

Athanasios A. Koutinas

Professor of Food Chemistry & Biotechnology

SHORT PRESENTATION / PROFILE



Prof. A. A. Koutinas obtained his diploma in Chemistry in 1969 from the Aristotle University of Thessaloniki, and his Ph.D. in 1979 from the Dept. of Chemistry, University of Patras (UP). He spent 4 years as production manager in an alcohol distillery. He was Guest Editor in the journal *Food Technology & Biotechnology*, is one of the Editors of the Book *Current Topics on Bioprocesses in Food Industry*, member of the Editorial Board of the *Open Biotechnology Journal*, and Honorary Editorial Board of the *International Journal of Wine Research*. He is head of the **Food Biotechnology Group** of the Dept. of Chemistry, UP, and Director of the international Postgraduate Program **MSc Food Biotechnology**, organised by the Greek Universities of Patras & Ioannina and the British University of Ulster (N. Ireland). He was convener of the 2nd Int. ICBF Conference (Patras, June 2006) and member of the **IFIBiop Forum** (former ICBF). He has active international collaborations with at least 5 Universities from different countries. He has coordinated 13 research/educational funded projects, has acted as reviewer in at least 16 peer review scientific journals, and is co-author of about 130 research publications in international journals and 4 patents.

RESEARCH INTERESTS / OBJECTIVES

- **Fermentation technology in food production** (Extremely low & high temperature fermentation; Improvement of food quality & nutritional value through biotechnological processing; Reduction of investment & production cost of food industries through biotechnology; Fermentation biocatalysts)
- **Biofuels from agro-industrial wastes & by-products** (Reduction of energy consumption & productivity increase in alcohol distilleries; Biocatalysts in methane fermentation; Bioethanol from cellulosic biomass)
- **Biotechnological exploitation of agro-industrial wastes for creation of added-value** (Exploitation of cheese whey; Upgrading of solid wastes through submerged & solid state fermentation processes)
- **Development of novel biotechnological processes** (Kefir yeast technology; Novel processes in wine, beer and potable alcohol production; Scale-up of processes)
- **Development of starter cultures for food production** (bread, dairy products, wine, beer and alcoholic beverages)
- **Immobilized cell biocatalysts in food and biofuel production**
- **Probiotics**

ACADEMIC STUDIES / POSITIONS

1975-82:	Research Associate, Laboratory of Chemical technology, Dept. of Chemistry, UP
1982-85:	Lecturer of Food Chemistry & Technology, Dept. of Chemistry, UP
1983-87:	Member of the Supreme Chemical Council of the Greek State
1985-91:	Assistant professor of Food Chemistry & Technology, Dept. of Chemistry, UP
1991-97:	Associate Professor of Food Chemistry & Technology, Dept. of Chemistry, UP
1997-present:	Professor of Food Chemistry & Biotechnology, Dept. of Chemistry, UP

RESEARCH EXPERIENCE / GRANTS

1. *Method of alcohol production using biocatalyst* - DISCINOVAION, STRIDE HELLAS, EU, 1996-1998.
2. *Exploitation of whey for the production of food products employing biotechnological methods* - EPET II (GSRT, EU) 1999-2001.
3. *Quality control in the food and packaging materials industry* - EPEAEK (Greek State, EU) 1998-1999.
4. *MSc Food Biotechnology* - EPEAK II (Greek State) 2002-2003.

5. Solid wastes & by-products of agricultural industries as substrates for cell immobilization for use as starter cultures in baking processes - EPEAK II, HERAKLITOS I (Greek State, EU) **2003-2005**.
6. Production of wine and beer using freeze-dried immobilised cells in various bioreactor configurations. Potential production of commercial dry biocatalysts - Joint Research and Technology Programmes: Greece-Serbia (GSRT, EU) **2003-2005**.
7. Utilization of brewer's spent grains for production of fungal biomass and products of high added value - EPEAK II, PYTHAGORAS I (Greek State, EU) **2004-2007**.
8. The dairy liquid waste as raw material for the production of probiotic kefir cultures for use in cheese ripening - EPEAK II, PYTHAGORAS I (Greek State, EU) **2004-2007**.
9. Biotechnological exploitation of mixed dairy and sugar industry liquid wastes (whey and molasses) for the production of mixed freeze-dried cultures for bread making - EPEAK II, PYTHAGORAS II (Greek State, EU) **2004-2007**.
10. Utilisation of agro-industrial wastes as carriers for immobilisation of wine yeasts for alcoholic fermentation processes - PENED 2003 (GSRT, EU) **2005-2009**.
11. Use of Pafos mastic as carriers for yeasts immobilisation for wine making - (IPE Cyprus) **2008-2010**.
12. Novel immobilized biocatalyst for increase productivity, improvement of wine quality for industrialization in wine making - PENED 2003 (GSRT, EU) **2006-2009**.
13. Five small funded projects from the Greek Organisation EOMEX.

