

REFERENCES

1. Kanig, J.L., and Rudnic, E.M. 1984. The mechanisms of disintegrant action. Pharm. Technol. 8:50-63.
2. Sakr, A.M., Kassem, A.A., and Farrag, N.A. 1973. The effect of certain disintegrants on water soluble tablets. Manuf. Chem. Aerosol News. 44:37-41.
3. Morrison, A.B., and Campbell, J.A. 1965. Tablet disintegration and physiological availability of drugs. J. Pharm. Sci. 54:1-8.
4. Taraszka, M.J., and Delor, R.A. 1969. Effect of dissolution rate of sulfamethazine from tablets on absorption and excretion of sulfamethazine. J. Pharm. Sci. 58:207-210.
5. Colombo, P., Caramella, C., Conte, U., and Manna, A.L. 1981. Disintegrating force and tablet properties. Drug Dev. Ind. Pharm. 7:135-153.
6. Gross, H.M., and Becker, C.H. 1952. A comparative study of tablet disintegrating agent. J. Amer. Pharm. Assoc., Sci. Ed. 41:157.

7. Firouzabadian, A., and Huyck, C.L. 1954. Some recently developed chemicals as disintegrating agents for compressed tablets. J. Amer. Pharm. Assoc., Sci. Ed. 43:248.
8. Granberg, C.B., and Benton, B.E. 1949. The used of dried bentonite as a disintegrating agent in compressed tablets of thyroid. J. Amer. Pharm. Assoc., Sci. Ed. 36:648.
9. Fakouhi, T.A., Billups, N.F., and Sager, R.W. 1963. Wood products, corncob and cellulose as tablet disintegrating agents. J. Pharm. Sci. 52:700-705.
10. Bequette, R.J., and Huyck, C.L. 1957. Tablet disintegration with cellulose. Drug Cosmet. Ind. 81:166.
11. Crisafi, R.C., and Becker, C.H. 1958. A study of natural sponge as a disintegrating agent in compressed tablets. J. Amer. Pharm. Assoc., Sci. Ed. 47:363.
12. Van Abbe, N.J., and Rees, J.T. 1958. Amberlite resin XE-88 as a tablet disintegrant. J. Amer. Pharm. Assoc., Sci. Ed. 47:487.

13. Fenyvest, E., Antal, B., Zsardon, B., and Szejtli, J. 1984. Cyclodextrin polymers, a new tablet disintegrating agent. Pharmazie 39:473-475.
14. Cham, T-M., and Lin, C-W. 1988. Evaluation of defatted soybean flakes as a tablet excipient part I. As a disintegrant. Drug Dev. Ind. Pharm. 14: 2201-2223.
15. Ponchel, G., and Duchene, D. 1990. Evaluation of formalin-casein as a tablet disintegrant. Drug Dev. Ind. Pharm. 16:613-628.
16. Ringard, J., and Guyot-Hermann, A.M. 1988. Calculation of disintegrant critical concentration in order to optimize tablets disintegration. Drug Dev. Ind. Pharm. 14:2321-2339.
17. Bolhuis, G.K., Van Kamp, H.V., Lerk, C.F., and Sessink, F.G.M. 1982. On the mechanism of action of modern disintegrants. Acta Pharm. Technol. 28:111-114.
18. Bough, W.A. 1977. Shellfish components in future food ingredients. Food Product Dev. 11:90-92.
19. Karlsten, J. 1991. Excipient properties of chitosan. Manuf. Chem. 62:18-19.

20. Khan, K.A., and Rhodes, C.T. 1973. Efficiency of disintegrants in tablet formulations. Manuf. Chem. Aerosol News 44:48-54.
21. Caramella, C. 1988. A physical analysis of the phenomenon of tablet disintegration. Int. J. Pharm. 44:177-186.
22. _____. 1991. Novel methods for disintegrant characterization, part I. Pharm. Technol. 15:49-54.
23. Lieberman, H.A., Lachman, L., and Schwartz, J.B., eds. 1989. Pharmaceutical dosage forms : Tablet volume I. 3 Vols. 2nd ed. New York : Marcel Dekker.
24. Bergman, L.A., and Bandelin, F.J. 1965. Effects of concentration, aging and temperature on tablet disintegrants in a soluble direct compression system. J. Pharm. Sci. 54:445-448.
25. Khan, K.A., and Rhodes, C.T. 1975. Water-sorption properties of tablet disintegrants. J. Pharm. Sci. 64:447-451.
26. _____. 1976. Effect of disintegrant type upon the relationship between compressional pressure and dissolution efficiency. J. Pharm. Pharmac. 28:633-636.

