma description
1	2.30,2.36	Ethanol	296	000064-17-5	11.290	Ethanol-like[1]
2	21.67	2-Phenylethyl acetate	64370	000103-45-7	4.769	Flowery, fruity[1]
3	1.98,2.04	Ethyl acetate	4588,4589	000141-78-6	3.133	Solvent-like, fruity[1]
4	21.94	Ethyl dodecanoate	157256	000106-33-2	1.857	Oily, fruitly, floral[3]
5	11.57	Ethyl hexanoate	40244	000123-66-0	1.094	Fruity[1]
6	19.52	Ethyl decanoate	115400	000110-38-3	0.680	Oily, fruitly, floral[3]
7	4.08	Ethyl 2-methylbutanoate	26432	007452-79-1	0.508	Fruity[1]
8	6.06	Isoamyl acetate	26573	000123-92-2	0.300	Banana-like[1,2]
9	4.92	1-Propanol, 2-methyl-	2108	000078-83-1	0.280	Solvent-like[1]
10	26.16	Decanoic acid	76310	000334-48-5	0.238	Soap-like, fruity[1]
11	16.54	Ethyl octanoate	76354	000106-32-1	0.209	Fruity, fatty[1]
12	28.00	Dodecanoic acid	115375	000143-07-7	0.207	-
13	23.20	Cyclododecane	71564	000294-62-2	0.175	-
14	22.66	2-Phenylethanol	19952	000060-12-8	0.166	Honey-like, spicy[1]
15	28.54	Isobutyl phthalate	223257	000084-69-5	0.142	-
16	26.53	Phenol, 2,4-bis(1,1-dimethylethyl)-	124428	000096-76-4	0.138	-
17	22.41	Phenylethyl propionate	83442	000122-70-3	0.116	-
18	23.96	Isopropyl tetradecanoate	213939	000110-27-0	0.097	-
19	29.78	Dibutyl phthalate	223236	000084-74-2	0.091	-
20	27.10	Cyclotetradecane	110363	000295-17-0	0.077	-

1= Rychlik, Schieberle and Grosch (1998); 2= Jackson (2000), 3=Clarke and Bakker (2004)

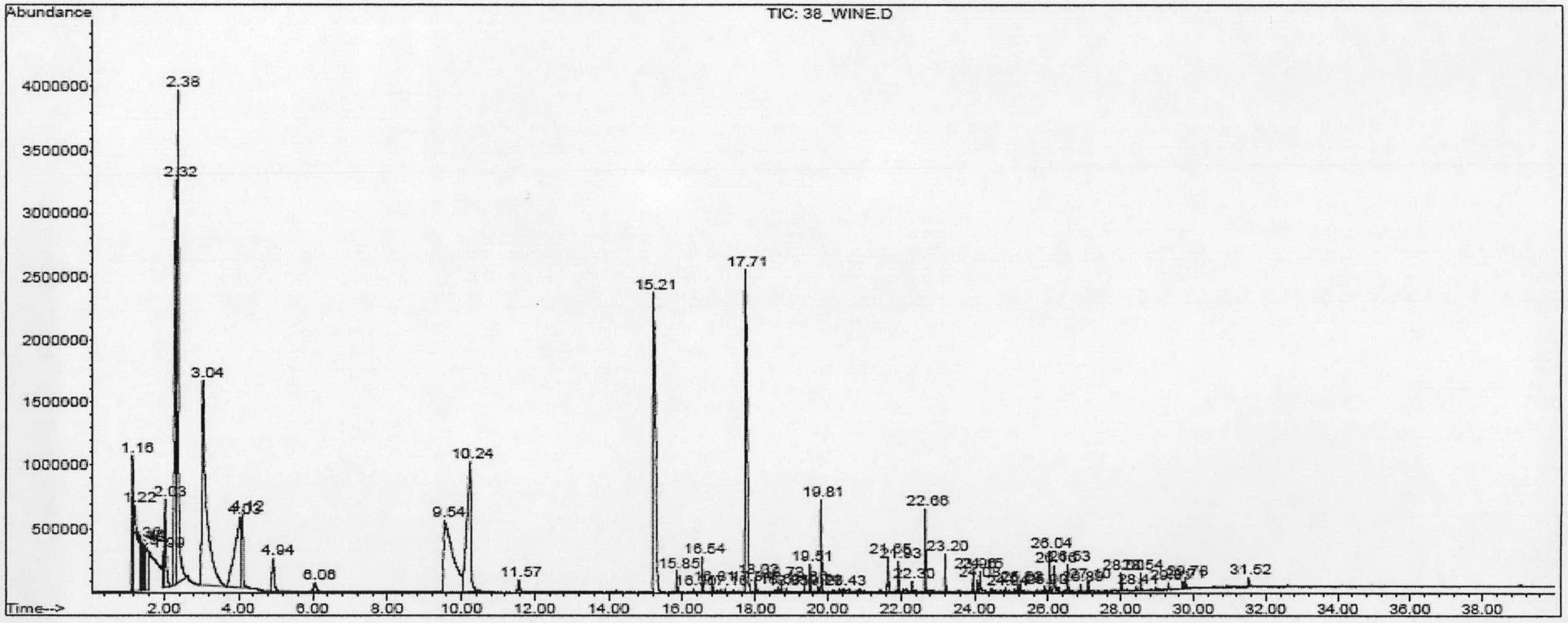


Figure E.7 The volatile compounds chromatogram of fermented pineapple juice inoculated with *Z. bailii*

