Metabolic and physiological characteristics of *Acinetobacter* species

Ms Excel version (↓)

Listed are all species with validly published names except for *A. boissieri* and *A. nectaris*, which are negative in the assimilation tests shown (they utilize other substrates such as sucrose or D-fructose). Not included are *A. grimontii*, *A. guangdongensis*, *A. pakistanensis*, and *A. dijkshoorniae* which are the later synonyms of *A. junii* (Vaneechoutte *et al*., 2008), *A. indicus* (Nemec & Radolfova-Krizova, 2017), *A. bohemicus* (Nemec & Radolfova-Krizova, 2016), and *A. lactucae* (Dunlap & Rooney, 2018), respectively. Genomic species 6, 15BJ and 16, and Taxon 21 and 22 are provisional designations of putative novel species. Each species includes a type strain. Numbers of strains of individual species are indicated in parentheses after the species names. The results [except for those for *A. guerrae* and *A. portensis* adopted from Carvalheira *et al.* (2020), *A. chengduensis* from Qin *et al*. (2020), and *A. lanii*, *A. shaoyimingii*, and *A. wanghuae* from Zhu *et al*. (2020)] were obtained in the Laboratory of Bacterial Genetics in Prague using an array of standardized, in-house tests as described by Nemec *et al*. (2009) and Krizova *et al.* (2015), and were published previously (Hu *et al*. 2018; Krizova *et al*., 2015; Nemec *et al*., 2017, 2018; Qin *et al*. 2018, 2019) except for the unpublished results for Taxon 21 and 22. Except for temperature-dependent tests, the culture temperature was 25 °C for *A. celticus* and 30 °C for the other species. Assimilation/growth tests were interpreted after 6 days of culture, other tests after 3 (haemolytic and gelatinase activities) or 2 (D-glucose acidification, temperature growth tests) days. +, All strains positive; -, all strains negative; !, results which are opposite to those published in original nomenclatural proposals; D, (mostly) doubtful or irreproducible reactions; W, (mostly) weak positive reactions; ND, not determined. Numbers are percentages of strains with clearly positive reactions; for strain-dependent reactions, results for type strains are given in parentheses.

Characteristic	*A. albensis* (8)	*A. apis* (1)	*A. baumannii* (25)	*A. baylyi* (5)	*A. beijerinckii* (15)	*A. bereziniae* (16)	*A. bohemicus* (25)	*A. bouvetii* (1)	*A. brisouii* (1)	*A. calcoaceticus* (11)	*A. celticus* (6)	*A. chengduensis* (2)	*A. chinensis* (2)	*A. colistiniresistens* (24)	*A. courvalinii* (9)	*A. cumulans* (6)
Growth at 44 °C	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
Growth at 41 °C	-	-	+	60 (-)	-	-	-	-	-	9 (-)	-	-	-	-	50W (D	-
Growth at 37 °C	-	-	+	+	+	+	-	D	+	91 (-)	-	+	-	82 (+)	+	17 (D)
Growth at 35 °C	-	-	+	+	+	+	-	+	+	+	-	+	+	+	+	+
Growth at 32 °C	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+