27. Shotton, E., and Leonard, G.S. 1976. Effect of intragranular and extragranular disintegrating agents on particle size of disintegrated tablets. J. Pharm. Sci. 65:1170-1174.
28. Gissinger, D., and Stamm, A. 1980. A comparative evaluation of the properties of some tablet disintegrants. Drug Dev. Ind. Pharm. 6:511-536.
29. The American Pharmaceutical Association and The Pharmaceutical Society of Great Britain. 1986. Handbook of pharmaceutical excipients. USA.
30. Shangraw, R., Mitrevej, A., and Shah, M. 1980. A new era of tablet disintegrants. Pharm. Technol. 4:49-57.
31. Schwartz, J.B., and Zelinskie, J.A. 1978. The binding and disintegrant properties of the corn starch fractions : amylose and amylopectin. Drug Dev. Ind. Pharm. 4:463-483.
32. Manudhane, K.S., Contractor, A.M., Kim, H.Y., and Shangraw, R.F. 1969. Tableting properties of directly compressible starch. J. Pharm. Sci. 58:616-620.
33. Ingram, J.T., and Lowenthal, W. 1966. Mechanism of action of starch as a tablet disintegrant I. J. Pharm. Sci. 55:614-617.

34. Visavarungroj, N., and Remon, J.P. 1990. Crosslinked starch as a disintegrating agent. Int. J. Pharm. 62:125-131.
35. Patel, N.R., and Hopponen, R.E. 1966. Mechanism of action of starch as a disintegrating agent in aspirin tablets. J. Pharm. Sci. 55:1065-1068.
36. Modrzejewski, F., and Wochna, L. 1965. Investigation of the swelling power of tablet disintegrants. Acta Pol. Pharm. 22:396-402.
37. Hess, H. 1978. Tablet under the microscopic. Pharm. Technol. 2:36-57.
38. Mendell, E. 1974. An evaluation of carboxymethyl starch as a tablet disintegrant. Pharm. Acta Helv. 49:248-250.
39. Nyqvist, H., and Nicklasson, M. 1983. The effect of water sorption on physical properties of tablets containing microcrystalline cellulose. Int. J. Pharm. Tech. & Prod. Mfr. 4:67-73.
40. Fox, C.D., Richman, M.D., Reier, G.E., and Shangraw, R. 1963. Microcrystalline cellulose in tableting. Drug Cosmet. Ind. 92:161-164, 258-261.

41. Pesonen, T., Paronen, P., and Ketolainen, J. 1989. Disintegrant properties of an agglomerated cellulose powder. Int. J. Pharm. 57:139-147.
42. Gould, P.L., and Tan, S.B. 1985. The effect of recompression on the swelling kinetics of wet massed tablets, containing super-disintegrants. Drug Dev. Ind. Pharm. 11:1819-1836.
43. Gorman, E.A., Rhodes, C.T., and Rudnic, E.M. 1982. An evaluation of croscarmellose as a tablet disintegrant in direct compression systems. Drug Dev. Ind. Pharm. 8:397-410.
44. Ashford, N.A., Hattis, D., and Murray, A.E. 1979. Industrial prospects for chitin and protein from shellfish wastes. The first marine industries business strategy program marine industry advisory service. pp.3-12.
45. Budavari, S., ed. 1989. Merck index. 11th ed. N.J. : Merck.
46. Muzzarelli, R.A.A. 1973. Natural chelating polymers : alginic acid, chitin and chitosan. 1st ed. New York : Pergamon Press.
47. _____, 1977. Chitin. New York : Pergamon Press.

48. Ramachandran, G.N., ed. 1967. Conformation of biopolymers vol. 1. London : Academic Press.
49. Rha, C.K. 1982. Chitosan as a biomaterial. Biotechnology and genetic engineering in the marine sciences, Annual MIT Sea Grant lecture and seminar series, Mar. 18-20, pp. 1-21.
50. Skaugrud, O. 1989. Chitosan makes the grade. Manuf. Chem. 60:31-35.
51. _____. 1991. Chitosan-new biopolymer for cosmetics and drugs. Drug Cosmet. Ind. 148:24-30.
52. Aspinall, G.O., ed. 1985. The polysaccharides vol. 3. London : Academic Press.
53. Sawayanagi, Y., Nambu, N., and Nagai, T. 1982. Directly compressed tablets containing chitin or chitosan in addition to lactose or potato starch. Chem. Pharm. Bull. 30:2935-2940.
54. _____. 1982. Directly compressed tablets containing chitin or chitosan in addition to mannitol. Chem. Pharm. Bull. 30:4216-4218.
55. _____. 1983. Enhancement of dissolution properties of prednisolone from ground mixtures with chitin or chitosan. Chem. Pharm. Bull. 31:2507-2509.

