Classification and nomenclature of species in the genus *Acinetobacter*

Validly published and correct species name (*n* =85)	Former (provisional) designation	Reference	Cultured from*
A. albensis	Taxon 31**	Krizova et al. 2015b	Soil, water
A. amyesii	Taxon 36**	Nemec et al. 2022b	Soil, water, animals
A. apis †		Kim et al. 2014	*Apis mellifera*
A. baretiae		Alvarez-Perez et al. 2021	*Apis mellifera*
A. baumannii	Genomic sp. 2	Bouvet & Grimont 1986	Human, warm-blooded animals
A. baylyi		Carr et al. 2003	Activated sludge, soil
A. beijerinckii	Phenon 7**	Nemec et al. 2009	Human, animals, soil, water
A. bereziniae	Genomic sp. 10	Nemec et al. 2010, Bouvet & Grimont 1986	Human
A. bohemicus	Taxon 26	Krizova et al. 2014	Soil, water
A. boissieri		Álvarez-Pérez et al. 2013	Floral nectar
A. bouvetii †		Carr et al. 2003	Activated sludge
A. brisouii †		Anandham et al. 2010	Peat
A. calcoaceticus	Genomic sp. 1	Bouvet & Grimont 1986	Soil, water, human
A. celticus	Taxon 33	Radolfova-Krizova et al. 2016b	Soil, water
A. chengduensis		Qin et al. 2020	Hospital sewage
A. chinensis		Hu et al. 2019	Hospital sewage
A. colistiniresistens	Genomic sp. 13BJ/14TU	Nemec et al. 2017, Bouvet & Jeanjean 1989	Human
A. courvalinii	Genomic sp. 14BJ	Nemec et al. 2016, Bouvet & Jeanjean 1989	Human, animals
A. cumulans		Qin et al. 2019	Hospital sewage
A. defluvii †		Hu et al. 2017	Hospital sewage
A. dispersus	Genomic sp. 17	Nemec et al. 2016, Bouvet & Jeanjean 1989	Soil, water, human
A. entericus †♣		Dong & Yang 2023	Zophobas atratus larvae gut
A. equi		Poppel et al. 2016	Horse
A. faecalis †		Chen et al. 2023	Elephant feces
A. gandensis	Taxon 30	Smet et al. 2014	Horse, cattle, water
A. geminorum †♦		Wolf et al. 2021	Human
A. gerneri †		Carr et al. 2003	Activated sludge
A. guerrae		Carvalheira et al. 2020	Meat
A. guillouiae	Genomic sp. 11	Nemec et al. 2010, Bouvet & Grimont 1986	Soil, water, human
A. gyllenbergii	Phenon 3	Nemec et al. 2009	Human
A. haemolyticus	Genomic sp. 4	Bouvet & Grimont 1986	Human
A. halotolerans †		Dahal et al. 2017	Soil
A. harbinensis †		Li et al. 2014b	River water
A. higginsii	Genomic sp. 16	Nemec et al. 2023	Human
A. ihumii †		Yacouba et al. 2022	Human
A. indicus †		Malhotra et al. 2012	Soil
A. johnsonii	Genomic sp. 7	Bouvet & Grimont 1986	Soil, water, human, animals
A. junii	Genomic sp. 5	Bouvet & Grimont 1986	Human, animals, water, soil
A. kanungonis †		Das et al. 2021	Pufferfish
A. kookii		Choi et al. 2013	Soil, water
A. lactucae †		Rooney et al. 2016	Lettuce
A. lanii		Zhu et al. 2021	Feces of *Equus kiang*
A. larvae †		Liu et al. 2017	Moth larval gut
A. lwoffii	Genomic sp. 9	Bouvet & Grimont 1986; Nemec et al. 2019	Human, animals, soil, water
A. modestus	Taxon 18	Nemec et al. 2016, Touchon et al. 2014	Human, water
A. nectaris		Alvarez-Perez et al. 2013	Floral nectar
A. nematophilus †		Machado et al. 2023	Nematode
A. nosocomialis	Genomic sp. 13TU	Nemec et al. 2011, Tjernberg & Ursing 1989	Human
A. oleivorans †¶		Kang et al. 2011	Soil
A. parvus	Phenon 4	Nemec et al. 2003	Human, animals
A. pecorum		Pallen et al. 2024; Gilroy et al. 2021	Feces of Gallus gallus and sheep
A. piscicola †		Liu et al. 2018	Fish
A. pittii	Genomic sp. 3	Nemec et al. 2011, Bouvet & Grimont 1986	Human, soil, water
A. pollinis		Alvarez-Perez et al. 2021	Floral nectar
A. populi		Li et al. 2015	Populus bark
A. portensis		Carvalheira et al. 2020	Meat
A. pragensis	Taxon 28	Radolfova-Krizova et al. 2016a	Soil, water
A. proteolyticus	Taxon 19	Nemec et al. 2016, Touchon et al. 2014	Human
A. pseudolwoffii	Genomic sp. 8,Taxon 23	Bouvet & Grimont 1986; Nemec et al. 2019	Human, animals, soil, water
A. puyangensis		Li et al. 2013	Populus bark
A. qingfengensis		Li et al. 2014a	Populus bark
A. radioresistens	Genomic sp. 12	Nishimura et al. 1988, Bouvet & Grimont 1986	Human, soil, cotton
A. rathckeae		Alvarez-Perez et al. 2021	Floral nectar
A. rudis		Vaz-Moreira et al. 2011	Raw milk, wastewater
A. schindleri	Phenon 2	Nemec et al. 2001	Human, animals
A. sedimenti		Zheng et al. 2022	Beach sediment
A. seifertii	'Close to 13TU'	Nemec et al. 2015, Gerner-Smidt & Tjernberg 1993	Human
A. shaoyimingii		Zhu et al. 2021	Feces of *Equus kiang*
A. sichuanensis †		Qin et al. 2018	Hospital sewage
A. silvestris	Taxon 35	Nemec et al. 2022a	Forest soil, water
A. soli †		Kim et al. 2008	Human, soil
A. stercoris †		Pulami et al. 2021	Digestate of a biogas plant
A. suaedae †		Xu et al. 2024	Rhizosphere soil
A. tandoii †		Carr et al. 2003	Activated sludge, water, soil
A. terrae	Taxon 24A	Nemec et al. 2021	Soil, sheep feces
A. terrestris	Taxon 24B	Nemec et al. 2021	Soil, animal feces
A. tibetensis †		Pan et al. 2023	Soil
A. tjernbergiae		Carr et al. 2003	Activated sludge
A. towneri		Carr et al. 2003	Activated sludge, water, soil
A. ursingii	Phenon 1	Nemec et al. 2001	Human
A. variabilis	Genomic sp. 15TU	Krizova et al. 2015a	Human, animals, soil
A. venetianus		Vaneechoutte et al. 2009, Di Cello et al. 1997	Salt water
A. vivianii	Taxon 20	Nemec et al. 2016, Touchon et al. 2014	Human, soil, water
A. wanghuae		Zhu et al. 2021	Feces of *Equus kiang*
A. wuhouensis		Hu et al. 2018	Hospital sewage

