REFERENCES

Abbasiliasi, S., Tan, J. S., Bashokouh, F., Ibrahim, T. A. T., Mustafa, S., Vakhshiteh, F., ... & Ariff, A. B. (2017). In vitro assessment of *Pediococcus acidilactici* Kp10 for its potential use in the food industry. *BMC microbiology*, *17*(1), 1-11.

Amaro, M. I., Tajber, L., Corrigan, O. I., & Healy, A. M. (2011). Optimization of spray drying process conditions for sugar nanoporous microparticles (NPMPs) intended for inhalation. *International journal of pharmaceutics*, *421*(1), 99-109.

Anggraini, L., Marlida, Y., Wizna, W., Jamsari, J., & Mirzah, M. (2019). Optimization of nutrient medium for *Pediococcus acidilactici* DS15 to produce GABA. *J. World's Poult. Res*, *9*, 139-146.

Arepally, D., & Goswami, T. K. (2019). Effect of inlet air temperature and gum Arabic concentration on encapsulation of probiotics by spray drying. *Lwt*, *99*, 583-593.

Arslan, S., Erbas, M., Tontul, I., & Topuz, A. (2015). Microencapsulation of probiotic Saccharomyces cerevisiae var. boulardii with different wall materials by spray drying. *LWT-Food Science and Technology*, *63*(1), 685-690.

Arslan-Tontul, S., & Erbas, M. (2017). Single and double layered microencapsulation of probiotics by spray drying and spray chilling. *Lwt-food science and technology*, *81*, 160-169.

Barbosa, J., Borges, S., Amorim, M., Pereira, M. J., Oliveira, A., Pintado, M. E., & Teixeira, P. (2015). Comparison of spray drying, freeze drying and convective hot air drying for the production of a probiotic orange powder. *Journal of Functional Foods*, *17*, 340-351.

Bhagat, D., Raina, N., Kumar, A., Katoch, M., Khajuria, Y., Slathia, P. S., & Sharma, P. (2020). Probiotic properties of a phytase producing *Pediococcus acidilactici* strain SMVDUDB2 isolated from traditional fermented cheese product, Kalarei. *Scientific reports*, *10*(1), 1-11.

Bhagwat, A., Bhushette, P., & Annapure, U. S. (2020). Spray drying studies of probiotic Enterococcus strains encapsulated with whey protein and maltodextrin. *Beni-Suef University Journal of Basic and Applied Sciences*, *9*(1), 1-8.

Buttó, L. F., & Haller, D. (2016). Dysbiosis in intestinal inflammation: cause or consequence. *International Journal of Medical Microbiology*, *306*(5), 302-309.

Carneiro, H. C., Tonon, R. V., Grosso, C. R., & Hubinger, M. D. (2013). Encapsulation efficiency and oxidative stability of flaxseed oil microencapsulated by spray drying using different combinations of wall materials. *Journal of food engineering*, *115*(4), 443-451.

Chandralekha, A., Rani, A., Tavanandi, H. A., Amrutha, N., Hebbar, U., & Raghavarao, K. S. M. S. (2017). Role of carrier material in encapsulation of yeast (Saccharomyces cerevisiae) by spray drying. *Drying Technology*, *35*(8), 1029-1042.

Chassaing, B., Vijay-Kumar, M., & Gewirtz, A. T. (2017). How diet can impact gut microbiota to promote or endanger health. *Current opinion in gastroenterology*, *33*(6), 417.

Corona-Hernandez, R. I., Álvarez-Parrilla, E., Lizardi-Mendoza, J., Islas-Rubio, A. R., de la Rosa, L. A., & Wall-Medrano, A. (2013). Structural stability and viability of microencapsulated probiotic bacteria: a review. *Comprehensive Reviews in Food Science and Food Safety*, *12*(6), 614-628.

Corrêa-Filho, L. C., Lourenço, M. M., Moldão-Martins, M., & Alves, V. D. (2019). Microencapsulation of β-Carotene by spray drying: effect of wall material concentration and drying inlet temperature. *International journal of food science*, *2019*.

Cryan, J. F., O'Riordan, K. J., Sandhu, K., Peterson, V., & Dinan, T. G. (2020). The gut microbiome in neurological disorders. *The Lancet Neurology*, *19*(2), 179-194.