56. Shirashi, S., Arahira, M., Imai, T., and Otagiri, M. 1990. Enhancement of dissolution rates of several drug by low-molecular chitosan and alginate. Chem. Pharm. Bull. 38:185-187.
57. Sawayanagi, Y., Nambu, N., and Nagai, T. 1982. Use of chitosan for sustained release preparations of water-soluble drugs. Chem. Pharm. Bull. 30:4213-4215.
58. Kawashima, Y., Lin, S.Y., Kasai, A., Handa, T., and Takenaka, H. 1985. Preparations of a prolonged release tablet of aspirin with chitosan. Chem. Pharm. Bull. 33:2107-2113.
59. Nigalaye, A.G., Adusumilli, P., and Bolton, S. 1990. Investigation of prolonged drug release from matrix formulations of chitosan. Drug Dev. Ind. Pharm. 16:449-467.
60. Kanke, M., Katayama, H., Tsuzuki, S., and Kuramoto, H. 1989. Application of chitin and chitosan to pharmaceutical preparations I : Film preparation and in vitro evaluation. Chem. Pharm. Bull. 37:523-525.
61. Miyazaki, S., Yamaguchi, H., Hou, W-M., Takeichi, Y., and Yasubuchi, H. 1990. Pharmaceutical application of biomedical polymers XXIX : Preliminary study on film dosage form prepared from chitosan for oral drug delivery. Acta Pharm. Nord. 2:401-406.

62. _____, Ishii, K., and Nagai, T. 1981. The use of chitin and chitosan as drug carriers. Chem. Pharm. Bull. 29:3067-3069.
63. Hirano, S., Kondo, S., and Ohe, Y. 1975. Chitosan gel: a novel polysaccharide gel. Polymer 16: 622-623.
64. _____. 1975. Chitosan gels : a novel molecular aggregation of chitosan in acidic solutions on a facile acylation. Agr. Biol. Chem. 39:1337-1338.
65. Bodmeier, R., Oh, K., and Pramar, Y. 1989. Preparation and evaluation of drug containing chitosan beads. Drug Dev. Ind. Pharm. 15:1475-1494.
66. Hou, W-M., Miyazaki, S., Takada, M., and Komai, T. 1985. Sustained release of indomethacin from chitosan granules. Chem. Pharm. Bull. 33: 3986-3992.
67. Kawashima, Y., Lin, S.Y., Kasal, A., Handa, T., Takenaka, H., and Ando, Y. 1985. Novel method for the preparation of controlled release theophylline granules coated with a polyelectrolyte complex of sodium polyphosphate-chitosan. J. Pharm. Sci. 74:26-268.

68. Machida, Y., and Nagai, T. 1989. Chitin/chitosan as pharmaceutical excipients. Int. Pharm. J. 3:511.
69. Rudnic, E.M., and Rhodes, C.T. 1982. Evaluations of the mechanism of disintegrant action. Drug Dev. Ind. Pharm. 8:87-109.
70. Caramella, C., Colombo, P., Bettinetti, G., Giordano, F., Conte, U., and Mamna, A.L. 1984. Swelling properties of disintegrants. Acta Pharm. Technol. 30:132-139.
71. Kornblum, S.S., and Stoopak, S.B. 1973. A new tablet disintegrating agent: cross-linked polyvinylpyrrolidone. J. Pharm. Sci. 62:43-49.
72. Van-Kamp, H.V., Bolhuis, G.K., de Boer, A.H., and Lei-A-Huen, L. 1986. The role of water uptake on tablet disintegration. Pharm. Acta. Helv. 61:22-29.
73. Wan, L.S.C., and Prasad, K.P.P. 1990. A study of the swelling of tablet excipients using video recording. Drug Dev. Ind. Pharm. 16:921-933.
74. Caramella, C., Ferrari, F., Bonferoni, M.C., and Ronchi, M. 1990. Disintegrants in solid dosage form. Drug Dev. Ind. Pharm. 16:2561-2577.

