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## Isolation and characteristics of Hydrogen-oxidizing bacteria in theleguminous rhizosphere in grassland of Sanjiangyuan region

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**Key words :** leguminous Rhizosphere, Sanjiangyuan region, hydrogen-oxidizing bacteria, isolation, characteristics

**Introduction** Dong and collaborators, theorized for the first time that H<sub>2</sub> released from root nodules can promote the growth of microbes around the root, as well as promote the growth of plants, and called this the "hydrogen fertilizer theory" (Dong Z *et al.*, 2003). Isolating hydrogen-oxidizing bacteria in different leguminous soil rhizospheres will significantly aid future studies of populations of this new group.

**Material and methods** Eight different leguminous rhizosphere soils (W, D, AI, AII, AIII, BI, BII and BIII) from the grassland of Sanjiangyuan Region were enriched for 15d at room temperature at  $4.16 \times 10^5$  mol/L<sup>-1</sup> H<sub>2</sub> concentration. Then mineral salt agar medium (MSA) and H<sub>2</sub> treatment system (CHEN X D *et al.*, 2007) were used to isolate and culture the hydrogen-oxidizing bacteria for about 1 week.

**Results** Sixty three bacterium strains were isolated from 8 different soil samples and the ability to take up hydrogen were measured for these strains. Data showed that 26 bacterium strains had strong ability to take up hydrogen and grow autotrophically (Table 1). Colony form and physiological biochemistry characteristic were studied. Among these 26 hydrogen-oxidizing bacteria 7 strains were classified to species (Table 2).

**Table 1** The result of oxidized H<sub>2</sub>.

Strains	H <sub>2</sub> consumption (10 <sup>-4</sup> mol · L <sup>-1</sup> )	Strains	H <sub>2</sub> consumption (10 <sup>-4</sup> mol · L <sup>-1</sup> )	Strains	H <sub>2</sub> consumption (10 <sup>-4</sup> mol · L <sup>-1</sup> )
W-4	6.82	BI-8	3.86	AIII-4	1.73
W-3	6.46	AI-9	3.50	AIII-3	1.64
BI-9	5.91	AI-8	3.36	AIII-9	1.45
BI-2	5.90	AI-5	3.18	W-9	1.39
AI-4	5.48	BII-3	2.89	D-7	0.94
BIII-2	4.63	BI-3	2.38	BIII-4	0.84
AII-6	4.52	AI-6	2.35	W-7	0.83
AII-1	4.36	W-1	2.27	BII-9	0.81
D-5	3.87	AI-3	1.74	blank	0.06

**Conclusions** This experiment not only used H<sub>2</sub> treatment system but also improved it. Physiological biochemistry characteristics were studied, and the 26 hydrogen-oxidizing bacteria were classified into the suitable species.

### References

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**Table 2** Classification.

Strains	Species
BIII-2	<i>Staphylococcus</i>
BIII-4	<i>Pimelobacter</i>
A-3	<i>Aeromicrobium</i>
W-9	<i>Xanthobacter</i>
BII-9	<i>Xanthobacter</i>
AIII-9	<i>Xanthobacter</i>
AII-6	<i>A.gromonas</i>