Daoub, R. M., Elmubarak, A. H., Misran, M., Hassan, E. A., & Osman, M. E. (2018). Characterization and functional properties of some natural Acacia gums. *Journal of the Saudi Society of Agricultural Sciences*, *17*(3), 241-249.

Dekaboruah, E., Suryavanshi, M. V., Chettri, D., & Verma, A. K. (2020). Human microbiome: an academic update on human body site specific surveillance and its possible role. *Archives of microbiology*, *202*(8), 2147-2167.

de Oliveira Vieira, K. C., Ferreira, C. D. S., Bueno, E. B. T., De Moraes, Y. A., Toledo, A. C. C. G., Nakagaki, W. R., ... & Winkelstroter, L. K. (2020). Development and viability of probiotic orange juice supplemented by Pediococcus acidilactici CE51. *LWT*, *130*, 109637.

Dias, C. O., de Almeida, J. D. S. O., Pinto, S. S., de Oliveira Santana, F. C., Verruck, S., Müller, C. M. O., ... & Amboni, R. D. D. M. C. (2018). Development and physico-chemical characterization of microencapsulated bifidobacteria in passion fruit juice: A functional non-dairy product for probiotic delivery. *Food bioscience*, *24*, 26-36.

Dijkstra, A. R., Setyawati, M. C., Bayjanov, J. R., Alkema, W., van Hijum, S. A., Bron, P. A., & Hugenholtz, J. (2014). Diversity in the robustness of *Lactococcus lactis* strains during heat stress, oxidative stress, and spray drying stress. *Applied and Environmental Microbiology*, *80*(2), 603-611.

Do, H. T., & Nguyen, H. V. (2018). Effects of spray-drying temperatures and ratios of gum arabic to microcrystalline cellulose on antioxidant and physical properties of mulberry juice powder. *Beverages*, *4*(4), 101.

Đorđević, V., Balanč, B., Belščak-Cvitanović, A., Lević, S., Trifković, K., Kalušević, A., ... & Nedović, V. (2015). Trends in encapsulation technologies for delivery of food bioactive compounds. *Food Engineering Reviews*, *7*(4), 452-490.

Durack, J., & Lynch, S. V. (2019). The gut microbiome: relationships with disease and opportunities for therapy. *Journal of experimental medicine*, *216*(1), 20-40.

Eratte, D., McKnight, S., Gengenbach, T. R., Dowling, K., Barrow, C. J., & Adhikari, B. P. (2015). Co-encapsulation and characterisation of omega-3 fatty acids and probiotic bacteria in whey protein isolate–gum Arabic complex coacervates. *Journal of functional foods*, *19*, 882-892.

Espitia, P. J. P., Otoni, C. G., & Soares, N. F. F. (2016). Pediocin applications in antimicrobial food packaging systems. In *Antimicrobial food packaging* (pp. 445-454). Academic Press.

Fernandez, B., Hammami, R., Savard, P., Jean, J., & Fliss, I. (2014). Pediococcus acidilactici UL 5 and *Lactococcus lactis* ATCC 11454 are able to survive and express their bacteriocin genes under simulated gastrointestinal conditions. *Journal of applied microbiology, 116*(3), 677-688.

Fiocco, D., Longo, A., Arena, M. P., Russo, P., Spano, G., & Capozzi, V. (2020). How probiotics face food stress: They get by with a little help. *Critical reviews in food science and nutrition*, *60*(9), 1552-1580.

Flores-Belmont, I. A., Palou, E., López-Malo, A., & Jiménez-Munguía, M. T. (2015). Simple and double microencapsulation of Lactobacillus acidophilus with chitosan using spray drying. *International journal of food studies*, *4*(2).

Fritzen-Freire, C. B., Prudêncio, E. S., Amboni, R. D., Pinto, S. S., Negrão-Murakami, A. N., & Murakami, F. S. (2012). Microencapsulation of bifidobacteria by spray drying in the presence of prebiotics. *Food Research International*, *45*(1), 306-312.

Fu, N., Huang, S., Xiao, J., & Chen, X. D. (2018). Producing powders containing active dry probiotics with the aid of spray drying. *Advances in Food and Nutrition Research*, *85*, 211-262.

Focaroli, S., Mah, P. T., Hastedt, J. E., Gitlin, I., Oscarson, S., Fahy, J. V., & Healy, A. M. (2019). A Design of Experiment (DoE) approach to optimise spray drying process conditions for the production of trehalose/leucine formulations with application in pulmonary delivery. *International journal of pharmaceutics*, *562*, 228-240.

