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**RESEARCH ARTICLE**

# *Paenarthrobacter nitroguajacolicus* can promote cucumber growth and control cucumber corynespora leaf spot

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## Supplemental materials

**Table S1** The radius of inhibition zone of different biocontrol bacteria against *C. cassicola* in the dishes

| Collect location           | Isolate No. | Inhibition radius (mm) |
|----------------------------|-------------|------------------------|
| Bazhou, Xinjiang           | XJ-2        | 14.5                   |
| Bazhou, Xinjiang           | XJ-5        | 8.0                    |
| Bazhou, Xinjiang           | XJ-6        | 5.5                    |
| Bazhou, Xinjiang           | XJ-8        | 4.5                    |
| Bazhou, Xinjiang           | XJ-11       | 8.5                    |
| Bazhou, Xinjiang           | XJ-12       | 6.5                    |
| Jing'an district, Shanghai | SJ-1        | 11.5                   |
| Jing'an district, Shanghai | SJ-3        | 17.0                   |
| Jing'an district, Shanghai | SJ-9        | 6.0                    |
| Yangpu district, Shasnghai | SY-3        | 13.0                   |
| Yangpu district, Shasnghai | SY-5        | 9.5                    |
| Yangpu district, Shasnghai | SY-9        | 11.0                   |
| Yangpu district, Shasnghai | SY-14       | 12.0                   |
| Haidian district, Beijing  | BJ-2        | 12.5                   |
| Haidian district, Beijing  | BJ-3        | 15.0                   |
| Haidian district, Beijing  | BJ-5        | 18.5                   |
| Haidian district, Beijing  | BJ-11       | 5.5                    |
| Meixian, Shaanxi           | SM-1        | 9.5                    |
| Meixian, Shaanxi           | SM-2        | 8.0                    |
| Meixian, Shaanxi           | SM-4        | 7.5                    |
| Meixian, Shaanxi           | SM-6        | 4.0                    |
| Yangling, Shaanxi          | SX-4        | 8.5                    |
| Yangling, Shaanxi          | SX-6        | 12.0                   |
| Yangling, Shaanxi          | SX-17       | 14.0                   |
| Yangling, Shaanxi          | SX-19       | 11.0                   |
| Haikou, Haidian            | HN-2        | 1.5                    |
| Haikou, Haidian            | HN-3        | 9.0                    |
| Haikou, Haidian            | HN-6        | 4.0                    |
| Haikou, Haidian            | HN-11       | 3.0                    |
| Haikou, Haidian            | HN-18       | 5.5                    |
| Neimenggu                  | NM-3        | 8.0                    |
| Neimenggu                  | NM-6        | 2.5                    |
| Neimenggu                  | NM-7        | 15.0                   |
| Guiyang, Guizhou           | GY-3        | 11.5                   |
| Guiyang, Guizhou           | GY-8        | 9.5                    |
| Chengdu, Sichuan           | SC-4        | 9.0                    |
| Chengdu, Sichuan           | SC-7        | 4.0                    |
| Chengdu, Sichuan           | SC-9        | 3.0                    |
| Chengdu, Sichuan           | SC-14       | 2.0                    |