Table E.7 Major volatile compounds of pineapple juice inoculated with *Z. bailii*

Order	RT (min)	Common name	Ref#	CAS#	% Area	Aroma description
1	2.32, 2.38	Ethanol	304	000064-17-5	21.040	Ethanol-like[1]
2	10.24	Isoamyl alcohol (3-Methyl-1-butanol)	4896	000123-51-3	7.510	Malty[1], fruity-winey[3]
3	1.99, 2.03	Ethyl acetate	4587,4589	000141-78-6	2.336	Solvent-like, fruity[1]
4	4.94	Isobutyl alcohol	2109	000078-83-1	0.937	Ethereal, fruity[3]
5	22.66	2-Phenylethanol	19952	000060-12-8	0.849	Honey-like, spicy[1]
6	26.04	Ethyl hexadecanoate	231384	000628-97-7	0.442	-
7	21.65	2-Phenylethyl acetate	64369	000103-45-7	0.432	Flowery, fruity[1]
8	21.93	Ethyl dodecanoate	157256	000106-33-2	0.423	Oily, fruitly, floral[3]
9	16.54	Ethyl octanoate	76354	000106-32-1	0.409	Fruity, fatty[1]
10	23.20	1-Decene	36405	000872-05-9	0.387	-
11	11.57	Ethyl hexanoate	231384	000628-97-7	0.342	Fruity[1]
12	26.16	Decanoic acid	76310	000334-48-5	0.330	Soap-like, fruity[1]
13	6.06	Isoamyl acetate	26565	000123-92-2	0.321	Banana-like[1,2]
14	19.51	Ethyl decanoate	115400	000110-38-3	0.294	Oily, fruitly, floral[3]
15	26.53	2,4-Di-tert-butylphenol	124426	000096-76-4	0.281	-
16	28.00	Dodecanoic acid	115375	000143-07-7	0.272	-
17	23.96	Isopropyl tetradecanoate	213939	000110-27-0	0.240	-
18	24.15	Octanoic acid	40185	000124-07-2	0.235	Sweaty[1]
19	31.52	Hexadecanoic acid	195440	000057-10-3	0.199	-
20	28.54	Isobutyl phthalate	223249	000084-69-5	0.181	-

1= Rychlik, Schieberle and Grosch (1998); 2= Jackson (2000), 3=Clarke and Bakker (2004)

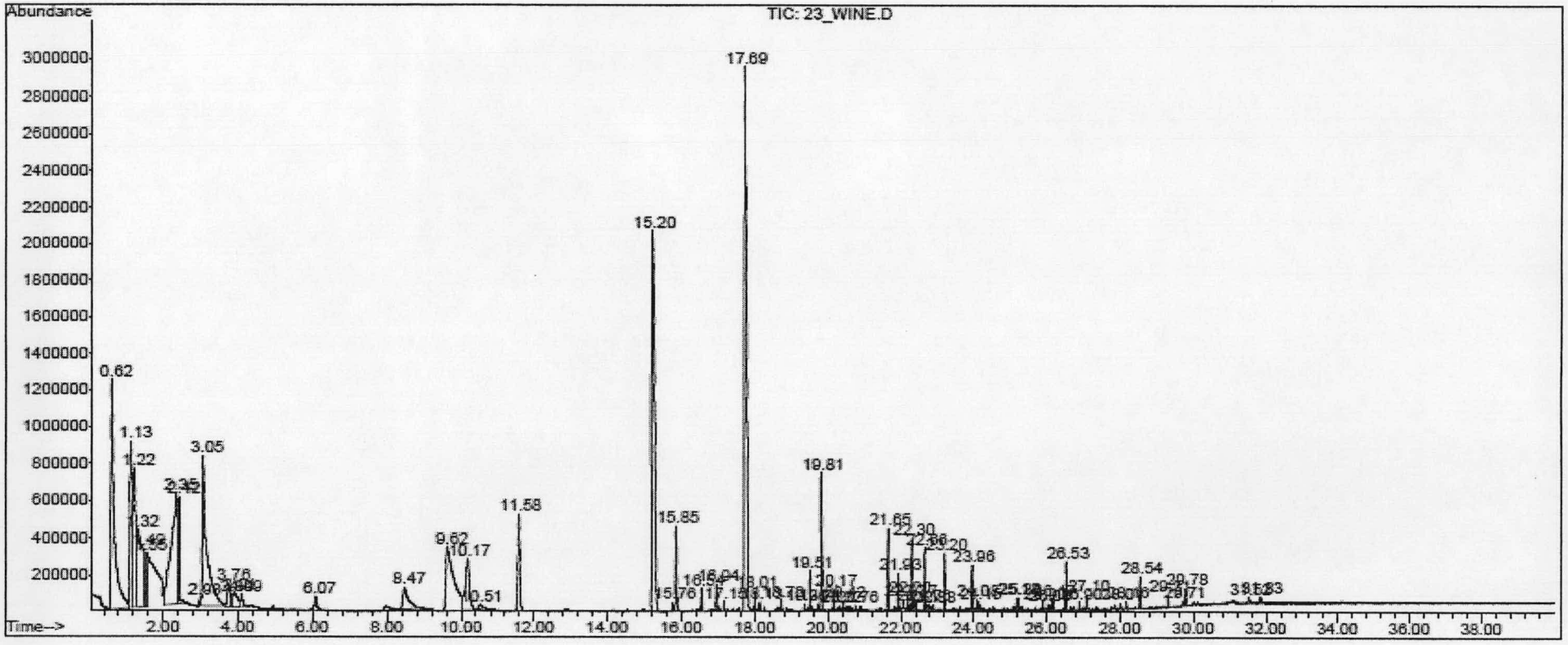


Figure E.8 The volatile compounds chromatogram of fermented pineapple juice inoculated with *Candida sp.*1