Acidification of D-glucose	-	+	+	+	-	88 (+)	-	-	-	91 (-)	-	-	-	+	+	-
Hemolysis of sheep blood	-	-	-	-	+	-	80W (V	-	-	-	-	-	-	+	89 (+)	-
Liquefaction of gelatin	-	-	-	-	13 (-)	-	-	-	-	-	-	-	-	+	+	-
Assimilation of																
Acetate	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+
trans-Aconitate	-	-	92 (+)	+	-	38 (-)	-	-	+	+	-	-	-	-	44 (-)	-
Adipate	88 (+)	-	88 (+)	+	-	63 (+)	-	-	-	+	-	-	-	-	+	-
β-Alanine	-	-	+	-	-	+	-	-	+	91 (-)	-	-	-	17 (-)	89 (+)	-
4-Aminobutyrate	-	-	+	+	+	+	+	-	+	+	-	-	-	-	+	-
L-Arabinose	-	-	84 (+)	-	-	-	-	-	-	27 (-)	-	-	-	-	-	-
L-Arginine	-	-	+	+	-	-	+	-	+	+	-	-	-	+	+	-
L-Aspartate	+	-	+	+	+	+	+	-	+	+	+	-	-	-	11 (-)	-
Azelate	88 (+)	-	88 (+)	+	-	63 (+)	-	-	-	+	-	50 (+)	-	-	+	-
Benzoate	D (+)	-	84 (+)	+	-	+	92 (+)	+	+	+	+	+	-	17 (-)	+	+
2,3-Butanediol	-	-	+	+	-	+	+	-	+	+	-	-	-	-	-	-
Citraconate	-	-	40 (+)	-	-	-	-	-	-	-	-	-	-	-	-	-
Citrate (Simmons)	+	+	+	+	+	+	-	+	+	91 (D)	-	+	+	+	+	+
Ethanol	-	-	96 (+)	+	+	+	+	+	+	91 (+)	+	+	+	17 (-)	-	83 (+)
Gentisate	50 (+)	-	4 (-)	-	-	-	4 (-)	-	-	-	-	+	-	88 (+)	-	-
D-Gluconate	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-
D-Glucose	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-
L-Glutamate	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	50 (D)
Glutarate	-	-	96 (+)	D	-	+	-	+	+	91 (D)	-	-	50 (-)	-	+	33 (-)
Histamine	-	-	-	-	-	63 (+)	-	-	-	-	-	-	-	-	11 (-)	-
L-Histidine	-	-	96 (+)	-	+	94 (+)	+	+	-	+	-	-	-	+	+	-
4-Hydroxybenzoate	88 (+)	-	92 (+)	+	-	88 (+)	92 (+)	-	+	91 (+)	-	-	-	83 (+)	+	-
DL-Lactate	+	-	+	+	-	+	+	+	+	+	+	-	+	96 (+)	+	-
L-Leucine	-	-	88 (+)	-	93 (+)	-	-	-	-	91 (-)	-	-	-	13 (-)	+	-
Levulinate	-	-	24 (-)	-	-	-	-	-	-	91 (-)	50 (-)	-	-	-	11 (-)	-
D-Malate	38W (V	-	92 (+)	D (+)	+	88 (+)	D	-	+	D (-)	-	-	50 (+)	92 (+)	89 (+)	17 (-)
Malonate	+	-	88 (+)	+	+	-	+	-	+	+	+	-	+	8 (-)	+	-
L-Ornithine	-	-	76 (-)	-	-	-	-	-	+	+	-	-	-	-	89 (+)	-
Phenylacetate	-	-	84 (+)	-	-	25 (-)	-	-	+	+	67 (+)	-	-	96 (+)	+	-
L-Phenylalanine	-	-	84 (+)	-	-	-	-	-	-	+	-	-	-	96 (+)	+	-
Putrescine	-	-	96 (+)	-	-	-	-	-	D	+	-	-	-	-	+	-
D-Ribose	-	-	76 (+)	-	-	-	-	-	-	45 (-)	-	-	-	-	-	-
L-Tartrate	-	-	32 (-)	-	-	-	16 (-)	-	+	9 (-)	-	-	-	-	22 (-)	-
Tricarballylate	+	-	92 (+)	80 (+)	-	38 (-)	4 (-)	-	+	+	-	-	-	-	44 (-)	-
Trigonelline	-	-	60 (+)	+	-	+	-	-	-	9 (-)	-	-	-	33 (-)	67 (+)	-
Tryptamine	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22 (D)	-

Characteristic	*A. defluvii* (1)	*A. dispersus* (9)	*A. equi* (5)	*A. gandensis* (6)	*A. gerneri* (1)	*A. guerrae* (2)	*A. guillouiae* (17)	*A. gyllenbergii* (9)	*A. haemolyticus* (16)	*A. halotolerans* (1)	*A. harbinensis* (1)	*A. indicus* (2)	*A. johnsonii* (30)	*A. junii* (14)	*A. kookii* (2)	*A. lactucae* (6)	*A. lanii* (2)	*A. larvae* (1)
Growth at 44 °C	-	-	-	-	-	-	-	-	-	-	-	D	-	-	-	50 (+)	-	- !
