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Feasibility of 5S rRNA spacer and *atp*B-*rbc*L intergenic spacer region to the identification of *ginseng* cultivars

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Objectives

Ginseng (*panax ginseng*) is one of the most important medicinal plants in the Orient, in which almost every species of the genus has been employed as a source of medicine. It has been used as a tonic, a stimulant and an agent for more than 2000 years both in China and Korea. There are 5 cultivars have been found in Korea, making the identification of them necessary for both consumers and agriculture. Therefore, it is necessary to develop a time-saving technology to clearly and precisely differentiate *ginseng* cultivars. 5S rRNA spacer and *atp*B-*rbc*L intergenic region of chloroplast DNA can be used as molecular markers for cultivar identification, but the feasibility to the identification of ginseng cultivars need to be further studied. In our research, 5S rRNA spacer and *atp*B-*rbc*L intergenic spacer region of chloroplast DNA were amplified by polymerase chain reaction (PCR) from the isolated genomic DNA. The amplified spacer regions of different cultivars of *ginseng* were sequenced and compared to investigate the utility of 5S rRNA spacer and *atp*B-*rbc*L intergenic region in discriminating ginseng cultivars.

Material and methods

① DNA extraction of panax *ginseng* cultivars.
② PCR of 5S rRNA spacer and *atp*B-*rbc*L intergenic region.
③ Purification and sequencing.
④ Comparison of 5S rRNA spacer and *atp*B-*rbc*L intergenic region of different cultivars.

Results and discussions

Although the 5S rRNA spacer and *atp*B-*rbc*L intergenic region evolve rapidly, 5 cultivars of *panax ginseng* exhibited complete homology. We concluded that the two regions mentioned above can't be used for the identification of ginseng cultivars. As for closely related cultivars, determination of single gene is far not enough because the gene may be not where the difference located. In order to discriminate of 5 *ginseng* cultivars, DNA sequences of other genes need to be studied.

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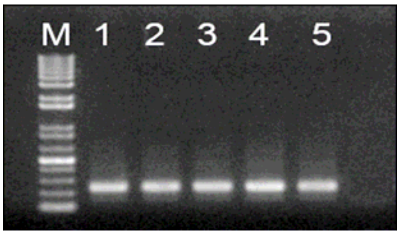

Fig.1 PCR products by 5S rRNA primers 5SP1 and 5SP2. Lane M: 100bp DNA ladder; lane 1: yunpoong; lane 2: gopoong; lane 3: sunpoong; lane 4: gumpoong; lane 5: chunpoong.


yunpoong GGATTCGTGCTTGGGCGAGAGTAGTACTAGGATGGGTGACCCCCTGGGAAGTCCTCGTGT 60
gopoong GGATTCGTGCTTGGGCGAGAGTAGTACTAGGATGGGTGACCCCCTGGGAAGTCCTCGTGT 60
sunpoong GGATTCGTGCTTGGGCGAGAGTAGTACTAGGATGGGTGACCCCCTGGGAAGTCCTCGTGT 60
chunpoong GGATTCGTGCTTGGGCGAGAGTAGTACTAGGATGGGTGACCCCCTGGGAAGTCCTCGTGT 60
gumpoong GGATTCGTGCTTGGGCGAGAGTAGTACTAGGATGGGTGACCCCCTGGGAAGTCCTCGTGT 60
5SP1
yunpoong TGCACCCCTTTTTATTTTTATTTTTTGCGATGTTCGGTGAAGAAAGAGCGTACTAGTGAA 120
gopoong TGCACCCCTTTTTATTTTTATTTTTTGCGATGTTCGGTGAAGAAAGAGCGTACTAGTGAA 120
sunpoong TGCACCCCTTTTTATTTTTATTTTTTGCGATGTTCGGTGAAGAAAGAGCGTACTAGTGAA 120
chunpoong TGCACCCCTTTTTATTTTTATTTTTTGCGATGTTCGGTGAAGAAAGAGCGTACTAGTGAA 120
gumpoong TGCACCCCTTTTTATTTTTATTTTTTGCGATGTTCGGTGAAGAAAGAGCGTACTAGTGAA 120
yunpoong CGTGTCTTGGTAAACTCGCATGCACGACGTAAGCGTCACTGCGTTCCACCCATATGTGGG 180
gopoong CGTGTCTTGGTAAACTCGCATGCACGACGTAAGCGTCACTGCGTTCCACCCATATGTGGG 180
sunpoong CGTGTCTTGGTAAACTCGCATGCACGACGTAAGCGTCACTGCGTTCCACCCATATGTGGG 180
chunpoong CGTGTCTTGGTAAACTCGCATGCACGACGTAAGCGTCACTGCGTTCCACCCATATGTGGG 180
gumpoong CGTGTCTTGGTAAACTCGCATGCACGACGTAAGCGTCACTGCGTTCCACCCATATGTGGG 180
yunpoong AATATAGGAATAAAAATGGAGAATCCTAACGGGTGCGATCATACCAGCACTAAGGATCC 239
gopoong AATATAGGAATAAAAATGGAGAATCCTAACGGGTGCGATCATACCAGCACTAAGGATCC 239
sunpoong AATATAGGAATAAAAATGGAGAATCCTAACGGGTGCGATCATACCAGCACTAAGGATCC 239
chunpoong AATATAGGAATAAAAATGGAGAATCCTAACGGGTGCGATCATACCAGCACTAAGGATCC 239
gumpoong AATATAGGAATAAAAATGGAGAATCCTAACGGGTGCGATCATACCAGCACTAAGGATCC 239
5SP2

Fig.2 Comparison of 5S rRNA spacer sequences of 5 *ginseng* cultivars