RESEARCH GROUP

Staff: 4; Post-doc researchers: 3; Graduate Students: 17; Ph. D. students: 10; MSc students: 20

RESEARCH PROJECT SUPERVISION- TRAINEES

MSc Level (Msc Food Biotechnology)

Year	NAME	Title
1997-1998	POLYCHRONIADOU E.	Apple wine spoilage and volatile by-products in comparison to wine from grapes
	CHRONOPOULOS G.	Lactic acid fermentation with <i>Bifidobacterium bifidum</i>
1998-1999	MCERLEAN C.	High temperature wine-making using the thermophilic yeast strain <i>K. marxianus imb3</i>
1999-2000	PASCHALIS T.	Anaerobic whey fermentation with kefir granules
	DOUMA M.	Continuous wine-making fermentation using quince immobilized yeast at room and low temperatures
2000-2001	VOULGARIS H.	Thresholds of volatiles of kefir drink from whey using gas chromatography olfactometry purge and trap
2001-2002	HARTA O.	Effect of various carbohydrate substrates on the production of kefir grains for use as a novel baking starter
	SYPSAS V.	Red wine making by immobilized cells: development of a novel bioreactor
	PAPAZOI A.	Production of feta-style cheese and flavour formation using kefir as mixed starter culture
	AGOURIDIS N.	Malolactic fermentation in wine with <i>L. casei</i> cells immobilized on delignified cellulosic material
	MALLIARIDOU S.	Brewing by immobilized cells on gluten pellets: volatile by-products by GC and GM-MS analysis
2002-2003	DIMITRELLOU D.	Freeze-dried kefir yeast as starter culture in mizithra-type cheese production
	TRANTALLIDI M.	Cell immobilization of kefir and <i>L. casei</i> on spent brewery grains for sourdough fermentation
	IPHERSON L.	Bread making using kefir grains as baker's yeast
2003-2004	KOLIOPOULOS D.	Upgrading of discarded oranges through SCP production using kefir and baker's yeast
	KOLOKITHAS G.	Wine making by freeze dried immobilized cells in a MFBT bioreactor

	VARVARIGOS E.	Production of a potential commercial biocatalyst
2004-2005	FISHER A.	Co-cultures of the thermophilic strain of <i>K. marxianus</i> and <i>L. bulgaricus</i> using whey as raw material to be employed as baker's yeast
	KOURETA A.	Co-cultures of the thermophilic strain of <i>Lactobacillus helveticus</i> and <i>K. marxianus</i> using whey as raw material to be employed as baker's yeast
	MIHELIS A.	Removal of <i>L. casei</i> cells from liquid foods through continuous process
	DAOUAHER M.	Study of MS spectra of alcoholic solutions for the extraction of kovats indices
2006-2007	KANDYLOGIANNAKIS L.	Production of unsalted hard type cheese using thermally dried starter cultures
	DAMASKINOVA A.	Effects of staling on qualitative and quantitative chemical composition of the aroma of bread produced using freeze dried cells in dough making
	KOKKALI V.	Probiotic yoghurt production using freeze-dried immobilized <i>L. casei</i> cells on natural supports
	GALLANAGH J.	Evaluation of aroma volatiles during storage of sourdough breads made by mixed cultures of <i>K. marxianus</i> and <i>L. bulgaricus</i> or <i>L. helveticus</i>
2007-2008	NIKOLAOU S.	Co-cultures of <i>A. awamori</i> and <i>S. cerevisiae</i> in submerged & solid state fermentation of solid brewery waste
	SERVETAS J.	Thermal drying of immobilized cells of kefir on delignified cellulosic material and evaluation of fermentation activity using whey
	MANOUSHI M.-E.	Immobilization of freeze-dried cells of <i>S. cerevisiae</i> AXAZ-1 on whole wheat grains for wine making
	KAPETANAKIS-SPYRIDAKIS K.	Wine making by immobilized cells on wheat
2008-2009	VELLI A.	Wine fermentation by immobilized cells on thermally dried spent grains
2009-2010	XIAOHUAN LI	Fermentation in the refrigerator using encapsulated cells in starch gel entrapped in tubular cellulosic material

