

REFERENCES

- Albuquerque, L., Rainey, F. A., Chung, A. P., Sunna, A., Nobre, M. F., Grote, R., ... & Da Costa, M. S. (2000). *Alicyclobacillus hesperidum* sp. nov. and a related genomic species from solfataric soils of São Miguel in the Azores. *International Journal of Systematic and Evolutionary Microbiology*, 50(2), 451-457.
- Anjos, M. M., Ruiz, S. P., & Abreu Filho, B. A. (2014). Evaluation of different culture media and enrichment in orange juice upon the growth of *Alicyclobacillus* spp. *Arquivos do Instituto Biológico*, 81(2), 113-118.
- Bahçeci, K. S., Gökmen, V., & Acar, J. (2005). Formation of guaiacol from vanillin by *Alicyclobacillus acidoterrestris* in apple juice: a model study. *European Food Research and Technology= Zeitschrift für Lebensmittel-Untersuchung und-Forschung. A*, 220(2), 196.
- Chang, S. S., & Kang, D. H. (2004). *Alicyclobacillus* spp. in the fruit juice industry: history, characteristics, and current isolation/detection procedures. *Critical reviews in microbiology*, 30(2), 55-74.
- Donaghy, J. A., Kelly, P. F., & McKay, A. (1999). Conversion of ferulic acid to 4-vinyl guaiacol by yeasts isolated from unpasteurised apple juice. *Journal of the Science of Food and Agriculture*, 79(3), 453-456.
- EIROA, M. N. U., Junqueira, V. C. A., & Schmidt, F. L. (1999). *Alicyclobacillus* in orange juice: occurrence and heat resistance of spores. *Journal of food protection*, 62(8), 883-886.
- Gocmen, D., Elston, A., Williams, T., Parish, M., & Rouseff, R. L. (2005). Identification of medicinal off-flavours generated by *Alicyclobacillus* species in orange juice using GC-olfactometry and GC-MS. *Letters in Applied Microbiology*, 40(3), 172-177.
- Goto, K. (2007). Parameters for detection of *Alicyclobacillus* and test methods. In *Alicyclobacillus* (pp. 49-78). Springer, Tokyo.
- Goto, K., Matsubara, H., Mochida, K., Matsumura, T., Hara, Y., Niwa, M., & Yamasato, K. (2002). *Alicyclobacillus herbarius* sp. nov., a novel bacterium containing omega-cycloheptane fatty acids, isolated from herbal tea. *International Journal of Systematic and Evolutionary Microbiology*, 52(1), 109-113.
- Huang, Z., Dostal, L., & Rosazza, J. P. (1993). Mechanisms of ferulic acid conversions to vanillic acid and guaiacol by *Rhodotorula rubra*. *Journal of Biological Chemistry*, 268(32), 23954-23958.
- International Federation of Fruit Juice Producers. (2007). Method on the detection of taint producing *Alicyclobacillus* in fruit juices.
- Hu, X., Huang, E., Barringer, S. A., & Yousef, A. E. (2020). Factors affecting *Alicyclobacillus acidoterrestris* growth and guaiacol production and controlling apple juice spoilage by lauric arginate and ϵ -polylysine. *LWT*, 119, 108883.
- Jensen, N. (1999). *Alicyclobacillus*: a new challenge for the food industry. *Food Australia*, 51(1-2), 33-36.
- Jensen, N. (2000). *Alicyclobacillus* in Australia [Paper based on a presentation at the 10th World Congress of Food Science and Technology (1999: Sydney)]. *Food Australia*, 52(7), 282-285.

Jensen, N., & Whitfield, F. B. (2003). Role of *Alicyclobacillus acidoterrestris* in the development of a disinfectant taint in shelf-stable fruit juice. *Letters in Applied Microbiology*, 36(1), 9-14.

Kannenbergh, E., Blume, A., Poralla, K., 1984. Properties of *u*-cyclohexane fatty acids in membranes. *FEBS Lett.* 172, 331e334.

Karmakar, B., Vohra, R. M., Nandanwar, H., Sharma, P., Gupta, K. G., & Sobti, R. C. (2000). Rapid degradation of ferulic acid via 4-vinylguaiacol and vanillin by a newly isolated strain of *Bacillus coagulans*. *Journal of Biotechnology*, 80(3), 195-202.

Matsubara, H., Goto, K., Matsumura, T., Mochida, K., Iwaki, M., Niwa, M., & Yamasato, K. (2002). *Alicyclobacillus acidiphilus* sp. nov., a novel thermo-acidophilic, omega-acyclic fatty acid-containing bacterium isolated from acidic beverages. *International Journal of Systematic and Evolutionary Microbiology*, 52(5), 1681-1685.

