

REFERENCE

- Adams, G.A. (1946) Fermentation of wheat by *Aerobacillus polymyxa* under aerobic and anaerobic conditions, Can. J. Res., Vol. 24F, pp. 1-11.
- Afschar, A. A., Bellgardt, K. H., Vaz Rossell, C. E., Czok, A. and Schaller, K. (1991) The production of 2,3-butanediol by fermentation of high test molasses, App. Microbiology Biotechnol., Vol. 34, pp. 582-585.
- Afschar, A. S. , Vaz Rossel, C. E., Jonas, R., Chanto, A. Quesada and Schallar, K. (1993) Microbial production and downstream processing of 2,3-butanediol, J. of Biotechnology, Vol. 27, pp. 317-329.
- Alam,S., Capit, F., Weigand, W.A., Hong, J. (1990) Kinetics of 2,3-butanediol fermentation by *Bacillus amyloliquefaciens*: Effect of initial substrate concentration and aeration, J.Chem. Tech. Biotechnol., Vol. 47, pp. 71-84.
- Barrett, E.L., Collins,E.B., Hall, B.J., Matoi, S.H. (1983), Production of 2,3-butylene glycol from whey by *Klebsiella pneumoniae* and *Enterobacter aerogens*, J. Dairy Sci., Vol. 66, pp. 2507-2514.
- Blackwood, A.C., J.A. Wheat, J.D. Leslie, G.A.. Ledingham and F.T. Simpson (1949). Production and properties of 2,3-butanediol. XXXI. Pilot plant studies on the fermentation of wheat by *Aerobacillus polymyxa*. Can. J. Res., 27F, 199-210.
- Borzani, W., Hiss, H., Desantos, T. W. and Vairo, M. L. R. (1992) Semicontinuous Ethanol Fermentation of Sugar-Cane Blackstrap Molasses by Presses Yeast, Biotechnology Letters, Vol. 14, pp. 981-984.

Buchanan, R.E., Gibbons, N.E.(1974): Bergey's Manual of Determinative Bacteriology, Eighth Ed., p.294, Baltimore: Williams and Wilkins

Cao, N. J., Xia, Y. K. , Gong, C. S. and Tsao, G. T. (1997) Production of 2,3-Butanediol from Pretreated Corn Cob by *Klebsiella Oxytoca* in the Presence of Fungal Cellulase, Vol. 63, pp 129-139.

Chua, J. W. , Erarslan, A., Kinoshita, S. and Taguchi, H. (1980) 2,3-Butanediol production by immobilized *Enterobacter aerogenes* IAM1133 with *K-Carrageenan*, J. Fermentation Technol., Vol. 58, pp. 123-127.

Champluvier, B., Decallonne, J., Rouxhet, P.G. (1989 a), Influence of sugar source (lactose, glucose, galactose) on 2,3-butanediol production by *Klebsiella oxytoca* NRRL-B199, Arch. Microbiol., Vol. 152, pp. 411-414.

Champluvier, B., Francart, B., Rouxhet, P.G. (1989b), Co-immobilization by adhesion of β -galactosidase in nonviable calls of *Kluyveromyces lactis* with *Klebsiella oxytoca*: Conversion of lactose into 2,3-butanediol, Biotechnol. Bioeng., Vol. 34, pp. 844-853.

Decarvalho, J. C. M., Aquarone, E., Sato, S., Brazzach, M. L., Moraes, D. A. and Borzani, W. (1993), Fed-batch alcoholic fermentation of sugar cane blackstrap molasses- influence of the feeding rate and on yeast yield and productivity, App. Microbiology and Biotechnology, Vol. 38, pp. 596-598.

Dettwiler, B., Dunn, I.J., Heinzle, E., Prenosil, J.E. (1993), A simulation model for the continuous production of acetoin and butanediol using *Bacillus subtilis* with integrated pervaporation separation, Biotechnol. Bioeng., Vol. 41, pp. 791-800.

DeMas, C., Jansen, N.B., Taso, G.T. (1988) Production of optically active 2,3-butanediol by *Bacillus polymyxa*, *Biotechnology Bioeng.*, Vol. 31, pp. 366-377.

Desantos, T. W., Vario, M. L. R., Hiss, H. and Borzani, W. (1992) Semicontinuous Alcoholic Fermentation of Sugar-cane Blackstrap Molasses by Pressed Yeast, *Biotechnology Letters*, Vol. 14, pp. 975-980.

Donker, H.J.L., (1926) *Comptes Rendes*, Ph.D. dissertation, University of Delft, The Netherlands.