Golowczyc, M. A., Silva, J., Abraham, A. G., De Antoni, G. L., & Teixeira, P. (2010). Preservation of probiotic strains isolated from kefir by spray drying. *Letters in Applied Microbiology*, *50*(1), 7-12.

Haque, M. A., & Adhikari, B. (2015). Drying and denaturation of proteins in the spray drying process. *Handbook of industrial drying*, *33*(10), 971-985.

Heidebach, T., Först, P., & Kulozik, U. (2010). Influence of casein-based microencapsulation on freeze-drying and storage of probiotic cells. *Journal of food engineering*, *98*(3), 309-316.

Huang, S., Vignolles, M. L., Chen, X. D., Le Loir, Y., Jan, G., Schuck, P., & Jeantet, R. (2017). Spray drying of probiotics and other food-grade bacteria: A review. *Trends in food science & technology, 63*, 1-17.

Huq, T., Vu, K. D., Riedl, B., Bouchard, J., Han, J., & Lacroix, M. (2016). Development of probiotic tablet using alginate, pectin, and cellulose nanocrystals as excipients. *Cellulose*, *23*(3), 1967-1978.

İncili, G. K., Karatepe, P., & İlhak, O. İ. (2020). Effect of chitosan and *Pediococcus acidilactici* on *E. coli* O157: H7, *Salmonella Typhimurium* and *Listeria monocytogenes* in meatballs. *LWT*, *117*, 108706.

Ishwarya, S. P., Anandharamakrishnan, C., & Stapley, A. G. (2015). Spray-freeze-drying: A novel process for the drying of foods and bioproducts. *Trends in Food Science & Technology*, *41*(2), 161-181.

Jafari, S. M., Assadpoor, E., Bhandari, B., & He, Y. (2008). Nano-particle encapsulation of fish oil by spray drying. *Food Research International*, *41*(2), 172-183.

Jouppila, K., & Roos, Y. H. (1994). Glass transitions and crystallization in milk powders. *Journal of dairy science*, *77*(10), 2907-2915.

Jyothi, S. S., Seethadevi, A., Prabha, K. S., Muthuprasanna, P., & Pavitra, P. (2012). Microencapsulation: a review. *Int. J. Pharm. Biol. Sci*, *3*, 509-531.

Kang, C. H., Jeon, H., Shin, Y., Kwon, Y. J., & So, J. S. (2015). Heat adaptation improves viability of Lactococcus lactis subsp. lactis HE-1 after heat stress. *Food science and biotechnology*, *24*(5), 1823-1827.

Kechagia, M., Basoulis, D., Konstantopoulou, S., Dimitriadi, D., Gyftopoulou, K., Skarmoutsou, N., & Fakiri, E. M. (2013). Health benefits of probiotics: a review. *International Scholarly Research Notices*, *2013*.

Kheadr, E., Zihler, A., Dabour, N., Lacroix, C., Le Blay, G., & Fliss, I. (2010). Study of the physicochemical and biological stability of pediocin PA-1 in the upper gastrointestinal tract conditions using a dynamic in vitro model. Journal of applied microbiology, 109(1), 54-64.

Khuenpet, K., Charoenjarasrerk, N., Jaijit, S., Arayapoonpong, S., & Jittanit, W. (2016). Investigation of suitable spray drying conditions for sugarcane juice powder production with an energy consumption study. *Agriculture and Natural Resources*, *50*(2), 139-145.

Klein, M., Aserin, A., Ishai, P. B., & Garti, N. (2010). Interactions between whey protein isolate and gum Arabic. *Colloids and Surfaces B: Biointerfaces*, *79*(2), 377-383.

Krunić, T. Ž., Obradović, N. S., & Rakin, M. B. (2019). Application of whey protein and whey protein hydrolysate as protein based carrier for probiotic starter culture. *Food chemistry*, *293*, 74-82.

Kulkarni, S., Haq, S. F., Samant, S., & Sukumaran, S. (2018). Adaptation of *Lactobacillus acidophilus* to thermal stress yields a thermotolerant variant which also exhibits improved survival at pH 2. *Probiotics and antimicrobial proteins*, *10*(4), 717-727.