Ph.D. level

1. AKRIDA-DEMERTZI K. Trace elements and elements assimilated by yeast of raw materials containing sugars and effect of their extracts on alcoholic fermentation. Ph.D. Thesis, Dept. of Chemistry, University of Ioannina, 1987.
2. ATHANASOPOULOS N. Treatment of raisin finishing and alcohol distilleries liquid wastes with biogas production in high rate bioreactors. Effect of SO_3^{2-} , SO_4^{2-} and organic nitrogen. Ph.D. Thesis, Dept. of Chemistry, University of Patras, 1989.
3. KANA K. Distillates and by-products of alcoholic fermentation with new and traditional methods: Volatile by-products. Ph.D. Thesis, Dept. of Chemistry, University of Patras, 1989.
4. LOUKATOS P. Quality of distillates from wines produced using immobilized cells. Ph.D. Thesis, Dept. of Chemistry, University of Patras, 2004.
5. BAKOYIANNIS V. Volatile by-products during continuous wine making with cells immobilized on kissiris, γ -alumina, and calcium alginate, and application at industrial fermentation pilot plant using kissiris. Ph.D. Thesis, Dept. of Chemistry, University of Patras, 1995.
6. BARDI E. Winemaking and brewing with cells immobilized on delignified cellulosic materials and gluten. Ph.D. Thesis, Dept. of Chemistry, University of Patras, 1997.
7. ICONOMOPOULOU M. Controlled Wine fermentation using freeze-dried free and immobilized cells as starter cultures. Ph.D. Thesis, Dept. of Chemistry, University of Patras, 2001.
8. ATHANASIADIS I. Biotechnological exploitation of whey using the mixed culture of kefir. Development of technology in industrial fermentations. Ph.D. Thesis, Dept. of Chemistry, University of Patras, 2003.
9. PLESSAS S. Solid agro-industrial wastes of as immobilization supports for baker's yeast cultures. Ph.D. Thesis, Dept. of Chemistry, University of Patras, 2005.
10. TSAKIRIS A. Red wine making with cells immobilized on solid winery by-products. Ph.D. Thesis, Dept. of Chemistry, University of Patras, 2005.
11. PAPAVALSILEIOU G. Use of freeze-dried kefir culture in whey fermentation. Ph.D. Thesis, Dept. of Chemistry, University of Patras, 2007.

12. SYPSAS V. Novel method for wine making at home scale using dried raw materials. Ph.D. Thesis, Dept. of Chemistry, University of Patras, 2007.
13. TSAOUSI K. Use of brewery solid wastes for the production of immobilized dried yeasts. Ph.D. Thesis, Dept. of Chemistry, University of Patras, 2009.
14. KANDYLIS P. Use of biocatalysts made of cells immobilized on starch and starchy raw materials for winemaking in wet and freeze-dried form. Ph.D. Thesis, Dept. of Chemistry, University of Patras, 2009.
15. KATECHAKI E. Effect of thermally dried starter cultures in hard-type cheese ripening. Ph.D. Thesis, Dept. of Chemistry, University of Patras, 2010.

Ph.D. under supervision

1. PAPAPOSTOLOU H. Fermentation efficiency of thermally dried lactose fermenting yeasts.
2. SIGGIRIDIS K. Production of biodiesel from food industry wastes.
3. GANATSIOS V. Development of a novel technology for brewing at home scale.
4. SERVETAS G. Development of winemaking technology using thermally dried yeasts.
5. GIALLELI A.-I. Cold pasteurization of liquid foods using nano-porous materials.