Donmez, S. and Ozcelik, F. (1992) Ethanol fermentation of beet molasses by *Clostridium-thermohydrosulfuricum*, *Enzyme and Microbial Technology*, Vol. 14, pp. 413-416.

Dzielwulski, D.M.(1986) 2,3-butanediol production from glucose by *Bacillus polymyxa* in a fed-batch mode with biomass recycle. *J. Biotechnol*, Vol. 4, pp. 171-180.

Elferai, A. H., Elabyad, M. S., Eldiwany, A. I., Sallam, L. A. and Allam, R. F. (1992) Some Physiological Parameters for Ethanol Production from Beet Molasses by *Saccharomyces Cerevisiae* Y-7, *Bioresource Technology*, Vol. 42, pp. 183-189.

Esener, A., Roels, J., Kossen, N. (1983), Theory and applications of unstructured growth models: kinetic and energetic aspects. *Biotennol. Bioeng.*, Vol. 25, pp. 2803-2841.

Fages, J. , Mulard, D., Rouquet, J. J. and Wilhelm, J. L. (1986) 2,3-Butanediol production from Jerusalem artichoke, *Helianthus tuberosus* by *Bacillus polymyxa*

ATCC 12321. Optimization of k_a profile, Applied Microbiology Biotechnology, Vol. 25, pp. 197-202.

Fields, M.L., and Richmond, B.(1967). The microbial production of 2,3-butanediol. Appl. Microbiol., Vol. 15, pp. 1313-1315.

Fond, O., Jansen, N. B. and Tsao, G. T. (1985) A model for acetic acid and 2,3-butanediol inhibition of the growth and metabolism of *Klebsiella Oxytoca*, Biotechnology Letters, Vol 7, pp. 727-732.

Frazer, F.R., McCaskey, T.A. (1991), Effect of components of acid hydrolysed hardwood conversion of D-xylose to 2,3 butanediol by *Klebsiella pneumoniae*, Enzyme Microb. Technol., Vol. 13, 110-115.

Fulmer, E.I., Christensen, L.M. and Kendall, A.R. (1933) Production of 2,3-butylene glycol by fermentation. Ind. Engg Chem., 25, 798-800.

Garg, S. K. and Jain, A. (1995) Fermentative production of 2,3-butanediol: A review, Bioresource Technology, Vol. 51, pp. 103-109.

Gottschalk, G.(1979) Bacterial metabolism. Springer-Verlag, New York.

Harrison, D.E.F., Pirt, S.J. (1967), The influence of dissolved oxygen concentration on the respiration and glucose metabolism of *Klebsiella aerogenes* during growth, J. Gen. Microbiol., Vol 46, pp. 193-221.

Harden, A. and Walpole, G.S. (1906) 2,3-Butylene glycol fermentation by *Aerobacter aerogenes*. Proc. Royal Soc. , Vol. B.77, pp. 399-405.

Hespell, R. B. (1996) Fermentation of xylan, corn fiber, or sugars to acetoin and butanediol by *Bacillus polymyxa* strains, *Current Microbiology*, Vol. 32, pp. 291-296.

Hohn-Bentz, H., Radler, F. (1978), Bacterial 2,3-butanediol dehydrogenases, *Arch. Microbiol.*, Vol. 116, pp. 197-203.

Jansen, N. B., Flickinger, M. C. and Tsao, G. T. (1984) Application of Bioenergetics to Modelling the Microbial Conversion of D-Xylose to 2,3-Butanediol, *Biotechnology and Bioengineering*, Vol 26, pp. 573-582.

Jansen, N.B., Flickinger, M.C., Tsao, G.T. (1984a), production of 2,3-butanediol from D-xylose by *Klebsiella oxytoca* ATCC 8724, *Biotechnol. Bioeng.*, Vol. 26, pp. 362-369.

Jansen, N. B. and Tsao, G.T. (1983) In *Advances in Biochemical Engineering/Biotechnology*, A. Fiechter, Ed.(Springer-Verlag, New York) pp.85-99.

Johansen, L., Bryn, K. and Størmer, F. C. (1975) Physiological and Biochemical Role of the Butanediol Pathway in *Aerobacter (Enterobacter) aerogenes*, *J. of Bacteriology*, Vol. 123, pp. 1124-1130.

Juni, E. (1952). Mechanism of formation of acetoin by bacteria. *J. Biol. Chem.*, Vol. 195, pp. 715-726.

Kosaric, N., Magee, R.J., Blaszczyk, R. (1992), Redox potential measurement for monitoring glucose and xylose conversion by *K.pneumoniae*, *Chem. Biochem. Eng.*, Vol.6, 145-152.