Lee, J. K. M., Taip, F. S., & Abdulla, H. Z. (2018). Effectiveness of additives in spray drying performance: A review. *Food Res*, *2*(6), 486-499.

Leylak, C., Özdemir, K. S., Gurakan, G. C., & Ogel, Z. B. (2021). Optimisation of spray drying parameters for Lactobacillus acidophilus encapsulation in whey and gum Arabic: Its application in yoghurt. *International Dairy Journal*, *112*, 104865.

Lipan, L., Rusu, B., Sendra, E., Hernández, F., Vázquez-Araújo, L., Vodnar, D. C., & Carbonell-Barrachina, Á. A. (2020). Spray drying and storage of probiotic-enriched almond milk: probiotic survival and physicochemical properties. *Journal of the Science of Food and Agriculture*, *100*(9), 3697-3708.

Lourens-Hattingh, A. & Viljoen, B. (2001). Yogurt as probiotic carrier food. *International Dairy Journal*, 11(1-2), 1-17. doi: 10.1016/s0958-6946(01)00036-x

Makinen, K., Berger, B., Bel-Rhlid, R., & Ananta, E. (2012). Science and technology for the mastership of probiotic applications in food products. *Journal of biotechnology*, *162*(4), 356-365.

Matsumoto, M., & Benno, Y. (2004). Consumption of *Bifidobacterium lactis* LKM512 yoghurt reduces gut mutagenicity by increasing gut polyamine contents in healthy adult subjects. *Mutation Research/Fundamental and Molecular Mechanisms of Mutagenesis*, *568*(2), 147-153

Mahdi, A. A., Mohammed, J. K., Al-Ansi, W., Ghaleb, A. D., Al-Maqtari, Q. A., Ma, M., ... & Wang, H. (2020). Microencapsulation of fingered citron extract with gum arabic, modified starch, whey protein, and maltodextrin using spray drying. *International journal of biological macromolecules*, *152*, 1125-1134.

Martins, I. M., Barreiro, M. F., Coelho, M., & Rodrigues, A. E. (2014). Microencapsulation of essential oils with biodegradable polymeric carriers for cosmetic applications. *Chemical Engineering Journal*, *245*, 191-200.

Masters, K. (1985). Spray drying handbook. *Spray drying handbook.*

Merrifield, D. L., Bradley, G., Harper, G. M., Baker, R. T. M., Munn, C. B., & Davies, S. J. (2011). Assessment of the effects of vegetative and lyophilized Pediococcus acidilactici on growth, feed utilization, intestinal colonization and health parameters of rainbow trout (Oncorhynchus mykiss Walbaum). *Aquaculture Nutrition*, *17*(1), 73-79.

Miles, A. A., Misra, S. S., & Irwin, J. O. (1938). The estimation of the bactericidal power of the blood. *Epidemiology & Infection*, *38*(6), 732-749.

Mirković, M., Seratlić, S., Kilcawley, K., Mannion, D., Mirković, N., & Radulović, Z. (2018). The sensory quality and volatile profile of dark chocolate enriched with encapsulated probiotic *Lactobacillus plantarum* bacteria. *Sensors*, *18*(8), 2570.

Moayyedi, M., Eskandari, M. H., Rad, A. H. E., Ziaee, E., Khodaparast, M. H. H., & Golmakani, M. T. (2018). Effect of drying methods (electrospraying, freeze-drying and spray drying) on survival and viability of microencapsulated *Lactobacillus rhamnosus* ATCC 7469. *Journal of functional foods*, *40*, 391-399

Mudalip, S. A., Khatiman, M. N., Hashim, N. A., Man, R. C., & Arshad, Z. I. M. (2021). A short review on encapsulation of bioactive compounds using different drying techniques. *Materials Today: Proceedings*, *42*, 288-296.

Ogunremi, O. R., Agrawal, R., & Sanni, A. I. (2015). Development of cereal-based functional food using cereal-mix substrate fermented with probiotic strain–*Pichia kudriavzevii* OG 32. *Food science & nutrition*, *3*(6), 486-494.

Patel, R. P., Patel, M. P., & Suthar, A. M. (2009). Spray drying technology: an overview. *Indian Journal of Science and Technology*, *2*(10), 44-47.

Peighambardoust, S. H., Tafti, A. G., & Hesari, J. (2011). Application of spray drying for the preservation of lactic acid starter cultures: a review. *Trends in Food Science & Technology*, *22*(5), 215-224.