Growth at 41 °C	-	-	D	-	-	ND	-	-	94 (+)	- !	-	+	-	93 (+)	+	+	+	- !
Growth at 37 °C	+	+	+	+	+	+	D	+	+	+	-	+	10W (D	+	+	+	+	+
Growth at 35 °C	+	+	+	+	+	+	+	+	+	+	- !	+	+	+	+	+	+	+
Growth at 32 °C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Acidification of D-glucose	-	-	-	-	+	-	-	-	75 (+)	+	-	-	-	-	-	+	+	-
Hemolysis of sheep blood	- !	+	-	-	-	ND	-	+	+	+	-	-	60W (-)	50 (-)	-	-	-	-
Liquefaction of gelatin	-	+	-	-	-	-	-	+	94 (+)	+	-	-	-	-	-	-	-	-
Assimilation of																		
Acetate	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
trans-Aconitate	-	11 (-)	-	-	-	-	12 (-)	-	63 (+)	+	-	On	-	-	-	+	ND	- !
Adipate	-	22 (-)	+	-	+	+	+	+	-	-	-	-	-	-	-	+	ND	- !
β-Alanine	- !	+	-	-	+	-	94 (+)	+	-	-	- !	-	-	-	-	+	+	+
4-Aminobutyrate	- !	+	-	-	+	-	88 (D)	D	+	+	-	-	83 (+)	86 (+)	+	+	ND	+
L-Arabinose	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	ND	-
L-Arginine	-	+	-	-	-	-	-	+	94 (+)	+	-	-	83 (+)	93 (+)	-	+	-	- !
L-Aspartate	-	-	+	-	D	+	+	-	31 (-)	+	-	-	83 (+)	21 (+)	-	+	ND	+
Azelate	-	22 (-)	-	-	+	ND	+	+	-	-	- !	50 (-)	-	-	-	+	ND	-
Benzoate	+	+	+	+	+	+	88 (+)	+	-	-	+ !	50 (+)	97 (+)	79 (+)	+	+	ND	- !
2,3-Butanediol	-	-	-	33 (-)	+	50 (+)	+	-	-	-	-	-	67 (-)	-	+	+	ND	+
Citraconate	-	-	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	ND	-
Citrate (Simmons)	-	+	+	50 (+)	+	+	+	+	75 (+)	+	-	-	90 (-)	79 (+)	-	+	-	+
Ethanol	+	11 (-)	80	+	+	+	+	22 (-)	94 (+)	+	+	+	+	93 (+)	+	+	+	+
Gentisate	-	33 (-)	+	-	-	+	18 (-)	11 (+)	81 (+)	-	-	-	-	-	-	+	-	-
D-Gluconate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND	-
D-Glucose	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L-Glutamate	+ !	+	+	33 (+)	+	+	+	+	+	+	- !	50 (+)	+	+	-	+	-	+
Glutarate	+ !	+	-	83 (+)	+	ND	+	D (-)	-	-	-	-	-	-	-	+	ND	+
Histamine	-	-	-	-	-	-	65 (+)	-	-	-	-	-	-	-	-	-	ND	-
L-Histidine	-	+	+	-	-	-	94 (+)	+	+	+	-	-	-	93 (+)	-	+	-	+
4-Hydroxybenzoate	-	+	+	-	+	50 (-)	88 (+)	89 (+)	81 (+)	+	-	-	20 (-)	-	-	+	ND	- !
DL-Lactate	+	+	+	+	+	+	+	+	-	-	+	+	+	93 (+)	+	+	+	+
L-Leucine	-	+	-	-	-	-	-	+	88 (+)	+	-	-	-	14 (-)	-	+	-	-
Levulinate	-	-	-	-	-	ND	-	-	-	-	-	-	-	-	-	67 (+)	ND	-
D-Malate	-	+	-	-	-	ND	94 (+)	+	88 (+)	+	-	-	10W (-)	79 (D)	-	+	ND	- !
Malonate	-	22 (-)	-	17 (-)	-	-	18 (-)	78 (+)	-	-	+	-	73 (-)	-	-	+	ND	+
L-Ornithine	-	89 (D)	-	-	-	-	-	56 (+)	-	-	-	-	-	-	-	+	ND	- !