Katznelson, H. (1944) Studies with *Bacillus polymyxa* I. Some factors affecting the fermentation of wheat by *Bacillus polymyxa*. Can J. Res., Vol. C 22, 235-250.

Krishnan, B.V. (1988) Kinetics of 2,3-butanediol production from mixed sugar, M. Tech. Dissertation, BERG, I.I.T. Delhi

Laube, V. M. , Groleau, D. and Martin, S. M. (1984) 2,3-Butanediol Production from Xylose and other Hemicellulosic Components by *Bacillus Polymyxa*, Biotechnology Letters, Vol. 6, pp. 257-262.

Laube, V. M. , Groleau, D. and Martin, S. M. (1984a), The effect of yeast extract on the fermentation of glucose to 2,3-butanediol by *Bacillus polymyxa*. Biotechnol Lett., Vol. 6, pp. 535-540.

Lee, H. K. and Maddox, I. S. (1984) Microbial Production of 2,3-Butanediol from Whey Permeate, Biotechnology Letters, Vol. 6, pp. 815-818.

Ledingham, G.A. and Neish, A. C. (1954) Fermentative production of 2,3 Butanediol Industrial fermentations, Vol.2. L.A.. Underkofler and R.J. Hickey, Eds. (Chemical Publishing Co., New York,

Ledingham, G.A., Adams, G.A., and Stanier, R.Y. (1945) Production and properties of 2,3-butanediol, I. Fermentation of wheat mashes by *Aerobacillus polymyxa*. Can. J. Res., Vol. F 23, 48-71.

Maddox, I. (1996), Microbial production of 2,3-butanediol, Biotechnology, Vol. 6, pp. 269-291, VCH Publishers (Berlin).

Magee,R.J., and Kosaric,N. (1987), The microbial production of 2,3-butanediol, Adv. Appl. Microbiol., Vol. 32, 89-161.

Mankad, T. and Nauman, E. B. (1992) Effect of Oxygen on Steady State Product Distribution in *Bacillus polymyxa* Fermentations, Biotechnology and Bioengineering, Vol. 40, pp. 413-426.

Malthe-Sorensen, D. and Stormer, F.C. (1970). The pH 6 acetolactate-forming enzyme from *Serratia marcesans* : purification and properties. Eur. J. Biochem., Vol. 14, 127-132.

Moteagudo, J. M. , Rincon, J., Rodriguez, L., Fuertes, J. and Moya, A. (1993) Determination of the best nutrient medium for the production of L-lactic acid from beet molasses, Acta Biotechnologica, Vol. 13, pp. 103-110.

Murphy D, Stranks DW (1951) The production of 2,3-butanediol from sulphite waste liquor. Can J Technol, Vol. 29, pp. 413-420

Nakashimada, Y., Kanai, K. and Nishio, N. (1998) Optimization of dilution rate, pH and oxygen supply on optical purity of 2,3-butanediol produced by *Paenibacillus polymyxa* in chemostat culture, Biotechnology Letters, Vol 20, pp. 1133-1138

Neish, A. C., Blackwood, A. C., Ledingham,G.A., International Congress on Biochemistry, Abstracts of communications, Ist Congress, Cambridge, England, pp. 533-535.

Nilegaonkar, S. S., Bhosale, S. B., Dandage, C. N. and Kapadi, A. H. (1996) Potential of *Bacillus licheniformis* for the Production of 2,3-Butanediol, J. of Fermentation and Bioengineering, Vol 82, pp. 408-410.

Nishikawa, N.K., Sutchliffe, R., saddler, J.N. (1988a), The influence of lignin degradation products on xylose fermentation by *klebsiella pneumoniae*, Appl. Microbiol. Biotechnol., Vol. 27, pp. 549-552.

Nigam, M. (1990). Studies on cells immobilised on bagasses. Ph.D.Thesis, BEREC, IIT Delhi.

Nigam, P. and Vogel, M. (1991) Bioconversion of Sugar Industry By-products – Molasses and Sugar Beet Pulp for Single Cell Protein Production by Yeasts, Biomass and Bioenergy, Vol 1, pp. 339-345.

Olson, B.H., Johnson, M.J. (1948), The production of 2,3-butylene glycol by aerobacter aerogenes 199, J. Bacteriol., Vol. 55, pp.209-222.

Papoutsakis E, Meyer CL (1985) Equation and calculations of product yields and preferred pathways for butanediol and mixed-acid fermentations. Biotechnol Bioeng, Vol. 27, pp.50-66.