Mayer, F., Czerny, M., & Grosch, W. (1999). Influence of provenance and roast degree on the composition of potent odorants in *Arabica* coffees. *European Food Research and Technology*, 209(3), 242-250.

Motohiro, N., & Hiroko, S. (1994). Selective culture medium for detecting thermotolerant acid-fast *Bacillus* and its detection. *Japan Patent*, 06-283459.

Mottram, D. S. (1998). Chemical tainting of foods. *International journal of food science & technology*, 33(1), 19-29.

Murray, M. B., Gurtler, J. B., Ryu, J. H., Harrison, M. A., & Beuchat, L. R. (2007). Evaluation of direct plating methods to enumerate *Alicyclobacillus* in beverages. *International journal of food microbiology*, 115(1), 59-69.

Nishimura, K., Ohnishi, M., Masuda, M., Koga, K., & Matsuyama, R. (1983). Reactions of wood components during maturation, in: *Flavour of Distilled Beverages: Origin and Development*.

Orr, R. V., Shewfelt, R. L., Huang, C. J., Tefera, S., & Beuchat, L. R. (2000). Detection of guaiacol produced by *Alicyclobacillus acidoterrestris* in apple juice by sensory and chromatographic analyses, and comparison with spore and vegetative cell populations. *Journal of food protection*, 63(11), 1517-1522.

Pacheco, C. P. (2002). Sensibility and specificity of methods for *Alicyclobacillus* detection and quantification: a collaborative study. *Fruit processing*, (11), 478-482.

Parish, M. E., & Goodrich, R. M. (2005). Recovery of presumptive *Alicyclobacillus* strains from orange fruit surfaces. *Journal of Food Protection*, 68(10), 2196-2200.

Pettipher, G. L., Osmundson, M. E., & Murphy, J. M. (1997). Methods for the detection and enumeration of *Alicyclobacillus acidoterrestris* and investigation of growth and production of taint in fruit juice and fruit juice-containing drinks. *Letters in Applied Microbiology*, 24(3), 185-189.

Pometto III, A. L., Sutherland, J. B., & Crawford, D. L. (1981). *Streptomyces setonii*: catabolism of vanillic acid via guaiacol and catechol. *Canadian journal of microbiology*, 27(6), 636-638.

Pornpukdeewattana, S., Jindaprasert, A., & Massa, S. (2020). *Alicyclobacillus* spoilage and control-a review. *Critical reviews in food science and nutrition*, 60(1), 108-122.

PT. Saraswanti Indo Genetech | Saraswanti Group | PT Saraswanti Utama. (2021). Retrieved 18 September 2021, from <https://saraswanti.com/anak-perusahaan-2/pt-saraswanti-indo-genetech/>

Rosazza, J. P. N., Huang, Z., Dostal, L., Volm, T., & Rousseau, B. (1995). Biocatalytic transformations of ferulic acid: an abundant aromatic natural product. *Journal of industrial microbiology and biotechnology*, 15(6), 457-471.

Saxby, M. J. (1996). A survey of chemicals causing taints and off-flavours in food. *Food taints and off-flavours*, 41-71.

SIG LABORATORY | One Stop Laboratory Service. (2021). Retrieved 18 September 2021, from <https://siglaboratory.com/>

Silva, F. V., & Gibbs, P. (2004). Target selection in designing pasteurization processes for shelf-stable high-acid fruit products. *Critical reviews in food science and nutrition*, 44(5), 353-360.

Smit, Y., Cameron, M., Venter, P., & Witthuhn, R. C. (2011). Alicyclobacillus spoilage and isolation—A review. *Food Microbiology*, 28(3), 331-349.

Sokolowska, B., Niezgodna, J., & Chotkiewicz, M. (2013). Opportunities to germinate and grow of Alicyclobacillus acidoterrestris spores in the presence of organic acids. *FMFI*, 2, 10-16.

Spilittstoesser, D. F., Churey, J. J., & Lee, C. Y. (1994). Growth characteristics of aciduric spore forming bacilli isolated from fruit juices. *Journal of food protection*, 57(12), 1080-1083.

Springett, M. B. (1996). Formation of off-flavours due to microbiological and enzymic action. In *Food taints and off-flavours* (pp. 274-289). Springer, Boston, MA.

Walker, M., & Phillips, C. A. (2008). The effect of preservatives on Alicyclobacillus acidoterrestris and Propionibacterium cyclohexanicum in fruit juice. *Food Control*, 19(10), 974-981.

