

Antimicrobial resistance and phage sensitivity of *Chryseobacterium* sp. isolated from diseased rainbow trout (*Oncorhynchus mykiss*)

Mustafa Ustundag¹ • Berrin Ustundag²

¹ Department of Chemistry and Chemical Management Technologies, Muradiye Vocational School, Van Yuzuncu Yıl University, Van 65080, Türkiye

² Department of Scientific Research Project Office, Van Yuzuncu Yıl University, Van 65080, Türkiye

Article link: <https://doi.org/10.17017/j.fish.1165>

Supplementary Information

TABLE S1 *Chryseobacterium* sp. strains API ZYM results (20°C).

Tests*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<i>Chryseobacterium</i> sp. 1	+	+	+	-	+	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-
<i>Chryseobacterium</i> sp. 2	+	+	+	-	+	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-
<i>Chryseobacterium</i> sp. 3	+	+	+	-	+	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-
<i>Chryseobacterium</i> sp. 4	+	+	+	-	+	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-
<i>Chryseobacterium</i> sp. 5	+	+	+	-	+	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-
<i>Chryseobacterium</i> sp. 6	+	+	+	-	+	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-
<i>Chryseobacterium</i> sp. 7	+	+	+	-	+	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-
<i>Chryseobacterium</i> sp. 8	+	+	+	-	+	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-
<i>Chryseobacterium</i> sp. 9	+	+	+	-	+	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-

*1- Alkaline phosphatase, 2-Esterase, 3-Esterase lipase, 4-Lipase, 5-Leucine arylamidase, 6-Valine arylamidase, 7-Cystine arylamidase, 8-Tyrosinase, 9- α -Chymotrypsin, 10-Phosphatase acid, 11-Naphthol-AS-BI-, 12-phosphohydrolase, 13- α -Galactosidase, 14- β -Galactosidase, 15- β -Glucuronidase, 16- α -Glucosidase, 17- β -Glucosidase, 18-N-acetyl- β -glucosaminidase, 19- α -Mannosidase, 20- α -Fucosidase

Table S2 *Chryseobacterium* sp. API 20E results.

Tests*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<i>Chryseobacterium</i> sp. 1	-	-	+	+	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
<i>Chryseobacterium</i> sp. 2	-	-	+	+	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
<i>Chryseobacterium</i> sp. 3	-	-	+	+	+	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-
<i>Chryseobacterium</i> sp. 4	-	-	+	+	-	-	+	-	-	-	+	-	-	-	-	-	-	-	-	-
<i>Chryseobacterium</i> sp. 5	-	-	+	+	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
<i>Chryseobacterium</i> sp. 6	-	-	+	+	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-
<i>Chryseobacterium</i> sp. 7	-	-	+	+	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
<i>Chryseobacterium</i> sp. 8	-	-	+	+	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
<i>Chryseobacterium</i> sp. 9	-	-	+	+	+	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-

*1- β -galactosidase, 2-arginine dihydrolase, 3-lysine decarboxylase, 4-ornithine decarboxylase, 5-citrate utilization, 6-H₂S, 7-urease, 8-tryptophan deaminase, 9-indol, 10-VP, 11-gelatinase deaminase, 12-glucose, 13-mannitol, 14-inositol, 15-sorbitol, 16-rhamnose, 17-sucrose, 18-melibiose, 19-amygdalin, 20-arabinose.

Table S3 Antibiotic susceptibility test results.