Ph.D. external examiner in international Universities

1. MYLVAGANAM PAGTHINATHAN. University Putra Malaysia, 2010
2. SRI SUKANTA SHEKHAR BHATTACHARYA. Indian Institute of Technology, Kharagpur, India, 2010

SELECTED PUBLICATIONS

1. Koutinas, A.A., Yianoulis, P., and Gravalos, K. 1981. A model for Industrial Production of Fuel-Grade Ethanol from Sugar Beets. *Energy Convers. Magmnt.* 21, 313.
2. Koutinas, A.A., Kalfoglou, N.K., 1983 Modified Chlorinated polypropylene as a Polymer Fire Retardant Additive in Polyhydrocarbons. *J. Appl. Polymer Sci.*, 28 (1): 123-133
3. Koutinas, A.A. and Demertzis, P.G. 1983. N-Chlorination of Nylon Fabric and Polyurea 6. *J. Polym. Sci. Polym. Chem. Ed.*, 21, (2), 335.
4. Koutinas, A.A., Yianoulis, P. and Lycourghiotis, A. 1983. Industrial Scale Modeling of the Thermochemical Energy Storage Based on $\text{CO}_2 + 2\text{NH}_3 \leftrightarrow \text{NH}_2\text{COONH}_4$ equilibrium. *Energy Convers. Magmnt.*, 23, 55-63.
5. Koutinas, A.A., Kanellaki, M., Lycourghiotis, A., Typas, M.A. and Drainas, C. 1988. Ethanol Production by *Zymomonas mobilis* Entrapped in Alumina Pellets. *Appl. Microbiol. Biotechnol.*, 28(3), 235-239.
6. Kana, K., Kanellaki, M., Papadimitriou, A., Psarianos, C. and Koutinas, A.A. 1989. Immobilization of *Saccharomyces cerevisiae* on γ -Alumina Pellets and its Ethanol Production in Glucose and Raisin Extract Fermentation. *J. Ferment. Bioeng.*, 68(3), 213-215.
7. Kana, K., Kanellaki, M., Psarianos, C. and Koutinas, A.A. 1989. Ethanol Production by *Saccharomyces cerevisiae* immobilised on mineral Kissiris. *J. Ferment. Bioeng.* (μέχρι το 1988 *J. Ferment. Technol.*), 68(2), 144-147.
8. Kana, K., Kanellaki, M., Papadimitriou, A. and Koutinas, A.A. 1991. Cause of and Methods to Reduce Methanol Content of Tsicoudia, Tshipouro and Ouzo. *Int. J. Food Sci. Technol.*, 26, 241-247.
9. Koutinas, A.A., Toutoutzidakis, G., Kana, K. and Kouinis, J. 1991. Methane Fermentation Promoted by γ -alumina Pellets. *J. Ferment. Bioeng.* 72(1), 64-67.
10. Argiriou, T., Kaliafas, A., Psarianos, C., Kana, K., Kanellaki, M. and Koutinas A.A. 1992. New Alcohol Resistant Strains of *Saccharomyces cerevisiae* Species for Potable Alcohol Production Using Mollasse. *Appl. Biochem. Biotechnol.*, 36, 153-161.
11. Bardi, E.P. and Koutinas, A.A. 1994. Immobilization of yeast on Delignified Cellulosic Material for Room Temperature and Low Temperature Wine Making. *J. Agric. Food. Chem.*, 42(1), 221-226.
12. Koutinas, A.A., Tsoutsas, T. and Kaliafas, A. 1994. Anaerobic Bioconversion of sucrose to Biogas Promoted by the Mineral Kissiris. *Process Biochem.*, 29, 285.
13. Zagouras, N.G. and Koutinas, A.A., 1995. Processing Scheme Based on Selective Dissolution to Recycle Food Packaging and other Polymeric Wastes and its Economic Analysis. *Waste Management and Research*, 13, 325.
14. Argiriou, T., Kaliafas, A., Psarianos, K., Kanellaki, M., Voliotis, S and Koutinas, A.A. 1996. Psychrotolerant *Saccharomyces cerevisiae* Strains after an Adaptation Treatment for Low Temperature Wine Making. *Process Biochem.*, 31(7), 639-643.