Walls, I. (1998). Alicyclobacillus-historical perspective and preliminary characterization study. *Dairy, Food Environmental Sanitation*, 18(8), 499-503.

Walls, I., & Chuyate, R. (2000). Spoilage of fruit juices by Alicyclobacillus acidoterrestris: Alicyclobacillus in the food industry. *Food Australia*, 52(7), 286-288.

Wisotzkey, J. D., Jurtshuk JR, P., Fox, G. E., Deinhard, G., & Poralla, K. (1992). Comparative sequence analyses on the 16S rRNA (rDNA) of *Bacillus acidocaldarius*, *Bacillus acidoterrestris*, and *Bacillus cycloheptanicus* and proposal for creation of a new genus, *Alicyclobacillus* gen. nov. *International Journal of Systematic and Evolutionary Microbiology*, 42(2), 263-269.

Witthuhn, R. C., Duvenage, W., & Gouws, P. A. (2007). Evaluation of different growth media for the recovery of the species of Alicyclobacillus. *Letters in applied microbiology*, 45(2), 224-229.

Witthuhn, R. C., Smit, Y., Cameron, M., & Venter, P. (2011). Isolation of Alicyclobacillus and the influence of different growth parameters. *International journal of food microbiology*, 146(1), 63-68.

Yamazaki, K., Teduka, H., & Shinano, H. (1996). Isolation and identification of *Alicyclobacillus acidoterrestris* from acidic beverages. *Bioscience, biotechnology, and biochemistry*, 60(3), 543-545.

APPENDICES

Table 3. Composition of culture medium K agar for *Alicyclobacillus* sp.

K Agar (pH 3.7; Adjusted with 25% L-malic acid)	
Composition	Amount (g)
Yeast Extract	2.5
Peptone	5.0
Glucose	1.0
Tween 80	1.0
Agar	15.0
Demineralized water	1 L

Table 4. Composition of culture medium YSG agar for *Alicyclobacillus* sp.

YSG Agar (pH 3.7; Adjusted with 1 N HCl)	
Composition	Amount
Yeast Extract	2.0 g
Glucose	1.0 g
Soluble starch	2.0 g
Agar	15.0 g
Demineralized water	1 L

Table 5. Composition of culture medium YSG broth for *Alicyclobacillus* sp.

YSG Broth (pH 3.7; Adjusted with 1 N HCl)	
Composition	Amount
Yeast Extract	2.0 g
Glucose	1.0 g
Soluble starch	2.0 g
Demineralized water	1 L

Table 6. Composition of culture medium BAT agar for *Alicyclobacillus* sp.

BAT Agar (pH 4; Adjusted with 1N H ₂ SO ₄ or 1N NaOH)		Trace minerals solution	
Composition	Amount	Composition	Amount
CaCl ₂ · 2H ₂ O	0.25 g	CaCl ₂ · 2H ₂ O	0.66 g
MgSO ₄ · 7 H ₂ O	0.50 g	ZnSO ₄ · 7H ₂ O	0.18 g
(NH ₄) ₂ SO ₄	0.20 g	CuSO ₄ · 5H ₂ O	0.16 g
KH ₂ PO ₄	3.0 g	MnSO ₄ · H ₂ O	0.15 g
Yeast extract	2.0 g	CoCl ₂ · 6H ₂ O	0.18 g
Glucose	5.0 g	H ₃ BO ₃	0.10 g
Trace minerals solution	1.0 ml	Na ₂ MoO ₄ · 2H ₂ O	0.30 g
Demineralized water	500 ml	Demineralized water	1000 ml
Agar	15-20 g		
Distilled water	500 ml		

Table 7. Composition of culture medium BAT broth for *Alicyclobacillus* sp.

BAT Agar (pH 4; Adjusted with 1N H ₂ SO ₄ or 1N NaOH)		Trace minerals solution	
Composition	Amount	Composition	Amount
CaCl ₂ · 2H ₂ O	0.25 g	CaCl ₂ · 2H ₂ O	0.66 g
MgSO ₄ · 7 H ₂ O	0.50 g	ZnSO ₄ · 7H ₂ O	0.18 g
(NH ₄) ₂ SO ₄	0.20 g	CuSO ₄ · 5H ₂ O	0.16 g
KH ₂ PO ₄	3.0 g	MnSO ₄ · H ₂ O	0.15 g
Yeast extract	2.0 g	CoCl ₂ · 6H ₂ O	0.18 g
Glucose	5.0 g	H ₃ BO ₃	0.10 g
Trace minerals solution	1.0 ml	Na ₂ MoO ₄ · 2H ₂ O	0.30 g
Demineralized water	500 ml	Demineralized water	1000 ml
Distilled water	500 ml		