

## REFERENCES

- Abraham, E.P. *et al.* 1941. Further Observations on Penicillin. Lancet. 2 : 177.
- Alexander, N. 1977. Introduction to soil microbiology. 2<sup>nd</sup> ed. U. S. A : John Wiley & Son, 36-51.
- Arai, T., *et al.* 1976. Culture media for Actinomycetes. Japan : The Society for Actinomycetes, 1-31.
- Babes, V. 1885. Basis of Chemotherapy. J. Conn. Mid. Prat. Paris 7 : 321.
- Benedict, R.G., and Langlykke, A.F. 1947. Antibiotics. Ann. Rev. Microb. 1 : 193.
- Benedict, R.G., and Langlykke, A.F. 1947. Antibiotic Activity of *Bacillus polymyxa*. J. Bact. 54 : 24.
- Betina, V.A. 1964. Systematic Analysis of Antibiotics Using Paper Chromatography. J. Chromatography. 15 : 379-392.
- Buchanan, R.E., and Gibbons, N.E. 1974. Bergey's Manual of determinative Bacteriology (8th ed.). Baltimore: The Williams and Wilkins, 208-267.
- Burkholder, P.R. 1946. Studies on the Antibiotic Activity of Actinomycetes. J. Bact. 52 : 503.
- Burkholder, P.R. 1952. Cooperation and conflict among primitive organisms. American Scientist 40 : 601-631.
- Burkholder, P.R. 1953. Comments by Dr. Burkholder. American Scientist 41 : 14-16.

- Chain, E. *et al.* 1940. Penicillin as a chemotherapeutic agent. Lancet, 2 : 226.
- Chambers, S.O., and Weidman, F.D. 1928. A Fungistatic Strain of *Bacillus subtilis* Isolated from Normal Toes. Arch. Derm. Syph. 18 : 568.
- Cross, T. 1981. Aquatic actinomycetes: A critical survey of the occurrence, growth and role of actinomycetes in aquatic habitats. J. Appl. Bacteriol. 50 : 397-423.
- Dietz, A., and Mathews, J. 1962. Taxonomy by carbon replication. I. An examination of *Streptomyces hygroscopicus*. Appl. Microbiol. 10 : 258.
- Dietz, A., and Mathews, J. 1968. Taxonomy by carbon replication. II. Examination of eight additional cultures of *Streptomyces hygroscopicus*. Appl. Microbiol. 16 : 935.
- Dietz, A., and Mathews, J. 1969. Scanning electron microscopy of selected members of the *Streptomyces hygroscopicus* group. Appl. Microbiol. 18 : 694.
- Dietz, A., and Mathews, J. 1971. Classification of *Streptomyces* spore surfaces into five groups. Appl. Microbiol. 21 : 527-533.
- Dietz, A., and Mathews, J. 1970. Definitive comparison of members of the *Streptomyces hygroscopicus*-like complex. In : The Actinomycetales. Jana: Veb Gustav Fischer Verlag, 198-201.
- Douglas, H.W., Ruddick, S.M., and Williams, S.T. 1970. A study of the electrokinetic properties of some actinomycete spores. J. Gen. Microbiol. 63 : 289-295.
- Dubos, R.J. 1939. Studies on a bactericidal agent extracted from a soil bacillus. J. Exp. Med. 70 : 1-249.

