2.2.3. IAA μÅ GC-MS Αρνατική διάγνωση

2.3.3. IAA Εξερεύνηση των λεπτών μέθοδων HPLC 2 από τη έκθεση ερευνητικών δεδομένων ισοήματος ΙΑΑ μέσω διαγνωστικού σημείου.

3.1. IAA μΑ HPLC Διάγνωση μέθοδος

3.2. IAA μΑ GC-MS Αρνατική διάγνωση

3.3. BABA-3-ΟΟΕιν. Εξερεύνηση μέθοδος HPLC 2 από την διάταξη

3.4. Εξερεύνηση μέθοδος GC-MS τη συνθήκη
\[ E' \text{ and } E'' \text{ are standards for mass spectrometry analysis.} \]

**Fig. 3** Tryptophol HPLC analysis

1. \( E' \) and \( E'' \) standards, \( E' \) and \( E'' \) samples, \( E' \) and \( E'' \) standards.

**Fig. 4** Mass spectra of tryptophol

**Fig. 5** Process of biosynthesis of IAA
Research of Indole-3-Acetic Acid Biosynthetic Pathway of *Klebsiella oxytoca* SG-11 by HPLC and GC-MS

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Abstract The plant growth promoting bacteria are closely associated to plant. The bacteria are used to adhering to plant rhizoplane promoting plant growth by fixing nitrogen from atmosphere secreting stimulating substances or producing antagonistic to plant pathogens. It was indicated that the biological nitrogen fixation played an important role in plant growth promoting function. In fact it was verified recently by overall research that IAA does it. Therefore research of IAA production and biosynthetic pathway of plant growth-promoting bacteria is much more important. The various ways of IAA production indicated the strong or weak promoting function of bacterium to plants in general. The purpose of this paper is to determine whether IAA exists in cultured medium of *Klebsiella oxytoca* SG-11 and biosynthetic pathway of IAA in order to optimize cultural conditions for IAA production.

*Klebsiella oxytoca* SG-11 is a plant growth promoting bacterium isolated from rice rhizoplane which can fix nitrogen. The supernatant of SG-11 cultured medium determined by HPLC showed that 47.4 mg/L of IAA existed in LB medium and 1.2 mg/L of IAA in basal medium. IAA in metabolite was identified by GC/MS as well. The intermediate determination of tryptamine indole-3-acetamide tryptophol and indole-3-acetonitrile indirectly indicated that IAA was biosynthesized in a pathway of indole-3-pyruvic acid. Meanwhile tryptophol in metabolite of SG-11 was verified by GC/MS. The direct intermediates of indole-3-pyruvic acid and indole-3-acetaldehyde in the pathway can not be determined because both are unstable under normal condition. As reversible conversion existed between indole-3 pyruvic aldehyde and tryptophol the presence of tryptophol also proved the pathway of indole-3-pyruvic acid in the synthesis of IAA by *Klebsiella oxytoca* SG-11. The results laid basis for further research of plant growth-promoting function of the bacterium.

Key words high performance liquid chromatography mass spectrometry *Klebsiella oxytoca* SG-11 indole-3-acetic acid biosynthetic pathway