Table E.8 Major volatile compounds of pineapple juice inoculated with *Candida* sp.1

Order	RT (min)	Common name	Ref#	CAS#	% Area	Aroma description
1	0.62	Ethanol	304	000064-17-5	9.405	Ethanol-like[1]
2	10.17	Isoamyl alcohol (3-Methyl-1-butanol)	4903	000123-51-3	2.559	Malty[1], fruity-winey[3]
3	11.58	Ethyl hexanoate	40243	000123-66-0	2.395	Fruity[1]
4	8.47	Isoamylalcohol	4960	000000-00-0	1.436	Malty[1]
5	21.65	2-Phenylethyl acetate	64369	000103-45-7	0.883	Flowery, fruity[1]
6	22.66	2-Phenylethanol	19944	000060-12-8	0.572	Honey-like, spicy[1]
7	23.20	1-Dodecanol	95935	000112-53-8	0.505	-
8	23.96	Isopropyl tetradecanoate	213939	000110-27-0	0.482	-
9	26.53	2,4-Di-tert-butylphenol	124425	000096-76-4	0.479	-
10	6.07	Isoamyl acetate	26566	000123-92-2	0.431	Banana-like[1,2]
11	21.93	Ethyl dodecanoate	157256	000106-33-2	0.427	Oily, fruitly, floral[3]
12	19.51	Ethyl decanoate	115400	000110-38-3	0.373	Oily, fruitly, floral[3]
13	4.09	Ethyl 2-methylbutanoate	26432	007452-79-1	0.353	Fruity[1]
14	28.54	1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	223250	000084-69-5	0.312	-
15	16.54	Ethyl octanoate	76354	000106-32-1	0.249	Fruity, fatty[1]
16	16.94	Isoamyl octanoate	136208	002035-99-6	0.245	-
17	20.17	Ethyl 9-decenoate	112676	000000-00-0	0.229	-
18	10.51	Ethyl hexanoate	40244	000123-66-0	0.196	Fruity[1]
19	29.78	Dibutyl phthalate	223237	000084-74-2	0.176	-
20	20.42	Methionol	10547	000505-10-2	0.165	Potato-like[1]

1= Rychlik, Schieberle and Grosch (1998); 2= Jackson (2000), 3=Clarke and Bakker (2004)

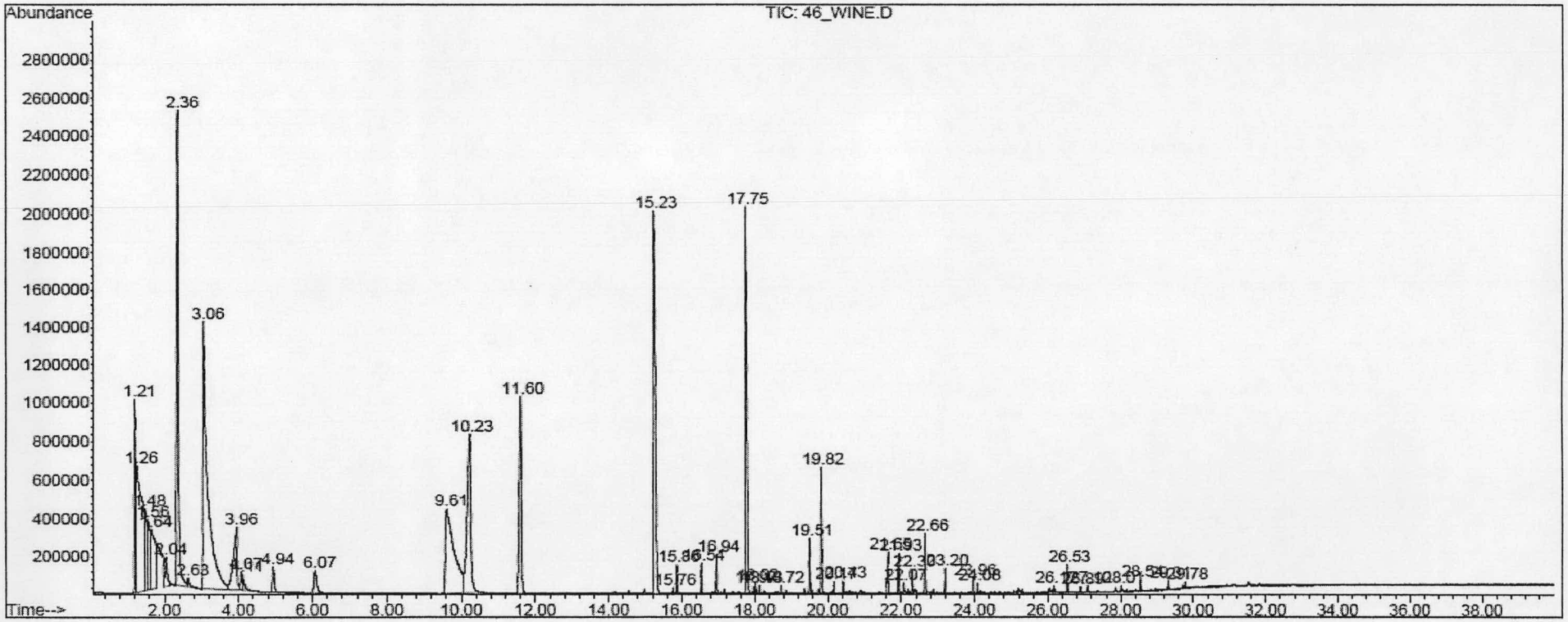


Figure E.9 The volatile compounds chromatogram of fermented pineapple juice inoculated with *Candida sp.*2