Piñón-Balderrama, C. I., Leyva-Porras, C., Terán-Figueroa, Y., Espinosa-Solís, V., Álvarez-Salas, C., & Saavedra-Leos, M. Z. (2020). Encapsulation of active ingredients in food industry by spray-drying and nano spray-drying technologies. *Processes*, *8*(8), 889.

Porto, M. C. W., Kuniyoshi, T. M., Azevedo, P. O. S., Vitolo, M., & Oliveira, R. S. (2017). Pediococcus spp.: An important genus of lactic acid bacteria and pediocin producers. *Biotechnology Advances*, *35*(3), 361-374.

Pudziuvelyte, L., Marksa, M., Jakstas, V., Ivanauskas, L., Kopustinskiene, D. M., & Bernatoniene, J. (2019). Microencapsulation of Elsholtzia ciliata Herb Ethanolic Extract by Spray-Drying: Impact of resistant-maltodextrin complemented with sodium caseinate, skim milk, and beta-cyclodextrin on the quality of spray-dried powders. *Molecules*, *24*(8), 1461.

Prata, A. S., Garcia, L., Tonon, R. V., & Hubinger, M. D. (2013). Wall material selection for encapsulation by spray drying. *Journal of Colloid Science and Biotechnology*, *2*(2), 86-92.

Rajam, R., & Anandharamakrishnan, C. (2015). Microencapsulation of Lactobacillus plantarum (MTCC 5422) with fructooligosaccharide as wall material by spray drying. *LWT-Food Science and Technology*, *60*(2), 773-780.

Ranadheera, C. S., Evans, C. A., Baines, S. K., Balthazar, C. F., Cruz, A. G., Esmerino, E. A., ... & Vasiljevic, T. (2019). Probiotics in goat milk products: Delivery capacity and ability to improve sensory attributes. *Comprehensive Reviews in Food Science and Food Safety*, *18*(4), 867-882.

Reddy, K. B. P. K., Madhu, A. N., & Prapulla, S. G. (2009). Comparative survival and evaluation of functional probiotic properties of spray-dried lactic acid bacteria. *International Journal of Dairy Technology*, *62*(2), 240-248.

Rolim, F., Freitas Neto, O., Oliveira, M., Oliveira, C., & Queiroga, R. (2020). Cheeses as food matrixes for probiotics: In vitro and in vivo tests. Trends In Food Science & Technology, 100, 138-154. doi: 10.1016/j.tifs.2020.04.008

Ruiz-Moyano, S., Martín, A., Benito, M. J., Hernández, A., Casquete, R., & de Guia Córdoba, M. (2011). Application of Lactobacillus fermentum HL57 and Pediococcus acidilactici SP979 as potential probiotics in the manufacture of traditional Iberian dry-fermented sausages. *Food Microbiology*, *28*(5), 839-847.

Salaün, F. (2016). Microencapsulation technology for smart textile coatings. In *Active coatings for smart textiles* (pp. 179-220). Woodhead Publishing.

Sangami, R., & Sri, S. R. (2017). Emerging trends in improving viability, advanced stability techniques and health claims of healthy microbiome—The probiotics. *International Journal of Current Microbiology and Applied Sciences*, *6*, 194-200.

Santivarangkna, C., Kulozik, U., & Foerst, P. (2007). Alternative drying processes for the industrial preservation of lactic acid starter cultures. *Biotechnology progress*, *23*(2), 302-315.Santos, M. G., Bozza, F. T., Thomazini, M., & Favaro-Trindade, C. S. (2015). Microencapsulation of xylitol by double emulsion followed by complex coacervation. *Food Chemistry*, *171*, 32-39.

Santos, D., Maurício, A. C., Sencadas, V., Santos, J. D., Fernandes, M. H., & Gomes, P. S. (2018). Spray drying: an overview. *Pignatello, R.(Comp.). Biomaterials-Physics and Chemistry-New Edition. InTech. UK*, 9-35.

Santos Monteiro, S., Albertina Silva Beserra, Y., Miguel Lisboa Oliveira, H., & Pasquali, M. A. D. B. (2020). Production of probiotic passion fruit (Passiflora edulis Sims f. Flavicarpa Deg.) drink using *Lactobacillus reuteri* and microencapsulation via spray drying. *Foods*, *9*(3), 335.