Phenylacetate	- !	89 (+)	-	-	+	ND	65 (+)	+	-	-	-	+	-	-	50 (+)	+	ND	-
L-Phenylalanine	-	89 (+)	-	-	+	-	-	89 (+)	-	-	-	-	-	-	-	+	-	-
Putrescine	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	ND	+
D-Ribose	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	83 (+)	ND	-
L-Tartrate	-	-	-	-	-	-	-	-	-	-	-	-	37 (-)	-	-	-	ND	-
Tricarballylate	-	11 (-)	80	-	-	ND	12 (-)	-	-	-	-	-	-	-	-	+	ND	-
Trigonelline	- !	-	-	-	-	ND	59 (-)	-	-	-	-	-	-	-	-	67 (+)	-	-
Tryptamine	-	11 (+)	-	-	+	-	82 (+)	-	-	-	-	-	-	-	-	50 (+)	ND	-

Characteristic	*A. lwoffii* (37)	*A. modestus* (7)	*A. nosocomialis* (20)	*A. parvus* (10)	*A. piscicola* (1)	*A. pittii* (20)	*A. populi* (3)	*A. portensis* (4)	*A. pragensis* (7)	*A. proteolyticus* (6)	*A. pseudolwoffii* (15)	*A. puyangensis* (2)	*A. qingfengensis* (2)	*A. radioresistens* (12)	*A. rudis* (3)
Growth at 44 °C	-	-	95 (+)	-	-	10 (-)	-	-	-	-	-	-	-	-	-
Growth at 41 °C	11W (-)	-	+	-	-	+	+	-	-	-	-	-	- !	+	-
Growth at 37 °C	+	+ (W)	+	90 (+)	-	+	+	-	-	+	+	+	+	+	+
Growth at 35 °C	+	+	+	+	-	+	+	ND	D	+	+	+	+	+	+
Growth at 32 °C	+	+	+	+	ND	+	+	ND	+	+	+	+	+	+	+
Acidification of D-glucose	19 (-)	-	+	-	-	95 (+)	-	-	-	-	-	-	- !	-	-
Hemolysis of sheep blood	-	+	-	-	+ !	-	-	ND	-	+	-	-	-	-	-
Liquefaction of gelatin	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
Assimilation of															
Acetate	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
trans-Aconitate	5 (-)	-	60 (+)	-	-	+	-	-	-	+	-	-	- !	-	-
Adipate	76 (+)	14 (-)	95 (+)	-	-	+	33 (+)	-	-	67 (-)	40 (+)	-	-	+	-
β-Alanine	-	-	85 (+)	-	- !	90 (+)	-	-	-	+	-	-	-	-	+
4-Aminobutyrate	84 (+)	-	+	-	-	+	+	-	-	D (-)	-	50 (-) !	+	+	+
L-Arabinose	-	-	+	-	-	85 (+)	-	-	-	-	-	-	- !	-	-
L-Arginine	5 (-)	+	+	-	+	+	-	-	-	+	-	-	- !	83 (+)	-
L-Aspartate	-	-	+	-	-	+	+	+	-	-	-	50 (-) !	50 (-) !	-	-
Azelate	+	-	95 (+)	-	- !	+	-	ND	-	67 (-)	80 (+)	-	-	+	-
Benzoate	84 (+)	+	90 (+)	-	+ !	90 (+)	-	-	+	+	80 (+)	D	-	+	+
2,3-Butanediol	8 (-)	14 (-)	90 (+)	-	-	85 (+)	+	-	29 (+)	-	-	+ !	+ !	+	+
Citraconate	-	-	-	-	-	-	+	ND	-	-	-	-	-	-	-
Citrate (Simmons)	8 (-)	-	+	-	+	+	-	+	+	+	-	- !	50 (-) !	-	+
Ethanol	+	+	+	+	+ !	+	+	75 (+)	+	-	73 (+)	+	+	+	+
Gentisate	-	-	10 (-)	-	-	25 (-)	-	25 (-)	43 (+)	+	-	-	-	-	-