Antibiotic discs	S (Sensitive)	I (Intermediately sensitive)	R (Resistant)
Sulphamethoxazole (RL, 25 µg)			R
Erythromycin (E,15 µg)			R
Enrofloxacin (ENR, 5 µg)	S		
Florfenicol (FFC, 30 µg)			R
Oxolinic acid (OA, 2 µg)	S		
Ampicillin (AMP, 10 µg)			R
Neomisin (N, 10 µg)			R
Trimethoprim (W 5 µg)			R
Oksitetrasiklin (OT, 30 µg)		I	
Amoxycillin (AML 10 µg)			R
Rifampisin (5 µg)			
Klindamisin (2 µg)			
Gentamicin (10 µg)			R
Amikacin (30 µg)			R
Tetracycline (30 µg)			R
Ciprofloxacin (10 µg)	S		
Chloramphenicol (30 µg)			R
Piperacillin (PIP, 100 µg)			R
Cefotaxime (CTX, 30 µg)			R
Ceftazidime (CAZ, 30 µg)			R
Cefepime (FEP, 30 µg)			R
Aztreonam (ATM, 30 µg)			R
Imipenem (IPM, 10 µg)			R
Meropenem (MEM, 10 µg)			R
Kanamycin (KAN, 30 µg)			R
Streptomycin (STR, 10 µg)			R
Doxycycline (DO, 30 µg)			R
Minocycline (MIN, 30 µg)		I	
Norfloxacin (NOR, 10 µg)	S		
Ofloxacin (OFX, 5 µg)	S		
Nalidixic acid (NA, 30 µg)			R

Table S4 Conventional test results of the isolated *Chryseobacterium sp.* strains.

Characters	<i>Chryseobacterium sp.</i> strains								
	1	2	3	4	5	6	7	8	9
Cell morphology	S	S	S	S	S	S	S	S	S
Gram	-	-	-	-	-	-	-	-	-
Motility - Gliding movement	*+	*+	*+	*+	*+	*+	*+	*+	*+
Catalase	+	+	+	+	+	+	+	+	+
Oxidase	+	+	+	+	+	+	+	+	+
Oxidation-fermentation (O/F)	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-	-/-
Flexirubin pigment	+	+	+	+	+	+	+	+	+
Nitrate reduction	-	-	-	-	-	-	-	-	-
Gelatine hydrolysis	+	+	+	+	+	+	+	+	+
Starch hydrolysis	-	-	-	-	-	-	-	-	-
Casein hydrolysis	+	+	+	+	+	+	+	+	+
Congo red	-	-	-	-	-	-	-	-	-
Growth in %0 NaCl	-	-	-	-	-	-	-	-	-
Growth in %0.5 NaCl	-	-	-	-	-	-	-	-	-
Growth in %1.0 NaCl	-	-	-	-	-	-	-	-	-
Growth in %1.5 NaCl	+	+	+	+	+	+	+	+	+
Growth at 15°C	+	+	+	+	+	+	+	+	+
Growth at 37°C	-	-	-	-	-	-	-	-	-

*: Weak positives included, S: Slender rod

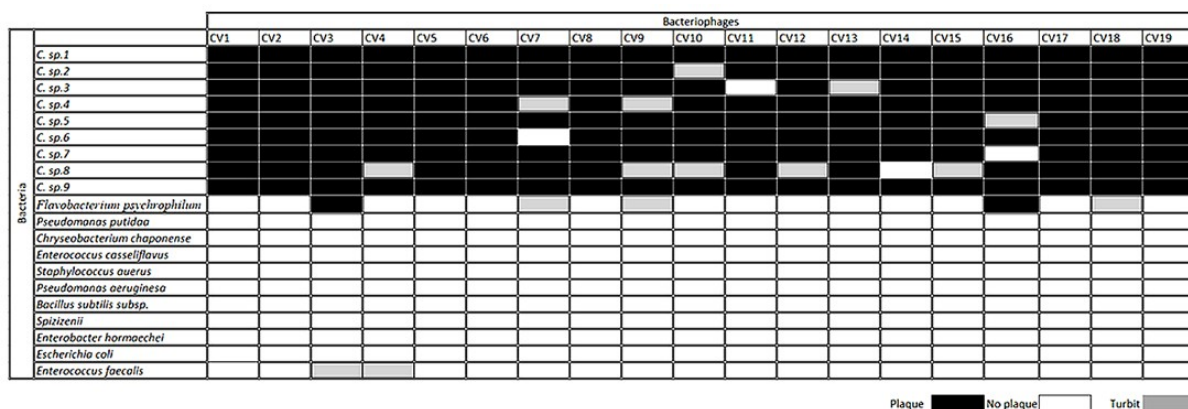


FIGURE S1 Phage–host range.