Table E.9 Major volatile compounds of pineapple juice inoculated with *Candida* sp.2

Order	RT (min)	Common name	Ref#	CAS#	% Area	Aroma description
1	2.36	Ethanol	296	000064-17-5	10.633	Ethanol-like[1]
2	10.23	Isoamylalcohol	4960	000000-00-0	7.662	Malty[1]
3	11.60	Ethyl hexanoate	40244	000123-66-0	5.167	Fruity[1]
4	6.08	Isoamyl acetate	26575	000123-92-2	0.827	Banana-like[1,2]
5	4.08,4.11	Ethyl 2-methylbutanoate	26432	007452-79-1	0.772	Fruity[1]
6	2.04	Ethyl acetate	4588	000141-78-6	0.766	Solvent-like, fruity[1]
7	4.94	Isobutyl alcohol	2109	000078-83-1	0.623	Ethereal, fruity[3]
8	22.66	2-Phenylethanol	19944	000060-12-8	0.587	Honey-like, spicy[1]
9	19.51	Ethyl decanoate	115400	000110-38-3	0.527	Oily, fruitly, floral[3]
10	21.65	5-Phenyl-2-pentanone	62399	002235-83-8	0.516	-
11	21.93	Ethyl dodecanoate	157258	000106-33-2	0.478	Oily, fruitly, floral[3]
12	16.94	Isoamyl octanoate	136208	002035-99-6	0.442	-
13	16.54	Ethyl octanoate	76354	000106-32-1	0.331	Fruity, fatty[1]
14	26.53	2,4-Di-tert-butylphenol	124425	000096-76-4	0.274	-
15	23.20	1-Decene	36405	000872-05-9	0.260	-
16	22.30	Propanoic acid, 2-methyl-, 1-(1,1-dimethylethyl)-2-methyl-1,3-propanediyl ester	233350	074381-40-1	0.240	-
17	2.63	Formic acid, ethyl ester	1960	000109-94-4	0.202	-
18	23.96	Nerolidol	148268	007212-44-4	0.185	-
19	20.43	3-Methylmercapto-1-propanol	10546	000505-10-2	0.132	-
20	20.17	Ethyl 9-decenoate	112545	067233-91-4	0.122	-

1= Rychlik, Schieberle and Grosch (1998); 2= Jackson (2000), 3=Clarke and Bakker (2004)