Park, S. C. and Baratti, J., Comparison of ethanol production by *Zymomonas mobilis* from sugar-beet molasses (1991) App. Microbiology and Biotechnology, Vol. 35, pp. 283-291.

Pirt, S.J., (1957). The oxygen requirement of growing cultures of an *Aerobacter* species determined by means of the continuous culture techniques. J. Gen. Microbiol., Vol. 16, pp. 59-75.

Pirt, J. and Callow, D. S. (1958) Exocellular Product Formation by Microorganisms in Continuous Culture 1. Production of 2,3-Butanediol by *Aerobacter Aerogenes* in an Single Stage Process J. Applied Bacteriology, Vol 21, pp. 188-205.

Quershi, N. and Cheryan, M. (1989) Effects of Aeration on 2,3-Butanediol Production from Glucose by *Klebsiella oxytoca*, J. of Fermentation and Bioengineering, Vol. 67, pp. 415-418.

Quershi, N. and Cheryan, M. (1989a), Production of 2,3-butanediol by *Klebsiella oxytoca*, Appl. Microbiol. Biotechnol., Vol. 303, pp.440-443.

Quershi, N. and Cheryan, M. (1989b), Effect of lactic acid on growth and butanediol production by *Klebsiella oxytoca*, J. Ind. Microbiol., Vol. 4, pp.453-456.

Ramachandran, K. B. and Goma, G. (1987), Effect of oxygen supply and dilution rate on the production of 2,3-butanediol in continuous bioreactor by *klebsiella pneumoniae*, Enzyme Micro. Technol., Vol. 9, pp.107-111.

Ramachandran, K. B. and Goma, G. (1988) 2,3-Butanediol production from glucose by *Klebsiella pneumoniae* in a cell recycle system, Journal of Biotechnology, Vol. 9, pp. 39-46.

Ramachandran, K. B., Hashim, M. A. and Fernandez, A. A. (1990) Kinetic Study of 2,3-Butanediol Production by *Klebsiella oxytoca*, J. of Fermentation and Bioengineering, Vol.70, pp. 235-240.

Raspoet, D., Pot, B., De Deyn, D., De Vos, P., Kersters, K., De Ley, J. (1991), Differentiation between 2,3-butanediol producing *Bacillus licheniformis* and *B. polymyxa* strains by fermentation product profiles and whole cell protein electrophoretic patterns, Syst. Appl. Micro-biol., Vol. 14, pp. 1-7.

Rose, D. (1947) The effect of aerobic conditions on the *Aero-bacillus* fermentation. Can. J. Res., Vol. 25F, pp. 273-279.

Sablayrolles, J. M. and Goma, G. (1984) Butanediol production by *Aerobacter aerogenes* NRRL B199: Effects of Initial Substrate Concentration and Aeration Agitation, Biotechnology and Bioengineering, Vol. 26, pp. 148-155.

Serebrennikov, V. M. (1995) Effects of temperature on the biosynthesis of 2,3-butanediol and acetoin under varying conditions of batch culturing of *Bacillus polymyxa* CCM 1465, Applied Biochemistry and Microbiology, Vol. 31, pp. 537-542.

Serebrennikov, V. M., Kobzeva, N. Ya. and Bezborodov, A. M. (1995) Biomass concentration as a means of control of 2,3-butanediol biosynthesis in a batch culture of *Bacillus polymyxa*, Applied Biochemistry and Microbiology, Vol. 31, pp. 537-542.

Schutz, M., Schone, B., Klemm, K. (1985), Butanediolbildung aus Laktose durch *Enterobacter cloacae* in kontinuierlicher Kultur, Milchwissenschaft, Vol. 40, pp. 513-517.

Silveria, M. M., Schmidell, W. and Berbert, M. A. (1993) Effect of Air Supply on the production of 2,3-Butanediol by *Klebsiella pneumoniae* NRRL B199, J. of Biotechnology, Vol. 31, pp. 93-102.

Stormer, F.C. (1968) The pH 6 acetolactate-forming enzyme from *Aerobacter aerogenes*. I. Kinetic studies. J.Biol.Chem. , Vol. 243, pp. 3735-3739.

Taylor, M.B., Juni, E. (1960), Stereoisomeric specificities of 2,3-butanediol dehydrogenases, Biochim. Biophys. Acta, Vol. 39, pp. 448-457.

Tayeb, A. M., Asfour, H. M., Aly, I. H. and Mostafa, N. A. (1991) Optimizing energy production from agrowastes- a case study of Egyptian beet molasses, Energy conversion and management, Vol. 32, pp. 505-513.