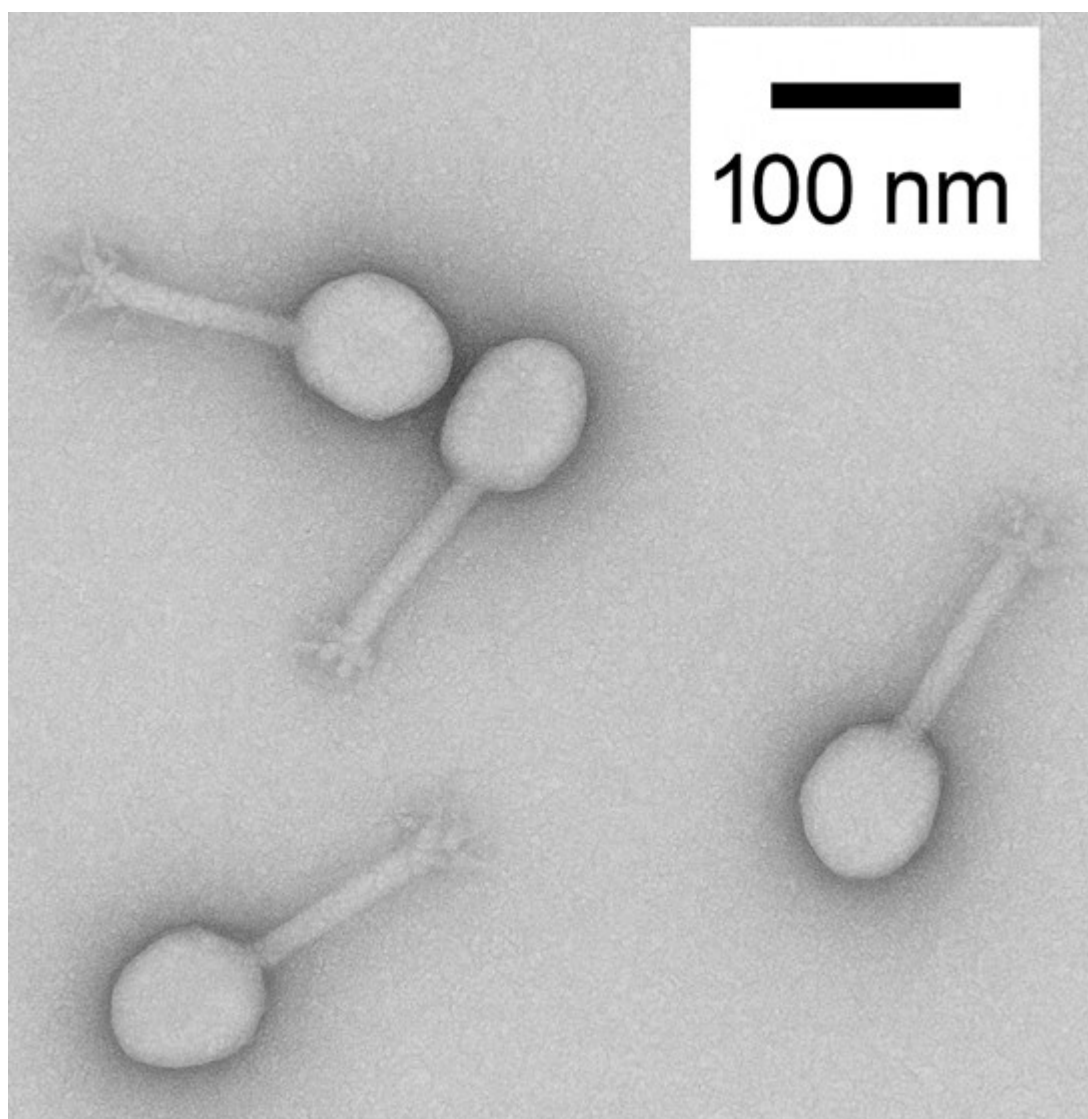


FIGURE S2 TEM image of the phages (CV1-CV2-CV7 and CV15).