Sarkar, S. (2020). Spray drying encapsulation of probiotics for functional food formulation-a review. *Novel Techniques in Nutrition & Food Science*, *5*(2).

Sbihi, H., Boutin, R. C., Cutler, C., Suen, M., Finlay, B. B., & Turvey, S. E. (2019). Thinking bigger: How early-life environmental exposures shape the gut microbiome and influence the development of asthma and allergic disease. *Allergy*, *74*(11), 2103-2115.

Shakibaie, M., Mohammadi-Khorsand, T., Adeli-Sardou, M., Jafari, M., Amirpour-Rostami, S., Ameri, A., & Forootanfar, H. (2017). Probiotic and antioxidant properties of selenium-enriched Lactobacillus brevis LSe isolated from an Iranian traditional dairy product. *Journal of Trace Elements in Medicine and Biology*, *40*, 1-9.

Sharifi, S., Rezazad-Bari, M., Alizadeh, M., Almasi, H., & Amiri, S. (2021). Use of whey protein isolate and gum Arabic for the co-encapsulation of probiotic Lactobacillus plantarum and phytosterols by complex coacervation: Enhanced viability of probiotic in Iranian white cheese. *Food Hydrocolloids*, *113*, 106496.

Shokri, Z., Fazeli, M. R., Ardjmand, M., Mousavi, S. M., & Gilani, K. (2015). Factors affecting viability of Bifidobacterium bifidum during spray drying. *DARU Journal of Pharmaceutical Sciences*, *23*(1), 1-9.

Singh, R. K., Chang, H. W., Yan, D. I., Lee, K. M., Ucmak, D., Wong, K., ... & Liao, W. (2017). Influence of diet on the gut microbiome and implications for human health. *Journal of translational medicine*, *15*(1), 1-17.

Silva, P. I., Stringheta, P. C., Teófilo, R. F., & de Oliveira, I. R. N. (2013). Parameter optimization for spray-drying microencapsulation of jaboticaba (Myrciaria jaboticaba) peel extracts using simultaneous analysis of responses. *Journal of Food Engineering*, *117*(4), 538-544.

Standen, B. T., Rawling, M. D., Davies, S. J., Castex, M., Foey, A., Gioacchini, G., ... & Merrifield, D. L. (2013). Probiotic Pediococcus acidilactici modulates both localised intestinal-and peripheral-immunity in tilapia (Oreochromis niloticus). *Fish & shellfish immunology*, *35*(4), 1097-1104.

Soccol, C. R., Prado, M. R., Garcia, L. M., Rodrigues, C., Medeiros, A. B. P., & Soccol, V. T. (2014). Current developments in probiotics. *J. Microb. Biochem. Technol*, *7*, 11-20

Tojo, R., Suárez, A., Clemente, M. G., de los Reyes-Gavilán, C. G., Margolles, A., Gueimonde, M., & Ruas-Madiedo, P. (2014). Intestinal microbiota in health and disease: role of bifidobacteria in gut homeostasis. *World journal of gastroenterology: WJG*, *20*(41), 15163.

Tripathi, M. K., & Giri, S. K. (2014). Probiotic functional foods: Survival of probiotics during processing and storage. *Journal of functional foods*, *9*, 225-241.

Vemuri, R., Shankar, E. M., Chieppa, M., Eri, R., & Kavanagh, K. (2020). Beyond just bacteria: functional biomes in the gut ecosystem including virome, mycobiome, archaeome and helminths. *Microorganisms*, *8*(4), 483.

Wang, Y., & Selomulya, C. (2020). Spray drying strategy for encapsulation of bioactive peptide powders for food applications. *Advanced Powder Technology*, *31*(1), 409-415.

Wittner, M. O., Karbstein, H. P., & Gaukel, V. (2018). Spray performance and steadiness of an effervescent atomizer and an air-core-liquid-ring atomizer for application in spray drying processes of highly concentrated feeds. *Chemical Engineering and Processing-Process Intensification*, *128*, 96-102.

Wu, G. D., Chen, J., Hoffmann, C., Bittinger, K., Chen, Y. Y., Keilbaugh, S. A., ... & Lewis, J. D. (2011). Linking long-term dietary patterns with gut microbial enterotypes. *Science*, *334*(6052), 105-108.