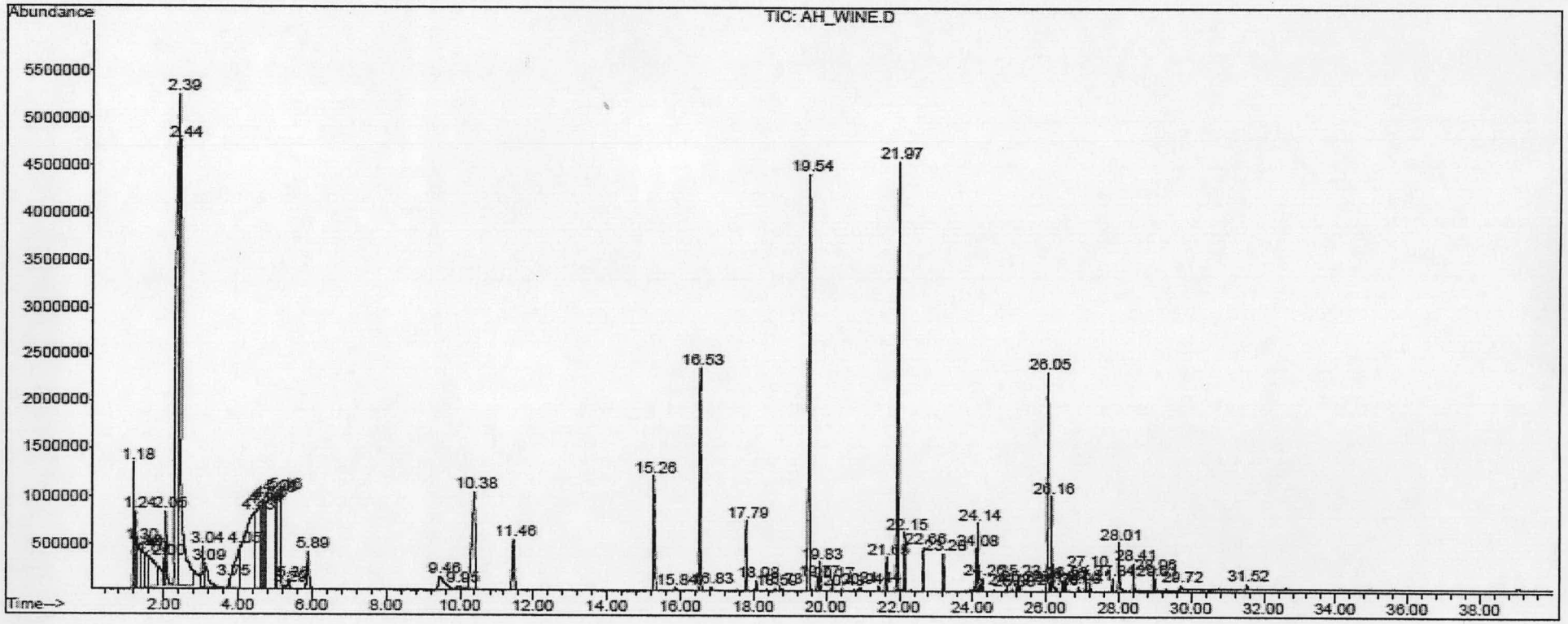


Figure E.10 The volatile compounds chromatogram of pineapple wine inoculated with mixed *S. cerevisiae* and *H. uvarum*

Table E.10 Major volatile compounds of pineapple wine fermented by mixed *S. cerevisiae* and *H. uvarum*

Order	RT (min)	Common name	Ref#	CAS#	% Area	Aroma description
1	2.40, 2044	Ethanol	295,304	000064-17-5	26.382	Ethanol-like[1]
2	19.54	Ethyl decanoate	115400	000110-38-3	5.808	Oily, fruitly, floral[3]
3	21.97	Ethyl dodecanoate	157256	000106-33-2	5.804	Oily, fruitly, floral[3]
4	10.39	Isoamyl alcohol	4905	000123-51-3	3.257	Malty[1], fruity-winey[3]
5	16.53	Ethyl octanoate	76354	000106-32-1	2.579	Fruity, fatty[1]
6	26.05	Ethyl hexadecanoate	231384	000628-97-7	1.975	-
7	2.01, 2.05	Ethyl acetate	4588,4589	000141-78-6	1.119	Solvent-like, fruity[1]
8	11.46	Ethyl hexanoate	40244	000123-66-0	1.087	Fruity[1]
9	5.89	1-Butanol, 3-methyl-, acetate	26563	000123-92-2	0.935	Banana-like[1,2]
10	26.16	Decanoic acid	76310	000334-48-5	0.930	Soap-like, fruity[1]
11	24.14	Octanoic acid	40186	000124-07-2	0.634	Sweaty[1]
12	28.01	Ethyl Oleate	261108	000111-62-6	0.612	-
13	22.15	Pentadecanoic acid, 3-methylbutyl ester	176833	002306-91-4	0.486	-
14	1.38	Acetaldehyde	204	000075-07-0	0.390	Pungent, fruity[1]
15	22.66	2-Phenylethanol	19944	000060-12-8	0.357	Honey-like, spicy[1]
16	24.08	Ethyl tetradecanoate	195472	000124-06-1	0.348	-
17	21.65	2-Phenylethyl acetate	64370	000103-45-7	0.348	Flowery, fruity[1]
18	28.41	Linoleic acid ethyl ester	258928	000544-35-4	0.233	-
19	27.10	Cyclohexadecane	152028	000295-65-8	0.197	-
20	28.96	Ethyl linolenate	256727	001191-41-9	0.164	-

1= Rychlik, Schieberle and Grosch (1998); 2= Jackson (2000), 3=Clarke and Bakker (2004)