75. List, P.H., and Muazzam, U.A. 1979. Swelling - the force that disintegrates. Drug Made Ger. 22:161-170.
76. Lowenthal, W. 1972. Disintegration of tablets. J. Pharm. Sci. 61:1695-1711.
77. _____. 1973. Mechanism of action of tablet disintegrants. Pharm. Acta Helv. 48:589-609.
78. List, P.H., and Muazzam, U.A. 1979. Swelling - a driving force in tablet disintegration. Pharm. Ind. 41:459-464.
79. Ringard, J., and Guyot - Hermann, A.M. 1981. Disintegration mechanisms of tablets containing starches : hypothesis about the particle-particle repulsive force. Drug Dev. Ind. Pharm. 7:155-177.
80. Lowenthal, W., and Burruss, R.A. 1971. Mechanism of action of starch as a tablet disintegrant IV : Effect of medicaments and disintegrants on mean pore diameter and porosity. J. Pharm. Sci. 60:1325-1332.
81. Nogami, H., Nagai, T., Fukuoka, E., and Sonobe, T. 1969. Disintegration of the aspirin tablets containing potato starch and microcrystalline cellulose in various concentrations. Chem. Pharm. Bull. 17:1450-1455.

82. Lowenthal, W. 1972. Mechanism of action of starch as a tablet disintegrant V : Effect of starch grain deformation. J. Pharm. Sci. 61:455-459.
83. Nogami, H., Nagai, T., and Uchida, H. 1966. Studies on powdered preparation XIV : Wetting of powder bed and disintegration time of tablets. Chem. Pharm. Bull. 14:152-158.
84. Colombo, P., Catellani, P.L., Predella, P., and Bellotti, A. 1989. Tablet water uptake and disintegration forces measurements. Int. J. Pharm. 51:63-66.
85. _____. 1987. Tablet disintegration update : The dynamic approach. Drug Dev. Ind. Pharm. 13:2111-2145.
86. _____. 1984. The role of swelling in the disintegration process. Int. J. Pharm. Tech. & Prod. Mfr. 5:1-5.
87. The United States Pharmacopeia 20th rev., The National Formulary 15th ed.. 1980. USA : United States Pharmacopeial Convention.
88. Lachman, L., Lieberman, H.A., and Kaning, J.L., eds. 1986. The theory and practice of industrial pharmacy. 3 rd ed. Philadelphia : Lea & Febiger.

89. The United States Pharmacopeia 22th rev., The National Formulary 17th ed.. 1980. USA : United States Pharmacopeial Convention.
90. Whistler, R.L., and Paschall, E.F. 1965. Starch, chemistry and technology vol I. New York : Academic Press.
91. Rudnic, E.M., Kanig, J.L., and Rhodes, C.T. 1983. The effect of molecular structure on the function of sodium starch glycolate in wet granulated systems. Drug Dev. Ind. Pharm. 9:303.
92. Knorr, D. 1982. Functional properties of chitin and chitosan. J. Food. Sci. 47:593-595.
93. _____. 1983. Dye binding properties of chitin and chitosan. J. Food. Sci. 48:36-41.
94. Austin, P.R., Brine, C.J., Castle, J.E., and Zikakis, J.P. 1981. Chitin : New facets of research. Science 212:749-753.
95. Lamberson, R.L., and Raynor, G.E. 1976. Tableting properties of microcrystalline cellulose. Manuf. Chem. Aerosol News 47:55-61.
96. Sixsmith, D. 1976. Microcrystalline cellulose as a tablet excipient. Manuf. Chem. Aerosol News 47:27-28.

97. Sheen, P-C., and Kim, S-I. 1989. Comparative study of disintegrating agents in tiramide hydrochloride tablets. Drug Dev. Ind. Pharm. 15:401-414.
98. Chowhan, Z.T. 1979. Moisture, hardness, disintegration and dissolution interrelationships in compressed tablets prepared by the wet granulation process. Drug Dev. Ind. Pharm. 5:41-62.
99. Gordon, M.C., and Chowhan, Z.T. 1990. The effect of aging on disintegrant efficiency in direct compression tablets with varied solubility and hygroscopicity, in terms of dissolution. Drug Dev. Ind. Pharm. 16:437-447.

VITAE

Miss Parichat Chomto was born on May 7, 1967. She got her Bachelor degree in Pharmacy with 2nd honour in 1989 from Faculty of Pharmaceutical Sciences, Mahidol University.