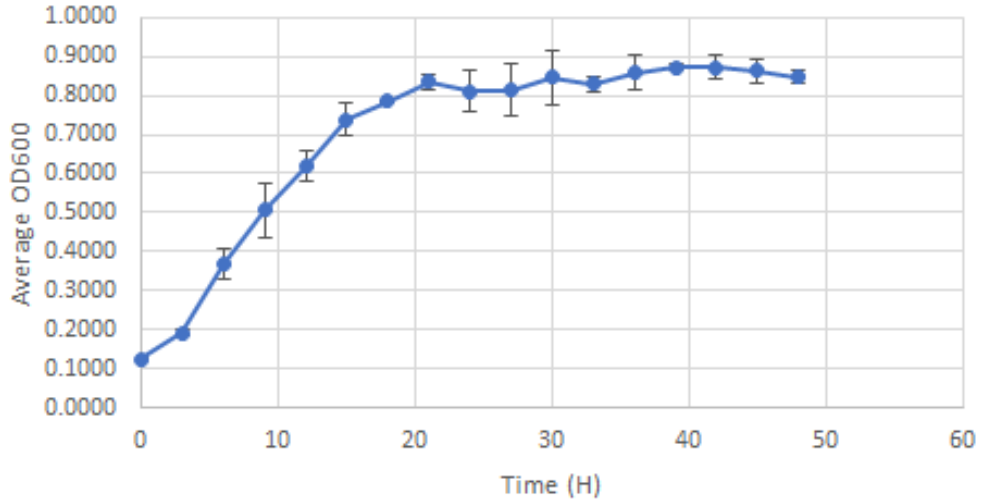
Yun, P., Devahastin, S., & Chiewchan, N. (2021). Microstructures of encapsulates and their relations with encapsulation efficiency and controlled release of bioactive constituents: A review. *Comprehensive Reviews in Food Science and Food Safety*, *20*(2), 1768-1799.

Zambrano, M. V., Dutta, B., Mercer, D. G., MacLean, H. L., & Touchie, M. F. (2019). Assessment of moisture content measurement methods of dried food products in small-scale operations in developing countries: A review. *Trends in Food Science & Technology*, *88*, 484-496.

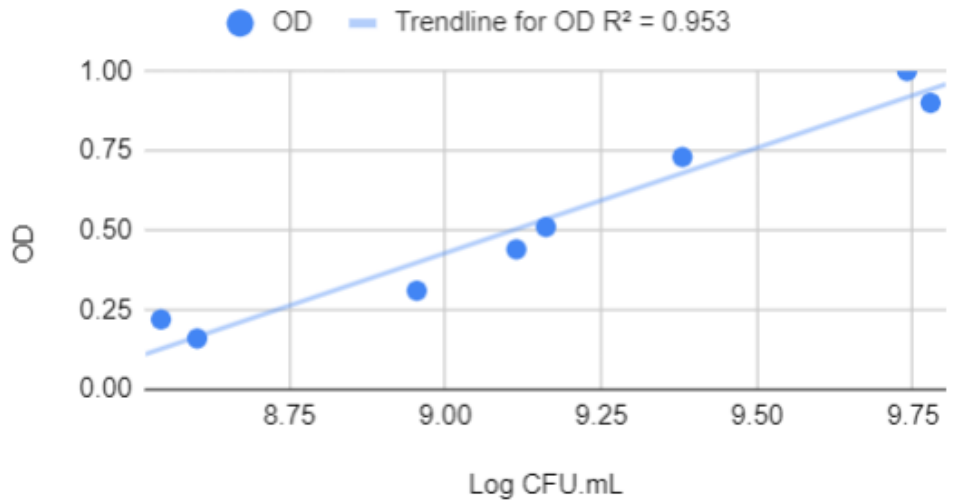
Zielinska, D., & Kołożyn-Krajewska, D. (2018). Food-origin lactic acid bacteria may exhibit probiotic properties. *Review. Biomed. Res. Int*, *5063185*.

APPENDICES

Appendix 1. Growth curve of *P. acidilactici* in 30°C with MRS broth media.



Appendix 2. Standard curve of *P.acidilactici* in 30°C with MRS broth media.



Appendix 3. Dataset of viable cell concentration before and after spray drying.