- Dubos, R.J., and Caltaneo, C. 1939. Studies on a bactericidal agent extracted from a soil bacillus. J. Exp. Med. 70 : 249.
- Dubos, R.J., and Hotchkiss, R.D. 1941. Production of bactericidal substances by aerobic sporulating bacilli. J. Exp. Med. 73 : 629.
- Duggar, B.M. 1948. Aureomycin, a product of the continuing search for new antibiotics. Ann. N. Y. Acad. Sci. 51 : 177.
- Ehrlich, J., Bartz, Q.R., Smith, R.M., Joslyn, D.H., and Burkholder, P.R., 1947. Chloromycetin, a new antibiotic from a soil actinomycete. Science 106 : 417.
- Emmerich, R., and Low, O. 1899. Bakeriolytische Enzyme als ursache der erworbenen Immunitat und die Herlung von Infektionskrankheitendurch dieselben. Z. Hvg. Infekt. 31 : 1.
- Ensign, J.C. 1978. Formation, properties, and germination of actinomycete spores. Annu. Rev. Microbiol. 32 : 185-219.
- Finlay, A.C., Hobby, G.L., Pan, S. Y., Regana, P.P. *et al* 1950 Terramycin a new antibiotic. Science. 111, 85.
- Fleming, A. 1929 On the antibacterial action of cultures of penicillin with special reference to their use in the isolation of B. influenzae. Brit. J.Exp. Path 10 : 226.
- Florey, H. W. *et al.* 1949. Antibiotics (Vol. I). England: Oxford University Press, 15.
- Flowers, T.H., and Williams, S.T. 1977a. Measurements of growth rates of Streptomycetes: Comparison of turbidimetric and gravimetric techniques. J. Gen. Microbiol. 98 : 285-289.

- Flowers, T.H., and Williams, S.T. 1977b. The influence of pH on the growth rate and viability of neutrophilic and acidophilic streptomycetes. Microbios. 18 : 223-228.
- Freednan, B.A. 1985. Textbook of microbiology. 22<sup>th</sup> ed. Japan: W.B. Saunders Company, 46-47.
- Garrett, S.D. 1981. Soil fungi and soil fertility. 2<sup>nd</sup> ed. England: Pergamon press, 41-42.
- Gebhardt, L. P., and Anderson, D. A. 1959. Microbiology (2nd ed). St. Louis : The C. V. Mosby Company, 28-40.
- Glasby, S.J. 1993. Encyclopedia of Antibiotics (3rd ed). England: John Wiley & Sons, 1-507.
- Goldberg, H.S. 1959. Antibiotics: Their Chemistry and non-medical uses. U.S.A.: Lancaster Press, 1-11.
- Goodfellow, M., and Simpson, K.E. 1987. Ecology of streptomycetes. Front. Appl. Microbiol. 2 : 97-125.
- Goodfellow, M., and Williams, S.T. 1983. Ecology of actinomycetes. Annu. Rev. Microbiol. 37 : 189-216.
- Goodfellow, M., Williams, S.T., and Mordarski, M. 1988. Actinomycetes in biotechnology. U.S.A.: Academic press Inc, 1-88.
- Gratia, A. 1926. Proprietes bacteriolytiques des streptothrix. Compte. Rendu Biol. Paris 94 : 1967.

- Gratia, A., and Dath S. 1924. Proprietes bacteriolytiques de certaines moisissures. Compte. Rendu Biol. Paris. 91 : 1442.
- Gray, T. R. G., and Parkinson, D. 1968. The ecology of soil bacteria (1st ed). An international symposium. England: Liverpool university press, 102-321.
- Hatanaka, H., Iwami, M., Kino, T., Goto, T., and Okuhara, M. 1989. FR-900520 and FR-900523, novel immunosuppressants isolated from a *Streptomyces* I. Taxonomy of the producing strain. J. Antibiotic. 41 : 1586-1591.
- Hays, P., Middlesex, H., and Gauld, G.W. 1969. Isolation methods for microbiologists. London: Academic Press, 183-191.
- Holt, J. G. 1989. Bergev' s Manual of Systemic Bacteriology (vol. IV). Bultimore: The Williams and Wilkins, 2333-2505.
- Hunter, J.C., Eveligh, D.E., and Casella, G. 1981. Actinomycetes of salt marsh. Zentralbl. Bakteriol. Mikrrobiol. Hyg. 1 Abt. Suppl. 11 : 195-200.
- Huntijens, J.L.M. 1972. Amino acid composition of humic acid-like polymers produced by streptomycetes and of humic acid from pasture and arable land. Soil Biol. Biochem. 4 : 348-379.
- Ikekawa, T., Twami, F., Akita, E., and Umazawa, H. 1963. Application of thin layer chromatography for separation and identification of antibiotic, J. Antibiotic 16 : 56-57.
- Imamura, N., Nishijima, M., Adachi, K., and Sano, H. 1993. Novel Antimycin antibiotics, urauchimycins A and B, produced by marine actinomycete. J. Antibiotics. 46 : 241-246.