15. Bakoyianis, V. and Koutinas, A.A. 1996. A catalytic Multi-Stage Fixed Bed Tower (MFBT) in an Industrial Scale Pilot Plant. *Biotechnol. Bioeng*, 49, 197-203.
16. Bardi, E., Koutinas, A.A., Psarianos, K. and Kanellaki, M. 1996. Volatile By-products formed in Low Temperature Wine Making by Immobilized Yeast Cells. *Process Biochem.* 32(7), 579-584.
17. Bardi, E.P., Koutinas, A.A., Soupioni, M. and Kanellaki, M. 1996. Immobilization of Yeast on Delignified Cellulosic Material for Low Temperatures Brewing. *J. Agric. Food. Chem.*, 44(2), 463-467.
18. Koutinas, A.A., Bakoyianis V., Argiriou, T., Kanellaki, M. and Voliotis, S. 1997. Qualitative Outline to Industrialize Alcohol Production by Catalytic Multi-Stage Fixed Bed Tower (MFBT) Bioreactor. *Appl. Biochem. Biotechnol*, 66. 121-131.
19. Loukatos, P., Kiaris, M., Ligas, I., Bourgos, G., Kanellaki, M., Komaitis, M., and Koutinas, A. A. 2000. Continuous wine making by γ -alumina-supported biocatalyst. *Appl. Biochem. Biotechnol.* 89, 1-13.
20. Athanasiadis, I., Boskou, D., Kanellaki, M., Koutinas, A.A. 2001. Effect of Carbohydrate Substrate on Fermentation by Kefir Yeast Supported on Delignified Cellulosic Materials. *J. Agric. Food Chem.* 49(2), 658-663.
21. Bekatorou, A., Koutinas, A.A., Psarianos, K. and Kanellaki, M. 2001. Low Temperature Brewing by Freeze-Dried Immobilized Cells on Gluten Pellets. *J. Agric. Food Chem.*, 49(1), 373-377.
22. Kourkoutas, Y., Komaitis, M., Koutinas, A. A. and Kanellaki, M. 2001. Wine production using yeast immobilized on apple pieces at low and room temperatures. *J. Agric. Food Chem.*, 49(3), 1417-1425.
23. Athanasiadis, I., Boskou, D., Kanellaki, M., Kiosseoglou, V., Koutinas, A.A. 2002. Whey liquid waste of the dairy industry as raw material for potable alcohol production by kefir granules. *J. Agric. Food Chem.*, 50(25), 7231-7234.
24. Bekatorou, A., Sarellas, A., Ternan, N.G., Mallouchos, A., Komaitis, M., Koutinas, A.A., Kanellaki, M. 2002. Low-temperature brewing using yeast immobilized on dried figs. *J. Agric. Food Chem*, 50(25), 7249-7257.
25. Chronopoulos, G., Bekatorou, A., Bezirtzoglou, E., Kaliafas, A., Koutinas, A.A., Marchant, R., Banat, I.M. 2002 Lactic acid fermentation by *Lactobacillus casei* in free cell form and immobilised on gluten pellets. *Biotech. Letters*, 24(15), 1233-1236.
26. Mallouchos, A., Komaitis, M., Koutinas, A.A., Kanellaki, M. 2002. Investigation of volatiles evolution during the alcoholic fermentation of grape must using free and immobilized cells with the help of solid phase microextraction (SPME) headspace sampling. *J. Agric. Food Chem.*, 50(13), 3840-3848.
27. Petsas, I., Psarianos, K., Bekatorou, A., Koutinas, A.A., Banat, I.M., Marchant, R. 2002. Improvement of Kefir yeast by mutation with N-methyl-N-nitrosoguanidine. *Biotech. Letters*, 24(7), 557-560.
28. Kourkoutas, Y., Bekatorou, A., Banat, I.M., Marchant, R., Koutinas, A.A. 2003 Immobilization technologies and support materials suitable in alcohol beverages production: a review. *Food Microbiology*, 21(4), 377-397.
29. Loukatos, P., Kanellaki, M., Komaitis, M., Athanasiadis, I., Koutinas, A.A. 2003. A new technological approach proposed for distillate production using immobilized cells. *J. Bioscience and Bioengineering*, 95(1), 35-39.
30. Paraskevopoulou, A., Athanasiadis, I., Blekas, G., Koutinas, A.A., Kanellaki, M., Kiosseoglou, V. 2003. Influence of polysaccharide addition on stability of a cheese whey kefir-milk mixture. *Food Hydrocol.*, 17(5), 615-620.
31. Skountzou, P., Soupioni, M., Bekatorou, A., Kanellaki, M., Koutinas, A.A., Marchant, R., Banat, I.M. 2003. Lead(II) uptake during baker's yeast production by aerobic fermentation of molasses. *Process Biochem.*, 38(10), 1479-1482.
32. Tsakiris, A., Bekatorou, A., Koutinas, A.A., Marchant, R. and Banat, I.M. 2003. Immobilization of yeast on dried raisin berries for use in dry white wine making. *Food Chem.*, 87(1), 11-15.
33. Kourkoutas, Y.; Bekatorou, A.; Marchant, R.; Banat, I.M.; Koutinas, A.A. 2004. Immobilisation supports and techniques applicable in alcoholic beverages production: a review. *Food Microbiology*, 21(4), 377-39.
34. Kourkoutas, Y.; Kanellaki, M.; Koutinas, A.A.; Tzia, C. 2004 Effect of storage of immobilized cells at ambient temperature on volatiles during wine-making. *J Food Eng.*, 74 217-223.
35. Koutinas A.A., Bekatorou, A. 2004. Kefir starter culture in food production. Invited Lecture. Conference on Bioprocesses in Food Industries (ICBF-2004). Chapter in the book of congress that will be edited by Asiatech (IN PRESS), 2004
36. Plessas, S.; Pherson, L.; Bekatorou, A.; Nigam, P.; Koutinas, A.A. 2004. Bread making using kefir grains as baker's yeast. *Food Chem.*, 93 (4), 585-589.
37. Tsakiris A, Sipsas V, Bekatorou S, Mallouchos A, Koutinas AA 2004 Red wine making by immobilized cells and influence on volatile composition. *J. Agric. Food Chem*, 52(5), 1357-1363.
38. Kourkoutas, Y.; Xolias, V.; Kallis, M.; Koutinas, A.A.; Bezirtzoglou, E.; Kaliafas, A.; Kanellaki, M. 2005 *Lactobacillus casei* immobilization on fruit pieces for probiotic additive, fermented milk and lactic acid production. *Process Biochem.*, 40, 411-416.
39. Koutinas, A.A., Athanasiadis, I.; Bekatorou, A., Iconomopoulou M. and Blekas G. 2005 Kefir yeast technology: scale-up in SCP production using milk whey. *Biotechnology and Bioengineering*, 89(7), 788-796.
40. Plessas, S., Bekatorou, A., Kanellaki, M., Psarianos, C., Koutinas, A.A. 2005 Cells immobilized in a starch–gluten–milk matrix usable for food production. *Food Chem.*, 89(2), 175-179.