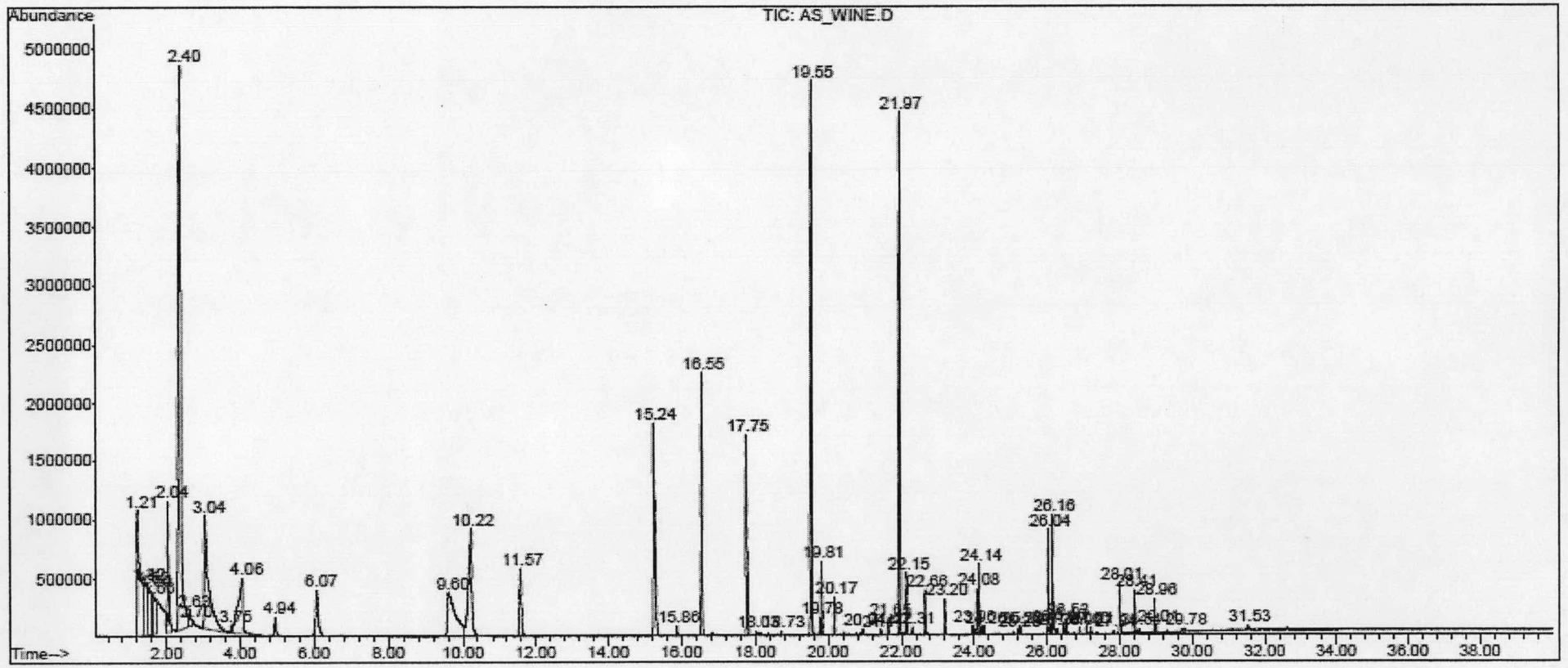


Figure E.11 The volatile compounds chromatogram of pineapple wine inoculated with mixed *S. cerevisiae* and *S'codes ludwigii*

Table E.11 Major volatile compounds of pineapple wine fermented by mixed *S. cerevisiae* and *S'codes ludwigii*

Order	RT (min)	Common name	Ref#	CAS#	% Area	Aroma description
1	0.10,0.36,2.40	Ethanol	305,295,304	000064-17-5	21.368	Ethanol-like[1]
2	19.55	Ethyl decanoate	115400	000110-38-3	9.696	Oily, fruitly, floral[3]
3	21.97	Ethyl dodecanoate	157256	000106-33-2	8.069	Oily, fruitly, floral[3]
4	10.22	Isoamylalcohol	4960	000000-00-0	5.089	Malty[1]
5	16.55	Ethyl octanoate	76354	000106-32-1	3.413	Fruity, fatty[1]
6	2.04	Ethyl acetate	4587	000141-78-6	2.541	Solvent-like, fruity[1]
7	1.42	Acetaldehyde	204	000075-07-0	1.789	Pungent, fruity[1]
8	11.58	Ethyl hexanoate	40244	000123-66-0	1.781	Fruity[1]
9	6.07	1-Butanol, 3-methyl-, acetate	26563	000123-92-2	1.675	Banana-like[1,2]
10	26.16	Decanoic acid	76310	000334-48-5	1.451	Soap-like, fruity[1]
11	26.04	Ethyl hexadecanoate	231384	000628-97-7	1.143	-
12	24.14	Octanoic acid	40186	000124-07-2	0.837	Sweaty[1]
13	28.01	Dodecanoic acid	115381	000143-07-7	0.759	-
14	22.15	Pentadecanoic acid, 3-methylbutyl ester	176833	002306-91-4	0.617	-
15	28.41	Ethyl linoleate	258925	000544-35-4	0.480	-
16	24.08	Tetradecanoic acid, ethyl ester	195472	000124-06-1	0.471	-
17	22.66	2-Phenylethanol	19944	000060-12-8	0.455	Honey-like, spicy[1]
18	28.96	Ethyl linolenate	256727	001191-41-9	0.397	-
19	4.94	Isobutyl alcohol	2109	000078-83-1	0.391	Ethereal, fruity[3]
20	20.17	Ethyl 9-decenoate	112676	000000-00-0	0.389	-

1= Rychlik, Schieberle and Grosch (1998); 2= Jackson (2000), 3=Clarke and Bakker (2004)