Sample (WP:GA)	Before spray drying (Log CFU/g)			After spray drying (Log CFU/g)		
	n1	n2	n3	n1	n2	n3
A (1:1)	8.60 ± 0.05	8.68 ± 0.16	8.56 ± 0.07	7.59 ± 0.21	7.86 ± 0.04	7.64 ± 0.06
B (3:1)	8.81 ± 0.09	8.30 ± 0.08	8.88 ± 0.03	7.75 ± 0.01	7.67 ± 0.11	7.92 ± 0.12
C (1:3)	8.94 ± 0.12	8.86 ± 0.02	8.92 ± 0.03	7.18 ± 0.06	7.99 ± 0.03	7.32 ± 0.02

Appendix 4. The *P. acidilactici* survival during GIT simulation.

Sample (WP:GA)	Survival (%)		
	Initial	**After SGJ**	**After SIJ**
Free cell	100 ± 0.00^{aA}	0.00 ± 0.00^{aB}	0.00 ± 0.00^{aB}
A (1:1)	100 ± 0.00^{aA}	91.04 ± 0.05^{bB}	91.10 ± 0.04^{bB}
B (3:1)	100 ± 0.00^{aA}	92.62 ± 0.03^{bB}	95.04 ± 0.03^{bAB}
C (1:3)	100 ± 0.00^{aA}	92.60 ± 0.00^{bB}	84.93 ± 0.00^{cC}

All data represent the mean (n=3) ± standard deviation (SD) of three replicate samples. SGJ: simulated gastric juice; SIJ: simulated intestinal juice that is done sequentially after SGJ. Means not sharing superscript (a, b, c) differ significantly at $p<0.05$ using Tukey's post hoc test, comparing all data in the same column; while superscript (A, B) in the same row.

Appendix 5. One-way ANOVA of encapsulation efficiency results.

ANOVA table	SS	DF	MS	F (DFn, DFd)	P value	Significant?
Treatment (between columns)	64.70	2	32.35	F (2, 6) = 2.583	P=0.1551	**No**
Residual (within columns)	75.14	6	12.52			**No**
Total	139.8	8				**No**

Appendix 6. Two-way RM ANOVA of viable cell during storage results.

ANOVA table	SS	DF	MS	F (DFn, DFd)	P value	Significant ?
Interaction	0.6241	14	0.04458	F (14, 42) = 0.4851	P=0.9285	No
Time	54.18	7	7.740	F (2.115, 12.69) = 84.23	P<0.0001	Yes
Ratio	0.5642	2	0.2821	F (2, 6) = 0.2909	P=0.7575	No
Subject	5.818	6	0.9697	F (6, 42) = 10.55	P<0.0001	Yes
Residual	3.860	42	0.09190			

Appendix 7. Two-way ANOVA of cell survival during GIT simulation.

ANOVA table	SS	DF	MS	F (DFn, DFd)	P value	Significant ?
Interaction	12595	6	2099	F (6, 24) = 334.9	P<0.0001	Yes
Time	7990	2	3995	F (2, 24) = 637.5	P<0.0001	Yes
Ratio	25016	3	8339	F (3, 24) = 1330	P<0.0001	Yes
Residual	150.4	24	6.267			

Appendix 8. One-way ANOVA of production yield.

ANOVA table	SS	DF	MS	F (DFn, DFd)	P value	Significant?
Treatment (between columns)	25.22	2	12.61	F (2, 6) = 1.008	P=0.4192	No
Residual (within columns)	75.01	6	12.50			
Total	100.2	8				

Appendix 9. One-way ANOVA of moisture content.

ANOVA table	SS	DF	MS	F (DFn, DFd)	P value	Significant ?
Treatment (between columns)	2.690	2	1.345	F (2, 6) = 8.203	P=0.0192	No
Residual (within columns)	0.9837	6	0.1639			
Total	3.673	8				

Appendix 10. One-way ANOVA of water activity.

ANOVA table	SS	DF	MS	F (DFn, DFd)	P value	Significant?
Treatment (between columns)	0.002422	2	0.001211	F (2, 6) = 3.206	P=0.1130	No
Residual (within columns)	0.002267	6	0.0003778			
Total	0.004689	8				

Encapsulation material	**Encapsulation efficiency (%)**	**Limitation**	**Reference**
Maltodextrin	78-98	Lower survival at pH 2.0 compared to free cells Relatively low survival during storage at 4°C Limited physicochemical evaluation	Reddy et al., (2009).
Nonfat skimmed milk	95-98		
Orange juice + maltodextrin	100	Focus on orange juice powder development	Barbosa et al. (2015)