Tran, A. V. and Chambers, R. P. (1986) Lignin and extractives derived inhibitors in the 2,3-butanediol fermentation of mannose-rich prehydrolysates, Applied Microbiology and Biotechnology, Vol. 23, pp. 191-197.

Tran, A. V. and R. P. Chambers (1987) The Dehydration of Fermentative 2,3-Butanediol into Methyl Ethyl Ketone, Biotechnology and Bioengineering, Vol. 29, pp. 343-351.

Tsao, G.T. (1978) Conversion of biomass from agriculture useful products. Final report, July 31, USDDE, Contact No. EG-77-S-4298.

Ui, S., Matsuyama, N., Masuda, H. and Muraki, H. (1984) Mechanism for the formation of 2,3-Butanediol Stereoisomers in *Klebsiella pneumoniae*, J. Ferment. Technol., Vol. 62, pp. 551-559.

Ui, S., Okajima, Y., Mimura, A., Kanai, H. and Kudo, T (1997) Molecular Generation of an *Escherichia-Coli* Strain Producing only the meso-isomer of 2,3-Butanediol, J. of Fermentation and Bioengineering, Vol. 84, pp. 185-189.

Ui, S., Masuda, T., Masuda, H., Muraki, H. (1986), Mechanism for the formation of 2,3-butanediol stereoisomers in *Bacillus polymyxa*, J. Ferment. Technol. 64, 481-486.

Vitolo, M. and Carriera, S. M. S. (1992) Entrapment of *Saccharomyces Cerevisiae* in Commercial Alginates, Agro Food Industry, Vol. 3, pp. 24-25.

Voloch, M., Ladisch, M.R., Rodwell, V.W., Taso, G.T. (1983), Reduction of acetoin to 2,3-butanediol in *Klebsiella pneumoniae*, Biotechnol. Bioeng., Vol. 25, pp. 173-183.

Willetts, A. (1984), Butane 2,3-diol production by immobilised *Aeromonas hydrophila*, Biotechnol. Lett. 6, pp. 263-268.

Willetts, A. (1985) Butane 2,3-Diol Production by Immobilized *Aeromonas Hydrophilia*, Biotechnology Letters, Vol. 7, pp. 261-266.

Wheat, J. A. (1953) Production and properties of 2,3-butanediol, Can. J. Technol, Vol 31, pp. 73-84

Yu, E. K. C., N. Levitin and J. N. Saddler (1982) Production of 2,3-Butanediol by *Klebsiella Pneumonia* Grown on Acid Hydrolyzed Wood Hemicellulose, Biotechnology Letters, Vol. 4, pp. 741-746.

Yu, E. K. C. and Saddler, J. N. (1983) Fed Batch Approach to Production of 2,3-Butanediol by *Klebsiella pneumoniae* Grown on High Substrate Concentrations, Applied and Environmental Microbiology, Vol. 46, pp. 630-635.

Yu, E. K. C., Deschatelets, L. and Saddler, J. N. (1984a) The combined enzymatic hydrolysis and fermentation of hemicellulose to 2,3-butanediol, Vol. 19, pp. 365-372.

Yu, E. K. C., L. Deschalates, N. Levitin and J. N. Saddler (1984b). The combined enzymatic hydrolysis and fermentation of hemicellulose to 2,3-butanediol, appl. Microbiol. Biotechnol., Vol. 19, pp. 365-372.

Yu, E. K. C., L. Deschalates, N. Levitin and J. N. Saddler (1984c) Production of 2,3-Butanediol from HF-Hydrolyzed Aspen Wood, Biotechnology Letters, Vol. 6, pp. 611-614

Zabriskie, D. W., Armiger, W. B., Phillips, D. H. and P. A. Albano (1980) Trader's guide to fermentation media formulation, Traders Protein Division of Traders Oil Mill, Fort Worth, Texas, USA.

Zeng, A. P., Biebl, H. and Deckwer, W. D. (1990) 2,3-butanediol Production by *Enterobacter aerogenes* in continuous culture: role of oxygen supply, Applied Microbiology and Biotechnology, Vol. 33, pp. 264-268.

Zeng, A. P., Biebl, H. and Deckwer, W. D. (1991) Production of 2,3-butanediol in a membrane bioreactor with cell recycle, Applied Microbiology and Biotechnology, Vol. 34, pp. 463-468.

Zeng, A. P. and Deckwer, W. D. (1991) A model for multiproduct-inhibited growth of *Enterobacter aerogenes* in 2,3-butanediol fermentation, Applied Microbiology and Biotechnology, Vol. 35, pp. 1-3.