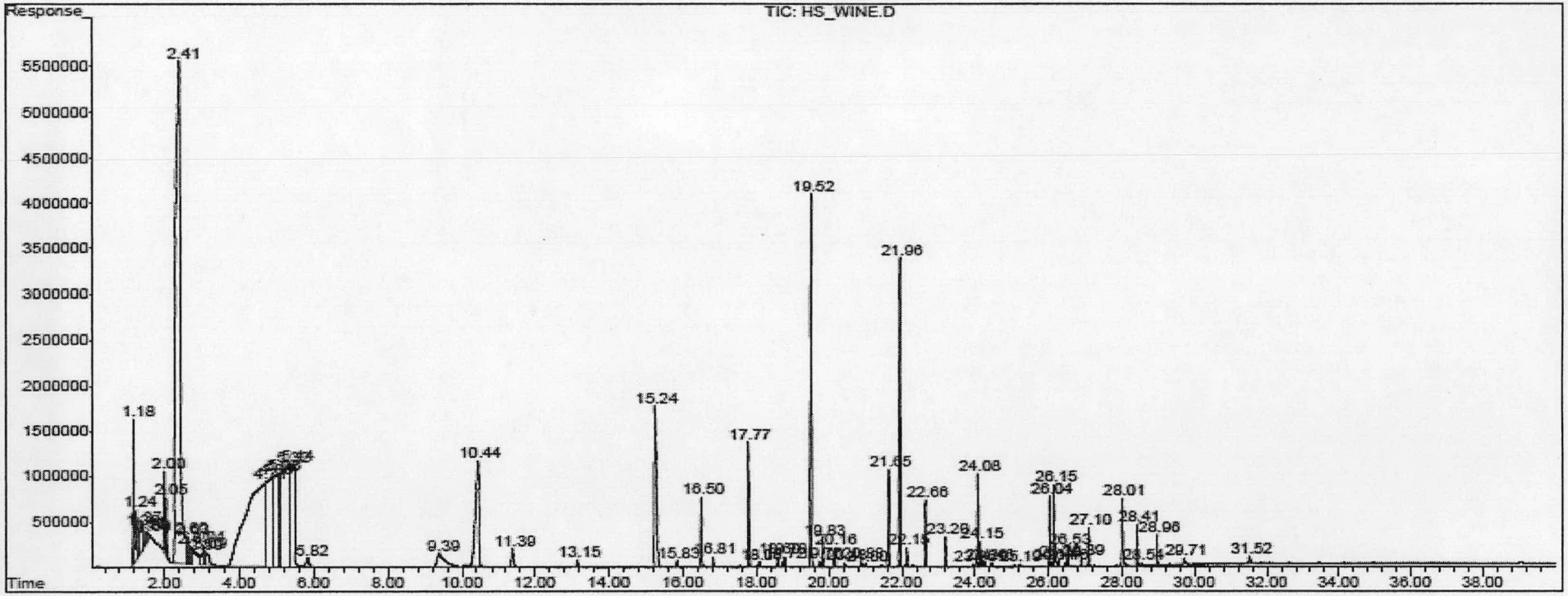


Figure E.12 The volatile compounds chromatogram of pineapple wine inoculated with mixed *S'codes ludwigii* and *H. uvarum*

Table E.12 Major volatile compounds of pineapple wine fermented by mixed *S'codes ludwigii* and *H. uvarum*

Order	RT (min)	Common name	Ref#	CAS#	% Area	Aroma description
1	2.41,2.60,2.63,2.68,2.99	Ethanol	296,304	000064-17-5	25.362	Ethanol-like[1]
2	19.52	Ethyl decanoate	115400	000110-38-3	4.725	Oily, fruitly, floral[3]
3	21.95	Ethyl dodecanoate	157256	000106-33-2	3.783	Oily, fruitly, floral[3]
4	10.44	Isoamyl alcohol	4905	000123-51-3	3.661	Malty[1], fruity-winey[3]
5	2.00,2.05	Ethyl acetate	4589	000141-78-6	1.184	Solvent-like, fruity[1]
6	21.65	2-Phenylethyl acetate	64366	000103-45-7	0.909	Flowery, fruity[1]
7	28.01	Ethyl Oleate	261108	000111-62-6	0.880	-
8	26.16	Decanoic acid	76310	000334-48-5	0.804	Soap-like, fruity[1]
9	24.08	Ethyl tetradecanoate	195478	000124-06-1	0.786	-
10	16.50	Ethyl octanoate	76354	000106-32-1	0.651	Fruity, fatty[1]
11	26.04	Ethyl hexadecanoate	231384	000628-97-7	0.609	-
12	22.66	2-Phenylethanol	19944	000060-12-8	0.535	Honey-like, spicy[1]
13	1.37	Acetaldehyde	204	000075-07-0	0.525	Pungent, fruity[1]
14	11.39	Ethyl hexanoate	40244	000123-66-0	0.416	Fruity[1]
15	28.41	Linoleic acid ethyl ester	258928	000544-35-4	0.350	-
16	27.10	1-Hexadecene	151998	000629-73-2	0.318	-
17	28.96	Ethyl linolenate	256727	001191-41-9	0.256	-
18	24.14	Octanoic acid	40186	000124-07-2	0.253	Sweaty[1]
19	23.20	Cyclododecane	71564	000294-62-2	0.253	-
20	5.82	Isoamyl acetate	26566	000123-92-2	0.233	Banana-like[1,2]

1= Rychlik, Schieberle and Grosch (1998); 2= Jackson (2000), 3=Clarke and Bakker (2004)