41. Proestos, C., Bakoyannis, A., Psarianos, C., Koutinas, A.A., Kanellaki, M., Komaitis, M. 2005. High Performance Liquid Chromatography analysis of phenolic substances in Greek wines. *Food Control*, 16(4), 319-323.
42. Kourkoutas, Y.; Kandyliis, P.; Panas, T.; Dooley, J.; Poonam, S.; Koutinas, A.A. 2006 Evaluation of freeze-dried kefir co-culture as starter in Greek Feta-type cheese production. *Appl Environ Microbiol*, 72, 6124-6135.
43. Bekatorou, A.; Psarianos, C. and Koutinas, A.A. 2006. Production of Food Grade Yeasts. *Food Technol. Biotechnol.*, 44(3), 407-415.
44. Dimitrellou, D.; Kourkoutas, Y.; Banat, I.M.; Marchant, R.; Koutinas, A.A. 2007. Whey cheese production using freeze-dried kefir co-culture as a starter. *J. Appl. Microbiol.*, 103, 1170-1183.
45. Plessas, S.; Bekatorou, A.; Koutinas, A.A.; Soupioni, M.; Banat I.; Marchant, R. 2007. Use of *Saccharomyces cerevisiae* cells immobilized on orange peel as biocatalyst for alcoholic fermentation. *Biores. Technol.*, 98(4), 860-865.
46. Plessas, S.; Trantallidi, M.; Bekatorou, A.; Kanellaki, M.; Nigam P.; Koutinas, A. A. 2007. Immobilization of kefir and *Lactobacillus casei* on spent brewery grains for use in sourdough wheat bread making. *Food Chem.*, 105(1), 187-194.
47. Koutinas A.A., Athanasiadis I., Bekatorou A., Psarianos C., Kanellaki M., Agouridis N. and Blekas G. 2007. Kefir-yeast technology: Industrial scale-up of alcoholic fermentation of whey, promoted by raisin extracts, using kefir-yeast granular biomass. *Enzyme and Microbial Technology*, 41(5), 576-582.
48. Papapostolou, H., Bosnea, L.A., Kanellaki, M., and Koutinas, A.A. 2007. Convective Drying of the Thermotolerant *Kluyveromyces marxianus* at Relatively Low Temperatures and its Efficiency in Whey Fermentation. *Open Biotechnol. J.*, 1, 52-58
49. Kopsahelis, N.; Panas, P.; Kourkoutas, Y.; Koutinas, A. A. 2008. Evaluation of thermally-dried immobilized cells of *Lactobacillus delbrueckii* subsp. *bulgaricus* on apple pieces as a potent starter culture. *J Agric Food Chem*, 55 9829-9836.
50. Plessas, S.; Bosnea, L.; Psarianos, C.; Koutinas, A. A.; Marchant, R. and Banat.M. 2008. Lactic acid production by mixed cultures of *Kluyveromyces marxianus*, *Lactobacillus delbrueckii ssp. bulgaricus* and *L. helveticus*. *Biores. Technol.*, 99, 5951-5955.
51. Agouridis, N., Kopsahelis, N., Plessas, S., Koutinas, A.A., Kanellaki, M. 2008. *Oenococcus oeni* cells immobilized on delignified cellulosic material for malolactic fermentation of wine. *Biores. Technol.* 99 (18), pp. 9017-9020
52. Katechaki, E., Panas, P., Rapti, K., Kandilogiannakis, L., Koutinas, A.A. 2008. Production of hard-type cheese using free or immobilized freeze-dried kefir cells as a starter culture *J. Agric. Food Chem.* 56 (13), pp. 5316-5323
53. Dimitrellou, D., Kandyliis, P., Kourkoutas, Y., Koutinas, A.A., Kanellaki, M. 2009 Evaluation of thermally-dried *Kluyveromyces marxianus* as baker's yeast *Food Chem.* 115 (2), pp. 691-696
- A. A. Koutinas, H. Papapostolou, D. Dimitrellou, N. Kopsahelis, E. Katechaki, A. Bekatorou, L. A. Bosnea. Whey valorisation: A complete and novel technology development for dairy industry starter culture production. *Biores. Technol.*, 100, 3734-3739, 2009.
54. Golfopoulos, A; Papaioannou, L; Soupioni M, et al. Lactose uptake rate by kefir yeast using C-14-labelled lactose to explain kinetic aspects in its fermentation. *Biores. Technol.*, 100, 21, 5210-5213, 2009
55. D. Dimitrellou, Y. Kourkoutas, A.A. Koutinas, M. Kanellaki. Thermally-dried immobilized kefir on casein as starter culture in dried whey cheese production. *Food Microbiology* 26 (2009) 809-820.