- Jensen, H.L. 1931. The definition and subdivision of the genus actinomycetes, with a preliminary account of Australian soil actinomycetes. Contribution to our knowledge of the *Actinomycetales*. II. Wales: Proc. Linnean Soc. N. S., 345.
- Johnson, B.A., Arker, H., and Meleney, F.L. 1945. Bacitracin, a new antibiotic produced by a member of the *B. subtilis* group. Science. 102 : 376.
- Jones, K.L. 1949. Fresh isolates of actinomycetes in which the presence of sporogenous aerial mycelia is a fluctuating characteristic. J. Bacteriol. 57 : 141-145.
- Kenneth, L.B. 1958. Textbook of Microbiology. 4nd ed. New York: Macmillan Company, 473-477.
- Khan, M.R., and Williams, S.T. 1975. Studies on the ecology of actinomycetes in soil. VIII. Distribution and characteristics of acidophilic actinomycetes. Soil Biol. Biochem. 7 : 345-348.
- King, H.D., Juergen, J., and Sanglier, J.J. 1986. Clavamycins, new clavam antibiotics from two variants of *Streptomyces hygroscopicus* I. Taxonomy of the producing organisms, fermentation, and biologicval activities. J. Antibiotic 49 : 510-515.
- Komagata, K., and Suzuki, K. 1987. Method in Microbiology. vol. 9. New York: Academic Press, 161-207.
- Kutzner, H.J. 1968. Uber die Budung von Huminstoffen durch Streptomyceten Landwirtsch. Forsch. 21 : 48-61.
- Kutzner, H.J. 1981. A Handbook on Habitats, Isolation and identification of Bacteria. (vol II). Berlin: Springer-Verlag, 2028-2090.

- Lacey, J. 1981. Airborne actinomycete spores as respiratory allergens. Zentralbl. Bakteriol. Mikrobiol. Hvg. I. Abt. Suppl. 11 : 243-250.
- Lechevalier, H.A., and Lechevalier, M.P. 1967. Biology of actinomycetes. Annual Review of Microbiology. 21 : 71-100.
- Lee, J. 1994. International Workshop on Application and Control of Microorganisms in Asia. Research and Development of Antibiotics in Korea. 279-329.
- Levy, J., Campbell, J.J.R., and Blackburn, T.H. 1973. Introductory microbiology. U. S. A.: John Wiley & Sons, 347-353.
- Lewis, J.A., and Starkey, R.L. 1969. Decomposition of plant tannins by some soil micro-organisms. Soil Sci. 107 : 235-241.
- Lloyd, A.B. 1969. Dispersal of streptomycetes in air. J.Gen. Microbiol. 57 : 35-40.
- Louis, p., and Gebhard, T. 1971. Method in Microbiology (vol. 4). New York: Academic Press, 295-331.
- Lyons, A.J., and Pridham, T.G. 1965. Colorimetric determination of color of aerial mycelium of *Streotomyces*. J. Bacteriol. 89 : 159-169.
- Mara, D.D., and Oragui, J.I. 1981. Occurrence of *Rhodococcus coprophilus* and associated actinomycetes in faeces, sewage and freshwater. Appl. Environ. Microbiol. 42 : 1037-1042.
- Mcguire, J. M. *et al.* 1952. Ilotycin, a new antibiotic. Antibiotics and Chemotherapy. 2 : 281.
- Miyadoh, S. (editor in chief). 1997. Atlas of Actinomycetes. Japan: The society for Actinomycetes, 180-187.