Classification and nomenclature of species in the genus *Acinetobacter* - *continued*

Validly published species name - a later synonym (*n* =4)	Former (provisional) designation	Reference	Cultured from*
A. grimontii † *(= A. junii)* ‡		Carr et al. 2003, Vaneechoutte et al. 2008	Activated sludge
A. dijkshoorniae (= *A. lactucae*) ‡	NB14	Cosgaya et al. 2016, Dunlap & Rooney 2017	Human, water
A. guangdongensis † (= *A. indicus*) ‡		Feng et al. 2014a, Nemec & Radolfova-Krizova 2017	Lead-zinc ore
A. pakistanensis † (= *A. bohemicus*) ‡		Abbas et al. 2014, Nemec & Radolfova-Krizova 2016	Wastewater

Effectively but not validly published species name nonsynonymous with a validly published name (*n* =6)	Reference	Cultured from*
'*A. kyonggiensis*' †	Lee & Lee 2010	Sewage treatment plant
'*A. marinus*' †	Yoon et al. 2007	Sea water
'*A. pullicarnis*' †	Han et al. 2020	Chicken meat
'*A. rongchengensis*' †	Qin et al. 2021	Hospital sewage
'*A. tianfuensis*' †	Qin et al. 2021	Hospital sewage
'*A. thutiue*' †	TuYet & Kim 2023	Soil

Effectively but not validly published species name synonymous with a validly published name (*n* =7)	Reference	Cultured from*
'*A. mesopotamicus*' † (= *A. lwoffii*) ‡	Acer et al. 2020, Nemec 2021	Soil
'*A. oryzae*' † (= *A. johnsonii*) §	Chaudhary et al. 2012, Nemec 2022	Rice
'*A. plantarum*' † (= *A. junii*) §	Du et al. 2016, Nemec 2022	Wheat
'*A. pullorum*' † (= *A. portensis*) ‡	Elnar et al. 2020, Qin et al. 2021	Chicken meat
'*A. refrigeratoris*' † (= *A. variabilis*) §	Feng et al. 2014b, Nemec 2022	Refrigerator
'*A. seohaensis*' † (= *A. towneri*) §	Yoon et al. 2007, Nemec 2022	Sea water
'*A. septicus*' † (= *A. ursingii*) ‡	Kilic et al. 2008, Nemec et al. 2008	Human