PATENTS

1. Koutinas A.A., Kanellaki, M., Voliotis, S., Kouinis, J., Kaliafas, A., Kana, K., Iconomou, L. 1993. «A method of Alcoholic Fermentation with the Catalyst Kissiris and gamma-alumina, after their Regeneration». Patent Corporation Treaty (PCT) with International Publication Number: WO 93/01298 and International Publication Date: 21 Jan. 1993. European Patent Office (EPO), Patent Nr. 0565647, Publication Date 20/10/93
2. Koutinas, A.A., Iconomou, L. and Bardi, E. 1995. «Dellignified Cellulosic Materials to Improve Industrial Processes of Alcoholic Fermentation». Patent Cooperation Treaty (PCT) with International Publication Number Wo 95/04138 and International Publication Date, 9 February 1995.
3. Kanellaki, M., Koutinas, A. A., Kopsahelis, N., Bekatorou, A., Agouridis, N., Plessas, S. Industrial use of a novel immobilised yeast biocatalyst on brewer's spent grains for alcoholic fermentation for ethanol and alcoholic beverages production, 2006. Hellenic Industrial Property Organisation, patent number (11):1005439.
4. Kanellaki, M., Koutinas, A. A., Bosnea, L., Kourkoutas, Y., Industrial use of immobilized lactic acid bacteria in liquid and freeze-dried form for the production of dairy products. Hellenic Industrial Property Organisation, patent number 3 Αυγούστου 2008.