- Murray, R.P. (Editor in chief). 1995. Manual of Clinical Microbiology. 6nd ed. Washington, D.C.: ASM Press, 238-239.
- Nicolle, M. 1907. Action du Bacillus subtilis sur diverses bacteries. Ann. Inst. Pasteur 21 : 613.
- Nisbet, L.J. 1982. Current strategies in the search for bioactive microbial metabolites. Journal of Chemical Technology and Biotechnology. 32 : 251-270.
- Nitsch, B., and Kutzner, H.J. 1969. Egg-yolk agar as a diagnostic medium gor streptomycetes. Experientia. 25 : 220-221.
- Ou, L.T., Davidson, J.M., and Rothwell, D.F. 1978. Responses of soil microflora to high 2,4-D applications. Soil Biol. Biochem. 10 : 443-445.
- Ozasa, T., *et al.* 1989. Novel Antitumor antibiotic phospholine 2. Structure determination. J. Antibiotics. 42 : 1339-1342.
- Pasteur, L., and Joubert, S.F. 1877. Chimie Physiologique Carbon et Septocemic. C.R. Soc. De Biol. 85 : 101.
- Perich, J.A., Lockwood. J.L. 1978. Interaction of atrazine with soil microorganisms: Population changes and accumulation. Can. J. Microbiol. 24 : 1145-1152.
- Prauser, H., Muller, H.J., and Eisenbrandt, K. 1969. Der Hexamycinbildner, strain 4/22 : *Streptomyces hygroscopicus*. Z. Allg. Mikrobiol. 9 : 657.
- Pridham, T.g. 1965. Color and Streptomycetes. Report of an international workshop on determination of color of streptomycetes. Appl. Microbiol. 13 : 43-61.



- Pridham, T.G., Hesseltine, C.W., and Benedict, R.G. 1958. A guide for the classification of streptomycetes according to select groups. Placement of strains in morphological sections. Appl. Microbiol. 6 : 52-79.
- Pringsheim, E.G. 1920. Zur Verbilligung und Vercharfung der Indolreaktion. Zbl. Bakt., 2. Abt. 51 : 72.
- Rudaya, S.M., and Solov'eva, N.K. 1970. Slimy structure in some Actinomycetes of the *Actinomyces hygrosopicus* type. Microbiologia. 39 : 87.
- Ruddick, S.M., and Williams, S.T. 1972. Studies on the ecology of actinomycetes in soil V. Some factors influencing the dispersal and adsorption of spores. Soil Biol. Biochem. 4 : 93-103.
- Sancelme, M., Fabre, S., and Prudhomme, M. 1994. Antimicrobial activities of Indolocarbazole and bis-indole protein kinase C inhibitors. J. Antibiotics 47 : 792-798.
- Schatz, A., and Hazen, E.L. 1948. Distribution of soil Microorganisms antagonistic to fungi pathogenic to man. Mycologia 40 : 461.
- Schatz, A., Bugie, E., and Waksman, S.A. 1944. Streptomycin, a substance exhibiting antibiotic activity against gram negative and gram positive bacteria. Proc. Soc. Exptl. Biol. Med. 55 : 66.
- Shapell, F.H. 1980. Industrial uses of biocides in processes and products. Dev. Indust. Microbiol. 21 : 133-140.
- Sharples, G.P., and Williams, S.T. 1976. Development and fine structure of sclerotia and spores of the actinomycete *Chainia olivacea*. Microbiol. 84 : 219-222.

- Shirling, E.B., and Gottlieb, D. 1966. Methods for characterization of *Streptomyces* species. International Journal of Systematic Bacteriology 16 (July) : 313-340.
- Shirling, E.B., and Gottlieb, D. 1968. Cooperative description of type cultures of *Streptomyces*. II. Species description from the first study. Int. J. Syst. Bacteriol. 18 : 69-189.
- Shirling, E.B., and Gottlieb, D. 1972. Cooperative description of type strains of *Streptomyces*. V. additional descriptions. Int. J. Syst. Bacteriol. 22 : 265.
- Smith, A.L. 1977. Principles of Microbiology 8<sup>th</sup> ed. Saint Louis: The C. V. Mosby Company, 432-434.
- Stressel, G. J. et al. 1953. Screening tests designed to discover antibiotics suitable for plant disease control. Mycologia 45 : 325.
- Szegi, J., and Gulyas, F. 1968. Data on the humus-decomposing activity of some streptomycetes and microscopic fungi. Agrokem. Talajtan. 17 : 109-119.
- Takesako, K., and Beppu, T. 1984. Studies on new antifungal antibiotics, Guanidylfungins A and B I. Taxonomy, fermentation, isolation and characterization. J. Antibiotic. 37 : 1161-1169.
- Tanner, F.W., Jr., et al. 1952. Some properties of magnamycin, a new antibiotic. Antibiotics & Chemotherapy. 2 : 441.
- Thoma, R.w. 1977. Industrial microbiology Benchmark Papers in Microbiology. vol. 12. U. S. A.: Powden Hutchison & Ross, 136-226.
- Tresner, H. D., and Backus, E.J. 1963. System of color wheels for streptomycete taxonomy. Appl. Microbiol. 11 : 335-338.