Tentative species designation including Candiatus names	Reference	Cultured from*/ sample (metagenome)
'*A. antiviralis*' † #	Lee et al. 2009	Tobacco plant roots
'Candidatus *A. avistercoris*'	Gilroy et al. 2021	Feces of Gallus gallus (metagenome)
'Candidatus *A. pediculi*'	Boumbanda Koyo et al. 2019	Pediculus humanus
Genomic sp. 6	Bouvet & Grimont 1986	Human
Genomic sp. 15BJ	Bouvet & Jeanjean 1989	Human
Taxon 21 ♠	Touchon et al. 2014	Human
Taxon 22 ♠	Touchon et al. 2014	Human
Taxon 24C ♠	Nemec et al. 2021	Soil, sheep feces
Taxon 24D ♠	Nemec et al. 2021	Soil, water
Taxon 24E ♠	Nemec et al. 2021	Soil, water
Taxon 25A, 25B, 27, 32, 34, 37–39 ♠	Nemec & Radolfova-Krizova (unpublished)	Soil, water
Taxon 2221, 6053, 7209, 7384, 7454, 7458, 7506, 7509, 7517, 7564, 7579, 7593, 7655 ♠	Nemec et al. (unpublished)	Cattle feces
Taxon 40–95 ♥	Qin et al. 2021	Miscellaneous

Notes

* Based also on selected studies other than those included in the reference list.
† Species description based on only a single strain.
‡ The first name is a later heterotypic synonym of that shown in parentheses (applied for both validly and only effectively published names).
§ The first name is a synonym of that shown in parentheses as evidenced by whole-genome comparative analysis and comprehensive phenotypic testing (Nemec & Radolfova-Krizova, unpublished).
¶ Strain '*A. oleivorans*' DR1 is closely related to two *A. calcoaceticus*-like strains described by Gerner-Smidt & Tjernberg (1993) (Touchon et al. 2014).
# An effectively published name for a patented organism with restricted availability.
♠ Taxon 21–39 and Taxon 2221–7655: designations of provisional taxa used in the Laboratory of Bacterial Genetics (Prague), which is based on the congruence of genotypic and phenotypic data for taxonomically novel groups (≥2 strains per group).
♥ Taxon 40–95: designations of single strains of groups of strains used by Qin et al. (2021) based on the rigirous application of a 96% ANI cutoff to define species boundaries. Some of these tentative taxa are conspecific with validly named species.
♦ Closely related to (and possibly conspecific with) *A. pittii*, having whole genome ANI against reference *A. pittii* strains as high as 95%.
♣ Closely related to (and possibly conspecific with) *A. bouvetii*, having whole genome ANI against the type strain of *A.bouvetii* as high as 95.2%.

References (hyperlinks)

