***Supplementary Material***

**Table 1 The primers were used for polarity effect in this study**

|  |  |  |
| --- | --- | --- |
| **Primers** | **Sequences** | **Function** |
| **2040-F** | ATGTACCCACTTATCAAAAA | To amplify the HAPS\_2040 gene (1008 bp) |
| **2040-R** | CTAAATAGAAATTTTCCTAACC |
| **2042-F** | ATGCACTCCTCTATTCCTTTAT | To amplify the HAPS\_2042 gene (192 bp) |
| **2042-R** | TCATTTCATATTCCCAACTAAAGC |
| **2044-F** | ATGATTATCCCTTGGCAAG | To amplify the HAPS\_2044 gene (225 bp) |
| **2044-R** | TTACAAATTCCCTAAGAAAG |
| **2045-F** | ATGACAGAACCTGTTATC | To amplify theHAPS\_2045 gene (606 bp) |
| **2045-R** | CTAGTAGAACAATGGCTTAATC |

**A**

crp location Map



**2000bp**

**1000bp**

**750bp**

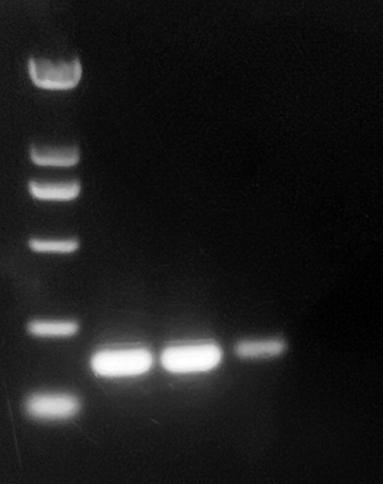
**500bp**

**250bp**

**100bp**

**M 1 2 3 N**

**HAPS\_2040**



**2000bp**

**1000bp**

**750bp**

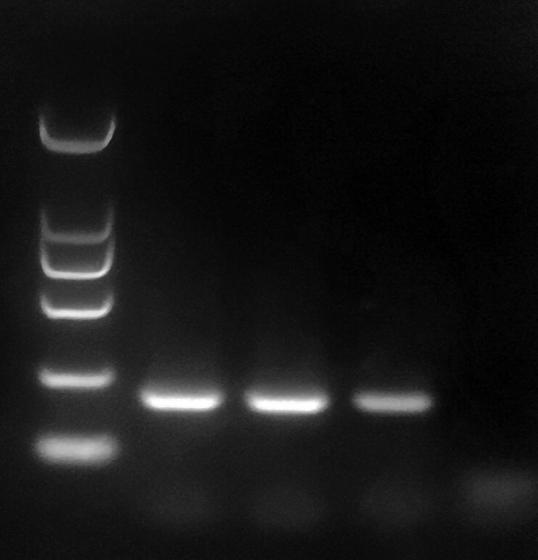
**500bp**

**250bp**

**100bp**

**M 1 2 3 N**

**HAPS\_2042**



**2000bp**

**1000bp**

**750bp**

**500bp**

**250bp**

**100bp**

**M 1 2 3 N**

**HAPS\_2044**

**M 1 2 3 N**



**2000bp**

**1000bp**

**750bp**

**500bp**

**250bp**

**100bp**

**HAPS\_2045**

**B**

**Figure 1.** Verification the expression of the neighbor genes of the crp gene. (**A**) Distribution diagram of upstream and downstream of *crp* gene. (**B**) RT-PCR identification of the HAPS\_2040, HAPS\_2042, HAPS\_2044 and HAPS\_2045 from cDNAs of wild type and *crp* mutant strain. M: DL 2000 Mark, 1 and 2 represented cDNA genomes of the wild type and *crp* mutant, 3 represented genomes DNA (gDNA) of the wild type which was the positive control, N represented negative control.