D-Gluconate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D-Glucose	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L-Glutamate	8 (-)	+	+	-	+	+	+	+	86 (D)	+	-	+	+	+	+
Glutarate	-	-	95 (+)	-	- !	90 (+)	+	ND	+	33 (-)	13 (-)	50 (+) !	-	+	+
Histamine	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L-Histidine	-	+	+	-	-	+	-	+	-	+	-	-	-	-	+
4-Hydroxybenzoate	-	-	80 (+)	-	-	+	-	-	+	+	7 (-)	+	+	-	+
DL-Lactate	84 (+)	-	+	-	+	+	+	+	+	+	40 (+)	+	+	+	+
L-Leucine	-	-	95 (+)	-	-	95 (+)	-	-	-	83 (-)	-	-	-	92 (+)	+
Levulinate	3 (-)	-	5 (-)	-	-	5 (-)	-	ND	-	-	-	-	-	-	-
D-Malate	11 (-)	D	+	-	- !	95 (+)	67 (+)	ND	-	+	7 (-)	-	-	-	-
Malonate	8 (-)	-	20 (+)	-	-	95 (+)	-	-	+	67 (+)	7 (-)	-	+W	+	+
L-Ornithine	8 (-)	-	95 (+)	20 (-)	-	95 (+)	-	-	-	+	-	-	-	-	-
Phenylacetate	81 (+)	-	85 (+)	-	-	75 (+)	33 (-)	ND	71 (+)	83 (-)	80 (+)	- !	- !	+	+
L-Phenylalanine	-	-	85 (+)	-	-	75 (+)	-	-	-	+	-	- !	-	92 (+)	+
Putrescine	-	-	95 (+)	-	-	+	-	-	-	-	-	-	- !	92 (+)	-
D-Ribose	-	-	80 (+)	-	-	35 (-)	-	-	-	-	-	-	-	-	-
L-Tartrate	-	-	-	-	-	85 (+)	-	-	+	-	13 (+)	-	-	-	-
Tricarballylate	8 (-)	-	95 (+)	-	-	+	-	ND	71 (-)	+	-	-	-	-	-
Trigonelline	-	+	20 (-)	-	-	20 (+)	-	ND	-	-	-	50 (-) !	+	-	-
Tryptamine	-	-	-	-	-	-	-	-	57 (-)	50 (+)	-	-	-	-	+

Characteristic	*A. schindleri* (22)	*A. seifertii* (16)	*A. shaoyimingii* (2)	*A. sichuanensis* (1)	*A. soli* (5)	*A. tandoii* (1)	*A. tjernbergiae* (2)	*A. towneri* (2)	*A. ursingii* (29)	*A. variabilis* (16)	*A. venetianus* (5)	*A. vivianii* (9)	*A. wanghuae* (2)	*A. wuhouensis* (8)	**Genomic sp. 6** (3)	**Genomic sp. 15BJ** (2)	**Genomic sp. 16** (4)	**Taxon 21** (4)	**Taxon 22** (2)
Growth at 44 °C	-	13 (-)	-	-	-	-	-	-	-	31W (V	-	-	-	-	-	-	-	-	-
Growth at 41 °C	+	94 (+)	+	-	80 (+)	-	-	+	-	+	-	-	+	-	-	-	-	-	-
Growth at 37 °C	+	+	+	-	+	+	-	+	+	+	+	+	+	-	+	50	+	+	50
Growth at 35 °C	+	+	+	-	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+
Growth at 32 °C	+	+	+	ND	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Acidification of D-glucose	-	+	+	-	+	-	-	-	-	13 (-)	-	89 (+)	+	-	+	-	-	-	50
Hemolysis of sheep blood	-	-	-	-	60 (+)	-	+	-	-	-	+	+	-	-	+	+	+	+	+
Liquefaction of gelatin	-	-	-	-	-	-	-	-	-	-	80 (+)	-	-	-	+	+	+	+	+
Assimilation of																			
Acetate	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