Abbas S, Ahmed I, Kudo T et al. (2014) *Pak J Agri Sci* 51:595–608. [Validation list 161]
Acer Ö, Güven K, Poli A et al. (2020) *Curr Microbiol* 77: 3192–3200.
Alvarez-Perez S, Baker LJ, Morris MM et al. (2021) *Int J Syst Evol Microbiol* 71:004783.
Álvarez-Pérez S, Lievens B, Jacquemyn H, Herrera CM. (2013) *Int J Syst Evol Microbiol* 63:1532–9.
Anandham R, Weon H-Y, Kim S-J et al. (2010) *J Microbiol* 48:36–9. [Validation list 140]
Boumbanda Koyo CS, Amanzougaghene N, Davoust, B. et al. (2019) *Parasites Vectors* 12:290.
Bouvet PJM & Grimont PAD. (1986) *Int J Syst Bacteriol* 36:228–40.
Bouvet PJM & Jeanjean S. (1989) *Res Microbiol* 140:291–9.
Carr EL, Kämpfer P, Patel BKC et al. (2003) *Int J Syst Evol Microbiol* 53:953–63.
Carvalheira A, Gonzales-Siles L, Salvà-Serra F et al. (2020) *Int J Syst Evol Microbiol* 70:4544–54.
Chaudhary HJ, Peng G, Hu M et al. (2012) *Microb Ecol* 63:813–21.
Chen X-M, An D-F, He S-R et al. (2023) *Curr Microbiol* 80:21. [Validation list 214]
Choi JY, Ko G, Jheong W et al. (2013) *Int J Syst Evol Microbiol* 63:4402–6.
Cosgaya C, Marí-Almirall M, Van Assche A et al. (2016) *Int J Syst Evol Microbiol* 66:4105–11.
Dahal RH, Chaudhary DK, Kim J. (2017) *Arch Microbiol* 199:701–10. [Validation list 177]
Das L, Deb S, Das SK. (2021) *Int J Syst Evol Microbiol* 71:004833.
Di Cello F, Pepi M, Baldi F, Fani R. (1997) *Res Microbiol* 148:237–49.
Dong X & Yang Y. (2023). *Int J Syst Evol Microbiol* 73:006006.
Du J, Singh H, Yu H et al. (2016) *Arch Microbiol* 198:393–8.
Dunlap CA & Rooney AP. (2017) *Int J Syst Evol Microbiol* 68:131–2.
Elnar AG, Kim MG, Lee JE et al. (2020) *J Microbiol Biotechnol* 30:526–32.
Feng G-D, Yang S-Z, Wang Y-H et al. (2014a) *Int J Syst Evol Microbiol* 64:3417–21.
Feng G, Yang S, Wang Y et al. (2014b) *Curr Microbiol* 69:888–93.
Gerner-Smidt P & Tjernberg I. (1993) *APMIS* 101:826–32.
Gilroy R, Ravi A, Getino M et al. (2021) *PeerJ* 9:e10941.
Han RH, Lee JE, Yoon S, Kim GB. (2020) *Arch Microbiol* 202:727–32.
Hu Y, Feng Y, Zhang X, Zong Y. (2017) *Int J Syst Evol Microbiol* 67:1709-13.
Hu Y, Feng Y, Qin J et al. (2018) *Int J Syst Evol Microbiol* 68:3212–6.
Hu Y, Feng Y, Qin J et al. (2019) *J Microbiol* 57:350–5. [Validation list 189]
Kang Y-S, Jung J, Jeon CO, Park W. (2011) *J Microbiol* 49:29–34. [Validation list 220]

References (hyperlinks)