- Tresner, H.D., and Backus, E.J. 1956. A broadened concept of the characteristics of *Streptomyces hygrosopicus*. Appl. Microbiol. 4 : 243.
- Tresner, H.D., Davbies, M.C., and Backus, E.J. 1961. Electron microscopy of *Streptomyces* spore morphology and its role in species differentiation. J. Bacteriol. 81 : 70-80.
- Tresner, H.D., Backus, E.J., and Hayes, J. A. 1967. Morphological spore types in the *Streptomyces hygrosopicus*-like complex. Appl. Microbiol. 15 : 637.
- Tsunakawa, M. *et al.* 1985. Insamycin, A complex of new aminoglycoside antibiotics I. Production, isolation and properties. J. Antibiotic. 38 : 1302-1312.
- Urakawa, A., Otani, T., and Yoshida, K. 1993. Isolation, structure determination and biological activities of a novel antifungal antibiotic, s-632-c, closely related to glutarimide antibiotics. J. Antibiotics. 46 : 1827-1833.
- Wagman, G.H., and Bailey, J.V. 1969. Use of Silicic Acid Glass Fiber Sheets for Bioautography of Antimicrobial Substances. J. Chromatog. 41:263-264.
- Waksman, S.A. 1953. Letter to the Editor. American Scientist. 41 : 8-12.
- Waksman, S.A., and Lechevalier, H.A. 1949. Neomycin, a new antibiotic active against streptomycin resistant bacteria, including tuberculosis organism. Science 109 : 395.
- Waksman, S.A., and Woodruff, H.B. 1940. Bacteriostatic and bactericidal substances produced by a soil actinomyces. J. Bact. 401 : 609.
- Waksman, S.A., and Woodruff, H.B. 1942. Selective antibiotics action of various substances of microbial origin. J. Bact. 44 : 373-384.

- Waksman, S.A., Geigen, W.B., and Reynolds, D.M. 1946. Proc. Nat. Acad. Sci. 32 : 117.
- Weiland, P. 1936. Bakterizide Wirkung von Mesentericus filtraten auf Diphtheriebazillen. Zbl. Bakt. Abtz. Orig. 136 : 451.
- Williams, S.T., *et al.* 1984. Numerical classification and identification of streptomycetes. Orlando : Academic Press, 537-551.
- Williams, S.T., Goodfellow, M., Alderson, G., Wellington, E.M.H., Sneath, P.H.A., and Sackin, M.J. 1983. Numerical classification of *Streptomyces* and related genera. J. Gen. Microbiol. 129 : 1743-1813.
- Williams, S.T., Goodfellow, M., Wellington, E.M.H., Vickers, J.C., Alderson, G., Sneath, P.H.A., Sackin, M.J., Mortimer, A.M. 1983. A probability matrix for identification of streptomycetes. J. Gen. Microbiol. 129 : 1815-1830.
- Williams, S.T., Shameemullah, M., Watson, E.T., and Mayfield, C.I. 1972. Studies on the ecology of actinomycetes in soil VI. The influence of moisture tension on growth and survival. Soil Biol. Biochem. 4 : 215-225.
- Williams, S.T., Sharples, G.P., and Bradshaw, R.M. 1973. The fine structure of the Actinomycetales. London: Academic Press, 113-130.
- Williams, S.T., and Mayfield, C.I. 1971. Studies on the ecology of actinomycetes in soil. III. The behaviour of neutrophilic streptomycetes in acid soil. Soil Biol. Biochem. 3 : 197-208.
- Wong, P.T.W., and Griffin, D.M. 1974. Effect of osmotic potential on streptomycete growth antibiotic production and antagonism to fungi. Soil Biol. Biochem. 6 : 319-325.