FOOD BIOTECHNOLOGY GROUP

The Food Biotechnology Group of the Dept. of Chemistry, UP, specializes on fermentation technology (submerged & solid state), fermented food production, agro-industrial waste utilization, industrial bioreactor design. Among the Group's achievements are the isolation of extremophiles, the development of alcoholic fermentation promoters and

solid carriers for cell immobilization, the production of starter cultures and novel foods with probiotic and functional properties, the development of kefir and cheese whey utilization technologies, the installation and operation of 100-100.000 L industrial bioreactors, etc. The Group has supervised a large number of Ph.D. and MSc theses on food biotechnology research subjects. Since 1997 the Group coordinates the **International Postgraduate Programme MSc Food Biotechnology**, in cooperation with the Universities of Ioannina (Greece) and Ulster (UK), leading to excellent common scientific cooperation, common publication of research papers, award of scholarships, and promotion of professional development of Greek graduates.

EQUIPMENT

The Food Biotechnology Group administrates laboratories specifying in both food chemistry and biotechnology. The available major equipment includes: GC-MS (with SPME sampling equipment) (Shimadzu); X-ray powder diffractometer (Enraf Nonius); Atomic adsorption spectrometer (Shimadzu); HPLC-RID (Shimadzu); GC-FID (3 instruments) (Shimadzu); Freeze dryers (3 instruments) (Labconco & LabTech); Spray dryer (Buchi); PCR Thermal Cycler (Thermo Electron Corp.); Vertical laminar airflow cabinet (BSC-EN); Kjeldahl & steam distillation apparatuses (Velp scientifica)

INTERNATIONAL COOPERATION

The Group has developed national and international cooperation in the frame of common: a) scientific research, b) research proposal submission and coordination, c) guidance of postgraduate theses, d) coordination of international forums and conferences, e) educational events, f) laboratory training, etc. Specifically:

- University of Ulster (UK), School of Biomedical Sciences (Prof. R. Marchant, Prof. I. M. Banat & Dr. P. Nigam)
- National Institute for Interdisciplinary Science and Technology (India), Biotechnology Division (Prof. A. Pandey)
- Imperial College London (UK), Dept. of Chemical Engineering and Chemical Technology, Centre for Process Systems Engineering (Dr A. Mantalaris & Prof. S. Pistikopoulos)
- University of Hannover (Germany), Dept. of Natural Sciences, Institute of Food Chemistry (Prof. R. G. Berger)
- University of Modena and Reggio Emilia (Italy), Dept. of Agricultural Sciences (Prof. P. Giudici)
- University Blaise-Pascal (France), Dept. of Chemical and Biochemical Engineering, LGCB (Prof. C. Larroche)
- University of Mersin (Turkey), Dept. of Environmental Engineering (Assist. Prof. A. Unyayar)
- University of Manchester (UK), School of Chemical Engineering and Analytical Science & Satake Centre for Grain Process Engineering (Prof. C. Webb)
- University of Reading (UK), Dept. Of Food Biosciences (Dr. D. Charalampopoulos)
- University of Ioannina (Greece), Dept. of Chemistry (Prof. M. Kontominas)
- Agricultural University of Athens (Greece), Dept. of Food Science and Technology (Prof. M. Komaitis)
- Democritus University of Thrace (Greece) , Dept. of Molecular Biology & Genetics and Dept. of Agricultural Development (Prof. E. Bezirtzoglou, Dr. Y. Kourkoutas & Dr. S. Plessas)
- National Technical University of Athens (Greece), School of Chemical Engineering (Prof. C. Tzia)
- University of Thessaloniki (Greece), Dept. of Chemistry (Ass. Prof. G. Blekas, Assoc. Prof. D. Kioseoglou & Dr. A. Paraskevopoulou)

CONTACT DETAILS

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