Kilic A, Li H, Mellmann A et al. (2008) *J Clin Microbiol* 46:902–8.
Kim D, Baik KS, Kim MS et al. (2008) *J Microbiol* 46:396–401. [Validation list 128]
Kim PS, Shin N-R, Kim JY et al. (2014) *J Microbiol* 52:639–45. [Validation list 160]
Krizova L, Maixnerova M, Sedo O, Nemec A. (2014) *Syst Appl Microbiol* 37:467–73. [Validation list 161]
Krizova L, McGinnis J, Maixnerova M et al. (2015a) *Int J Syst Evol Microbiol* 65:857–63.
Krizova L, Maixnerova M, Sedo O, Nemec A. (2015b) *Int J Syst Evol Microbiol* 65:3905–12.
Lee H-J & Lee S-S. (2010) *J Microbiol* 48:754–9.
Lee J-S, Lee KC, Kim KK et al. (2009) *J Microbiol Biotechnol* 19:250–6.
Li Y, Piao C, Ma Y et al. (2013) *Int J Syst Evol Microbiol* 63:2963–9.
Li Y, He W, Wang T et al. (2014a) *Int J Syst Evol Microbiol* 64:1043–50.
Li W, Zhang D, Huang X, Qin W. (2014b) *Int J Syst Evol Microbiol* 64:1507–13.
Li Y, Chang J, Guo L et al. (2015) *Int J Syst Evol Microbiol* 65:4461–68.
Liu S, Wang Y, Ruan Z et al. (2017) *Int J Syst Evol Microbiol* 67:806–11.
Machado RAR, Loulou A, Bhat AH et al. (2023) *Taxonomy* 3:148–168. [Validation list 212]
Malhotra J, Anand S, Jindal S et al. (2012) *Int J Syst Evol Microbiol* 62:2883–90.
Nemec A. (2021) *Curr Microbiol* 78: 369–70.
Nemec A. (2022) *Bergey's manual of systematics of archaea and bacteria* .
Nemec A, De Baere T, Tjernberg I et al. (2001) *Int J Syst Evol Microbiol* 51:1891–9.
Nemec A, Dijkshoorn L, Cleenwerck I et al. (2003) *Int J Syst Evol Microbiol* 53:1563–7.
Nemec A, Musílek M, Vaneechoute M et al. (2008) *J Clin Microbiol* 46:2826–7.
Nemec A, Musílek M, Maixnerová M et al. (2009) *Int J Syst Evol Microbiol* 59:118–24.
Nemec A, Musílek M, Sedo O et al. (2010) *Int J Syst Evol Microbiol* 60:896–903.
Nemec A, Krizova L, Maixnerova M et al. (2011) *Res Microbiol* 162:393–404. [Validation list 140]
Nemec A, Krizova L, Maixnerova M et al. (2015) *Int J Syst Evol Microbiol* 65:934–42.
Nemec A, Radolfova-Krizova L, Maixnerova M et al. (2016) *Int J Syst Evol Microbiol* 66:1673–85.
Nemec A, Radolfova-Krizova L, Maixnerova M, Sedo O. (2017) *Int J Syst Evol Microbiol* 67:2134–41.
Nemec A, Radolfova-Krizova L, Maixnerova M et al. (2019) *Syst Appl Microbiol* 42:159–67. [Validation list 188]
Nemec A, Radolfova-Krizova L, Maixnerova M et al. (2021) *Syst Appl Microbiol* 44:126217. [Validation list 201]
Nemec A, Radolfova-Krizova L, Maixnerova M et al. (2022a) *Int J Syst Evol Microbiol* 72:005383.
Nemec A, Radolfova-Krizova L, Maixnerova M et al. (2022b) *Int J Syst Evol Microbiol* 72:005642.
Nemec A, Spanělová P, Shestivska V et al. (2023) *Int J Syst Evol Microbiol* 73:006114.
Nemec A & Radolfova-Krizova L. (2016) *Int J Syst Evol Microbiol* 66:5614–7.
Nemec A & Radolfova-Krizova L. (2017) *Int J Syst Evol Microbiol* 67:4080–2.
Nishimura Y, Ino T, Iizuka H. (1988) *Int J Syst Bacteriol* 38:209–11.
Pallen MJ (2024). *Int J Syst Evol Microbiol* 74:006445.
Pan H, Li J, Liu H-H, et al. (2023) *Curr Microbiol* 80:51. [Validation list 211]
Poppel MT, Skiebe E, Laue M et al. (2016) *Int J Syst Evol Microbiol* 66:881–8.
Pulami D, Schauss T, Eisenberg T et al. (2021) *Antonie van Leeuwenhoek* 114:235–51. [Validation list 200]
Qin J, Hu Y, Feng Y et al. (2018) *Int J Syst Evol Microbiol* 68:3897–901.
Qin J, Maixnerová M, Nemec M et al. (2019) *Int J Syst Evol Microbiol* 42:319–25. [Validation list 189]
Qin J, Feng Y, Lü X, Zong Z (2020) *Syst Appl Microbiol* 43:126092. [Validation list 196]
Qin J, Feng Y, Lü X, Zong Z (2021) *MSystems* 6: e00237-21.
Radolfova-Krizova L, Maixnerova M, Nemec A. (2016a) *Int J Syst Evol Microbiol* 66:3897–903.
Radolfova-Krizova L, Maixnerova M, Nemec A. (2016b) *Int J Syst Evol Microbiol* 66:5392–8.
Rooney AP, Dunlap CA, Flor-Weiler LB. (2016) *Int J Syst Evol Microbiol* 66:3566–72.
Smet A, Cools P, Krizova L et al. (2014) *Int J Syst Evol Microbiol* 64:4007–15.
Tjernberg I & Ursing J. (1989) *APMIS* 97:595–605.
Touchon M, Cury J, Yoon E-J et al. (2014) *Genome Biol Evol* 6:2866–82.
TuYet & Kim (2023) *Diversity* 15, 1179.
Vaneechoutte M, De Baere T, Nemec A et al. (2008) *Int J Syst Evol Microbiol* 58:937–40.
Vaneechoutte M, Nemec A, Musilek M et al. (2009) *Int J Syst Evol Microbiol* 59:1376–81.
Vaz-Moreira I, Novo A, Hantsis-Zacharov E et al. (2011) *Int J Syst Evol Microbiol* 61:2837–43.
Wolf S, Barth-Jakschic E, Karolin Birkle K et al. (2021) *Int J Syst Evol Microbiol* 71:005018.
Xu L, Zhao Y, Li Y, Sun J-Q. (2024) *Environ Res* 246: 118145. [Validation list 217]
Yacouba A, Sissoko S, Saha OFT et al. (2022) *FEMS Microbiol Lett* 369:fnac038. [Validation list 210]
Yoon J-H, Kim I-G, Oh T-K. (2007) *J Microbiol Biotechnol* 17:1743–50.
Zheng K, Hong Y, Guo Z et al. (2022) *Int J Syst Evol Microbiol* 72:005609.
Zhu W, Dong K, Yang J et al. (2021) *Int J Syst Evol Microbiol* 71:004567.

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