## APPENDIX

### 1. Bouillon gelatin

Peptone	10.0	g
Meat extract	5.0	g
NaCl	5.0	g
Gelatin	15.0	g
Distilled Water	1000	ml
pH 7.0-7.2		

### 2. GBP

Glucose	15	g
Peptone	0.6	g
Beef extract	0.3	g
Yeast extract	0.3	g
NaCl	0.5	g
MgSO <sub>4</sub> ·7H <sub>2</sub> O	0.25	g
Distilled Water	1000	ml
pH 7.0		

### 3. Glucose asparagine agar (Waksman-2)

Glucose	10.0	g
Asparagine	0.5	g
K <sub>2</sub> HPO <sub>4</sub>	0.5	g
Agar	15.0	g
Distilled Water	1000	ml
pH 6.8		

**4. Litmus milk**

Bacto-skim milk, dehydrated (Difco)	100.0	g
Litmus or brom-cresol may be added		
Distilled Water	1000	ml

**5. Medium 2 Yeast extract malt extract agar**

Bacto-Yeast Extract (Difco)	4.0	g
Bacto-Malt Extract (Difco)	10.0	g
Bacto-Dextrose (Difco)	4.0	g
Bacto-agar	20.0	g
Distilled Water	1000	ml
100 ° C 15-20 minutes		

**Medium 3 Oatmeal agar**

Oatmeal	20.0	g
Agar	18.0	g
Distilled Water	1000	ml
Trace salts solution	1.0	ml
pH 7.2		
100 ° C 15-20 minutes		

**Medium 4 Inorganic salt-starch agar****Solution I :**

Difco soluble starch 10.0 g make a paste of the starch with a small amount of cold distilled water and bring to a volume of 500 ml.

**Solution II :**

K <sub>2</sub> HPO <sub>4</sub> (anhydrous)	1.0	g
MgSO <sub>4</sub> .7H <sub>2</sub> O	1.0	g
NaCl	0.5	g
(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	2.0	g
CaCO <sub>3</sub>	0.2	g
Distilled Water	500	ml
Trace salts solution	1.0	ml
Agar (Difco)	20.0	g
mixed with solution I		
pH 7.0-7.4		
100 ° C 15-20 minutes		

**Medium 7 Tyrosine agar**

Glycerol	15.0	g
L-tyrosine (Difco)	0.5	g
L-asparagine (Difco)	1.0	g
K <sub>2</sub> HPO <sub>4</sub> (anhydrous)	0.5	g
MgSO <sub>4</sub> .7H <sub>2</sub> O	0.5	g
NaCl	0.5	g
FeSO <sub>4</sub> .7 H <sub>2</sub> O	0.01	g
Distilled Water	1000	ml
Trace salts solution	1.0	ml
Bacto-agar	20.0	g
100 ° C 15-20 minutes		

**Medium 9 Carbon utilization medium****a) Sterile carbon source****b) Pridham and Gottlieb trace salts**

CuSO <sub>4</sub> .5H <sub>2</sub> O	0.64	g
FeSO <sub>4</sub> .7 H <sub>2</sub> O	0.11	g
MnCl <sub>2</sub> .4 H <sub>2</sub> O	0.79	g
ZnSO <sub>4</sub> .7H <sub>2</sub> O	0.15	g
Distilled Water	100	ml

**c) Basal mineral salts agar**

(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	2.64	g
K <sub>2</sub> HPO <sub>4</sub> (anhydrous)	2.38	g
K <sub>2</sub> HPO <sub>4</sub> .3 H <sub>2</sub> O	5.65	g
MgSO <sub>4</sub> .7H <sub>2</sub> O	1.0	g
Pridham and Gottlieb trace salts (b)	1.0	ml
Distilled Water	1000	ml
Agar (Difco)	15.0	g
pH 6.8-7.0		

**d) Complete medium**

Basal medium c).	
Carbon source a).	1%



**6. Medium No.1. GMS**

Glucose	20.0	g
Meat extract	10.0	g
Soybean flour	25.0	g
Soluble starch	10.0	g
Dried yeast	4.0	g
NaCl	2.0	g
Distilled Water	1000	ml