### 16S rRNA gene sequencing of BJ-5

GCGTGGGCGGGGTGCTTACCATGCAAGTCGAACGATGATCCCAGCTTGCTGGGGGATTAGTGGCGAAC  
GGGTGAGTAACACGTGAGTAACCTGCCCTTGACTCTGGGATAAGCCTGGGAAACTGGGTCTAATACCG  
GATATGACCGTCTGACGCATGTCAGGTGGTGAAAGCTTTTGTGGTTTTGGATGGACTCGCGGCCTATC  
AGCTTGTTGGTGGGGTAATGGCCTACCAAGGCGACGACGGGTAGCCGGCCTGAGAGGGTGACCGGCC  
ACACTGGGACTGAGACACGGCCAGACTCCTACGGGAGGCAGCAGTGGGGAATATTGCACAATGGGC  
GCAAGCCTGATGCAGCGACGCCGCGTGAGGGATGACGGCCTTCGGGTTGTAAACCTCTTTCAGTAGG  
GAAGAAGCGAAAGTGACGGTACCTGCAGAAGAAGCGCCGGCTAACTACGTGCCAGCAGCCGCGGTA  
ATACGTAGGGCGCAAGCGTTATCCGGAATTATTGGGCGTAAAGAGCTCGTAGGCGGTTTGTTCGCGTCT  
GCTGTGAAAGACCGGGGCTCAACTCCGGTTCTGCAGTGGGTACGGGCAGACTAGAGTGCAGTAGGGG  
AGACTGGAATTCCTGGTGTAGCGGTGAAATGCGCAGATATCAGGAGGAACACCGATGGCGAAGGCAG  
GTCTCTGGGCTGTAACCTGACGCTGAGGAGCGAAAGCATGGGGAGCGAACAGGATTAGATAACCCTGGT  
AGTCCATGCCGTAAACGTTGGGCACTAGGTGTGGGGGACATTCCACGTTTTCCGCGCCGTAGCTAACG  
CATTAAAGTGCCCCGCCTGGGGAGTACGGCCGCAAGGCTAAAACCTCAAAGGAATTGACGGGGGCCCGC  
ACAAGCGGCGGAGCATGCGGATTAATTCGATGCAACGCGAAGAACCTTACCAAGGCTTGACATGAAC  
CGGTAATACCTGGAAACAGGTGCCCGCTTGCGGTTCGGTTTACAGGTGGTGCATGGTTGTCGTCAGCT  
CGTGTCTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCTCGTTCTATGTTGCCAGCGCGTTA  
TGGCGGGGACTCATAGGAGACTGCCGGGTCAACTCGGAGGAAGGTGGGGACGACGTCAAATCATCA  
TGCCCCTTATGTCTTGGGCTTCACGCATGCTACAATGGCCGGTACAAAGGGTTGCGATACTGTGAGGTG  
GAGCTAATCCCAAAAAGCCGGTCTCAGTTCGGATTGGGGTCTGCAACTCGACCCATGAAGTCGGAGT  
CGTAGTAATCGCAGATCAGCAACGCTGCGGTGAATACGTTCCCGGGCCTTGACACACCGCCCGTCA  
AGTCACGAAAGTTGGTAACACCCGAAGCCGGTGGCCTAACCTTGTGGGGGAGCCGTCGAAGGTGA  
CCGGGG

**Table S2** Analysis of fungal cell wall hydrolase produced by *Paenarthrobacter nitroguajacolicus* strain BJ-5 and promoted of metabolic substances

| Secondary metabolites        | Result |
|------------------------------|--------|
| Chitinase                    | –      |
| $\beta$ -1,3-glucanase       | –      |
| Cellulase                    | +      |
| Protease                     | +      |
| Tween 20                     | +      |
| Tween 40                     | +      |
| Tween 60                     | +      |
| Tween 80                     | +      |
| Siderophore                  | +      |
| IAA                          | –      |
| HCN                          | –      |
| ACC deaminase                | –      |
| Solubilized organophosphorus | +      |

Note: “–”: negative reaction; “+”: positive reaction.

**Table S3** Adaptation assay of *Paenarthrobacter nitroguajacolicus* strain BJ-5

| Salt concentration (%) | Result | Culture temperature (°C) | Result |
|------------------------|--------|--------------------------|--------|
| 10                     | +      | 10                       | –      |
| 11                     | +      | 20                       | +      |
| 12                     | +      | 30                       | +      |
| 13                     | +      | 40                       | +      |
| 14                     | +      | 50                       | +      |
| 15                     | –      | 60                       | +      |

  

| pH | Result | pH | Result |
|----|--------|----|--------|
| 3  | +      | 8  | +      |
| 4  | +      | 9  | +      |
| 5  | +      | 10 | +      |
| 6  | +      | 11 | +      |
| 7  | +      | 12 | +      |

Note: “–”: No growth; “+”: Growth.