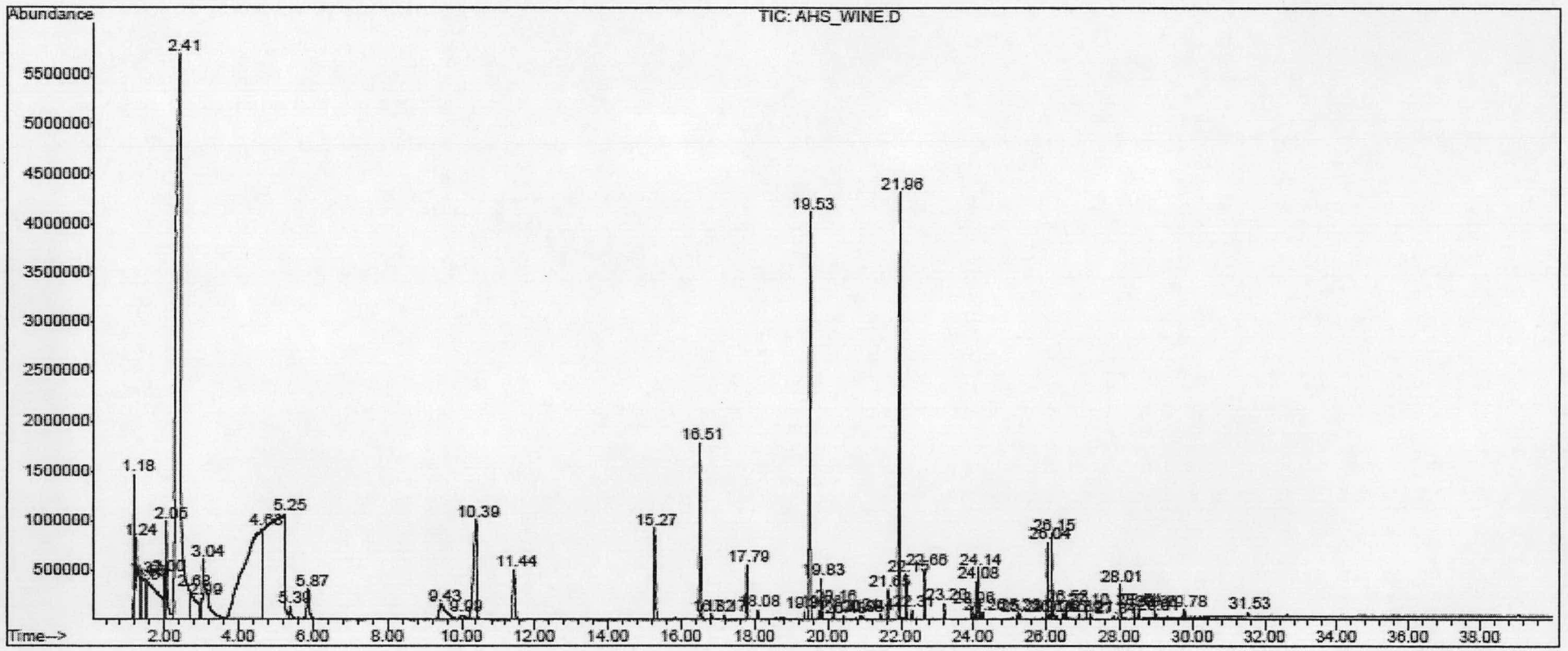


Figure E.13 The volatile compounds chromatogram of pineapple wine inoculated with mixed *S. cerevisiae*, *S'codes ludwigii* and *H. uvarum*

Table E.13 Major volatile compounds of pineapple wine fermented by mixed *S. cerevisiae*, *S'codes ludwigii* and *H. uvarum*

Order	RT (min)	Common name	Ref#	CAS#	% Area	Aroma description
1	2.41,2.68,2.98	Ethanol	296,304,305	000064-17-5	29.258	Ethanol-like[1]
2	21.96	Ethyl dodecanoate	157256	000106-33-2	5.053	Oily, fruitly, floral[3]
3	19.53	Ethyl decanoate	115400	000110-38-3	4.697	Oily, fruitly, floral[3]
4	10.39	Isoamyl alcohol	4905	000123-51-3	3.070	Malty[1], fruity-winey[3]
5	1.37,1.43	Acetaldehyde	204	000075-07-0	1.705	Pungent, fruity[1]
6	16.51	Ethyl octanoate	76354	000106-32-1	1.672	Fruity, fatty[1]
7	1.99,2.10	Ethyl acetate	4589	000141-78-6	1.663	Solvent-like, fruity[1]
8	11.44	Ethyl hexanoate	40244	000123-66-0	0.971	Fruity[1]
9	26.16	Decanoic acid	76310	000334-48-5	0.749	Soap-like, fruity[1]
10	5.87	Isoamyl acetate	26565	000123-92-2	0.671	Banana-like[1,2]
11	26.04	Ethyl hexadecanoate	231384	000628-97-7	0.571	-
12	24.14	Octanoic acid	40186	000124-07-2	0.443	Sweaty[1]
13	28.00	Dodecanoic acid	115375	000143-07-7	0.382	-
14	22.66	2-Phenylethanol	19944	000060-12-8	0.364	Honey-like, spicy[1]
15	22.15	Pentadecanoic acid, 3-methylbutyl ester	176833	002306-91-4	0.339	-
16	21.65	2-Phenylethyl acetate	64366	000103-45-7	0.305	Flowery, fruity[1]
17	24.08	Tetradecanoic acid, ethyl ester	195472	000124-06-1	0.279	-
18	5.39	Isobutyl alcohol	2109	000078-83-1	0.208	Ethereal, fruity[3]
19	20.16	Ethyl 9-decenoate	112544	067233-91-4	0.128	-
20	23.20	1-Decene	36405	000872-05-9	0.120	-

1= Rychlik, Schieberle and Grosch (1998); 2= Jackson (2000), 3=Clarke and Bakker (2004)

VITA

Miss On-ong Chanprasartsuk was born on July 3, 1977 in Chonburi, Thailand. She obtained BSc and MSc degree in Food Technology from Chulalongkorn University in 1998 and 2002, respectively. Then, she worked at Cerebos (Thailand) Limited in the position of Quality Assurance Supervisor in 2003. In 2004, she received a scholarship from the Royal Thai Government under the Agro-industry Ph.D. Program Consortium to further her Ph.D. at Department of Food Technology, Faculty of Science, Chulalongkorn University. After being finished Ph.D. degree, she will join the Department of Food Science, Faculty of Science at Burapha University.

Publication:

Chanprasartsuk, O., Sanguandeekul R., and Prakitchaiwattana C. 2007. Autochthonous yeasts associated with pineapple juice fermentations. In: P. Romano, A. Capece, L. Granchi (eds.). International specialized symposium on yeasts ISSY26, from alcoholic beverages to bioethanol for transportation: a new challenge for fermenting yeast, p.63. 3-7 June 2007, Sorrento, Italy.

Permanent mailing address:
4/2 Moo 7, Bung District,
Sriracha, Chonburi, 20230
THAILAND