trans-Aconitate	-	+	ND	-	+	+	-	-	-	6 (-)	-	56 (-)	ND	-	-	-	-	-	-
Adipate	41 (-)	63 (-)	ND	+	+	-	-	-	+	69 (-)	20 (-)	89 (+)	ND	-	-	-	25	-	50
β-Alanine	-	88 (-)	+	+	-	-	-	-	-	-	-	+	+	-	-	-	+	+	+
4-Aminobutyrate	-	+	ND	+	+	+	-	-	-	19 (-)	+	+	ND	25 (+)	-	-	D	-	+
L-Arabinose	-	-	ND	-	-	-	-	-	-	19 (-)	-	-	ND	-	-	-	-	-	-
L-Arginine	-	+	-	-	+	+	50 (+)	-	-	19 (-)	+	+	-	-	+	+	+	+	+
L-Aspartate	-	+	ND	+	+	+	-	-	97W (+	-	-	11 (D)	ND	-	67	-	-	-	-
Azelate	64 (-)	63 (-)	ND	+	+	-	-	-	+	81 (+)	20 (-)	89 (+)	ND	-	-	-	25	-	50
Benzoate	91 (+)	94 (+)	ND	+	+	+	-	+	52 (-)	88 (+)	+	+	ND	88 (+)	-	+	+	+	+
2,3-Butanediol	32 (-)	+	ND	+	+	+	-	50 (-)	-	81 (+)	-	-	ND	+	-	-	-	-	-
Citraconate	-	-	ND	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
Citrate (Simmons)	59W (+	+	-	-	+	+	-	-	+	25 (-)	+	+	-	+	+	50	+	+	+
Ethanol	95 (+)	+	+	+	+	+	+	+	+	+	+	-	+	+	+	-	-	-	-
Gentisate	41 (+)	75 (+)	-	+	-	-	-	-	-	-	-	89 (+)	-	-	-	+	+	-	-
D-Gluconate	-	-	ND	-	+	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
D-Glucose	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L-Glutamate	- (D)	+	+	+	+	+	+	50 (+)	+	25 (-)	+	+	+	+	+	+	+	+	+
Glutarate	95 (+)	+	ND	+	+	-	-	-	97 (+)	19 (-)	-	89 (+)	ND	+	-	-	-	+	+
Histamine	-	-	ND	-	-	-	-	-	-	-	-	-	ND	-	-	-	-	+	50
L-Histidine	-	94 (+)	-	-	+	+	+	-	-	-	+	+	-	-	+	+	+	+	+
4-Hydroxybenzoate	64 (+)	94 (+)	ND	+	+	+	-	-	97 (+)	-	-	+	ND	-	33	+	+	50	+
DL-Lactate	+	+	+	+	+	+	-	+	+	6 (-)	-	+	+	+	-	+	+	-	+
L-Leucine	-	94 (-)	-	-	-	+	-	-	-	-	+	+	-	-	+	+	+	+	+
Levulinate	-	6 (-)	ND	+	-	-	-	-	-	-	-	-	ND	-	-	-	-	-	-
D-Malate	95W (+	88 (+)	ND	+	80 (D)	+	-	50 (-)	+W	13 (+)	+	+	ND	25 (+)	67	50	+	50	+
Malonate	-	75 (+)	ND	-	+	+	-	-	-	-	+	+	ND	63 (+)	-	+	50	-	+
L-Ornithine	-	81 (-)	ND	-	-	+	-	-	-	-	-	+	ND	-	-	-	50	50	-
Phenylacetate	-	88 (+)	ND	+	+	+	-	-	-	75 (+)	-	+	ND	+	-	+	+	50	+
L-Phenylalanine	-	88 (+)	-	+	+	+	-	-	-	38 (-)	-	+	-	-	-	+	+	+	+
Putrescine	-	81 (-)	ND	+	-	+	-	-	-	-	-	78 (+)	ND	-	-	-	-	+	+
D-Ribose	-	-	ND	-	-	-	-	-	-	13 (-)	-	22 (+)	ND	-	-	-	-	-	-
L-Tartrate	18 (-)	31 (+)	ND	+	20 (-)	+	-	-	-	-	-	-	ND	-	-	-	-	-	-
Tricarballylate	45 (+)	+	ND	-	+	+	-	-	-	-	-	56 (-)	ND	-	-	-	-	-	-
Trigonelline	-	-	-	-	+	-	50 (+)	-	-	-	-	+	-	-	-	+	25	-	-
Tryptamine	-	6 (-)	ND	+	-	-	-	-	-	-	-	D	ND	-	-	-	50	-	-

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