**Medium No.2. MCC**

Malt extract	20.0	g
NaCl	5.0	g
CaCO <sub>3</sub>	2.0	g
Corn steep liquor	20.0	g
K <sub>2</sub> HPO <sub>4</sub>	0.2	g
Distilled Water	1000	ml

**Medium No.3. SPS**

Soluble starch	20.0	g
Glycerol	40.0	g
Yeast extract	3.0	g
NaCl	0.5	g
Polypeptone	5.0	g
Meat extract	5.0	g
MgSO <sub>4</sub>	0.5	g
Distilled Water	1000	ml

**Medium No.4. SM**

Soybean meal	20.0	g
Manitol	20.0	g
Distilled Water	1000	ml

**Medium No.5. GMY**

Glucose	10	g
Yeast extract	5.0	g
Malt extract	5.0	g
CaCO <sub>3</sub>	2.0	g
Distilled Water	1000	ml

**Medium No.6. GSS**

Glucose	20.0	g
Meat extract	1.0	g
Soybean flour	25.0	g
Soluble starch	10.0	g
Dried yeast	4.0	g
NaCl	2.0	g

**7. Nutrient agar (Difco)**

Difco peptone	5.0	g
Difco beef extract	3.0	g
Agar	15.0	g
Distilled Water	1000	ml
pH 7.4		

**8. PCA (Potato Carrot Agar)**

Potato	30	g
Carrot	25	g
Tap water	1000	ml
pH 7.0		

**9. Peptone KNO<sub>3</sub> broth**

Peptone	10	g
KNO <sub>3</sub>	1.0	g
NaCl	5.0	g
Distilled Water	1000	ml
pH 7.0		

**10. PY**

Glucose	20.0	g
Soluble starch	10.0	g
Yeast extract	3.0	g
Peptone	5.0	g
Beef extract	5.0	g
CaCO <sub>3</sub>	3.0	g
NaCl	5.0	g
Distilled Water	1000	ml
pH 7.0		

**11. SCA (Sodium Casienate Agar)**

Sodium Casienate	2.0	g
Glucose	1.0	g
K <sub>2</sub> HPO <sub>4</sub> (anhydrous)	0.2	g

MgSO <sub>4</sub> .7H <sub>2</sub> O	0.2	g
FeSO <sub>4</sub> .7 H <sub>2</sub> O	trace	
Distilled Water	1000	ml
Agar	15.0	g
PH 7.0		

### 12. Sabouraud dextrose agar SDA

Pancreatic digest of casein	5.0	g
Peptic digest of animal tissue	5.0	g
Dextrose	40.0	g
Agar	15.0	g
Distilled Water	1000	ml

### 13. SS

Sucrose	15.0	g
Soybean meal	15.0	g
Corn steep liquor	5.0	g
MgSO <sub>4</sub> .7H <sub>2</sub> O	0.5	g
FeSO <sub>4</sub> .7 H <sub>2</sub> O	0.5	g
CoCl <sub>2</sub> .6H <sub>2</sub> O	0.01	g
CaCO <sub>3</sub>	2.0	g
Glycerol	5.0	g

### 14. Sucrose nitrate agar

Sucrose	30.0	g
NaNO <sub>3</sub>	2.0	g
KCl	0.5	g

K <sub>2</sub> HPO <sub>4</sub>	1.0	g
MgSO <sub>4</sub> .7H <sub>2</sub> O	0.5	g
FeSO <sub>4</sub> .7H <sub>2</sub> O	0.01	g
Agar	15.0	g
Distilled Water	1000	ml
pH 7.0-7.2		

**15. Trypticase soy agar (TSA)**

Pancreatic digest of casien	15.0	g
Papaic digest of casien	5.0	g
Sodium chloride	5.0	g
Agar	15.0	g

**16. Yeast starch agar**

Yeast extract	1.0	g
Soluble starch	5.0	g
Agar	15.0	g
Tap water	1000	ml

## VITA

Miss Sirinin Chatuchinda was born on September 2, 1970 in Lampang, Thailand. She received her Bachelor degree of Science in Medical Technology in 1993 from the faculty of Medical Technology, Mahidol University, Bangkok, Thailand.

