Supporting Information

Effect of dielectric barrier discharge cold plasma on pea seed growth

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Materials and Methods

**Determination of chlorophyll.** At least 50 mg of dried leaves were sliced into small pieces and then ground using pestle and mortar. Ground powders were suspended in 50 ml of 50 % acetone and 50 % ethanol in dark for 24h. Absorbance of total chlorophyll was measured at 663 nm and 645 nm, respectively, using UV-vis spectrophotometer. Acetone (50 %) and ethanol (50 %) was mixed and used as a control.

**Biological pretreatment before sem determination.** Plant tissue was fixed with 2.5% glutaraldehyde solution at 4 °C overnight, then fixing solution was drained, and sample was rinsed three times with 0.1 M, pH 7.0 phosphate buffer for 15 min each time; sample was fixed with 1% citric acid solution for 1-2h; the citric acid waste was removed carefully, the samples were rinsed three times with 0.1M, pH 7.0 phosphate buffer for 15 min. The samples were dehydrated with ethanol with five different concentrations (including 30%, 50%, 70%, 80%, and 90%), each concentration for 15 min, and then treated twice with 100% ethanol for 20 min each. The samples were treated with a mixture of ethanol and isoamyl acetate (V/V = 1/1) for 30 min, then were treated with pure isoamyl acetate for 1 h or overnight, and finally were dried at critical point. Then the processed samples were observed in a scanning electron microscope.

**Analysis of microbial communities.** First, the samples were processed for DNA extraction using the E.Z.N.A.® Soil DNA kit (Omega Bio-Tek, USA). Then the extracted DNA was amplified by polymerase chain reaction (PCR) using the primer
ITS1F (CTTGGTCATTTAGAGGAAGTAA) and ITS2R (GCTGCGTTCTTCATCGATGC). After detection and quantification, the sample amplicons were sequenced on an Illumina Miseq platform (www.i-sanger.com).
### Table S1 pH value of solution after 10 minutes of plasma activation of tap water

<table>
<thead>
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<th>Power/W</th>
<th>60</th>
<th>73</th>
<th>87</th>
<th>122</th>
<th>164</th>
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<tbody>
<tr>
<td>pH</td>
<td>6.60</td>
<td>3.16</td>
<td>2.84</td>
<td>2.27</td>
<td>2.26</td>
</tr>
</tbody>
</table>

### Table S2 pH value of solution after plasma activation of tap water at 87W power

<table>
<thead>
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<th>Time/min</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
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<tbody>
<tr>
<td>pH</td>
<td>4.02</td>
<td>2.84</td>
<td>2.36</td>
<td>2.10</td>
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</table>
Fig. S1. Effect of high voltage on plant height and dry weight
Fig. S2. Water absorption of seeds under different conditions
Fig. S3. rarefaction curve of sobs index