# ABSTRACT

**Project Code:** **BRG5080032**

**Project Title:** **Determination of Elemental Fingerprints by Inductively Coupled Plasma Spectrometry and Their Applications**

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**Project Period:** 2007 – March, 2013

Elemental fingerprint refers to the pattern of elemental distribution in a sample, which gives its characteristics similar to a fingerprint of a person. Elemental fingerprinting identifies the distribution of elements within the matrix and thus defines the uniqueness of the sample. Elemental fingerprints can therefore be used in many fields such as geology, archeology, and environmental studies for many purposes

Elemental fingerprint may be linked to source and origin of the sample. It is efficiently used in the area of environmental forensic and source identification. This work presents an attempt to apply the inductively coupled plasma mass spectrometry with laser ablation for direct multi-element determination of solid samples in order to achieve source identification of products which are important to Thai economy. Here, the results of applications to gemstones and rice grains are reported in separated chapters. The problem with solid sampling techniques which is always the main obstacle of application to real samples is the lack of calibration standard. Therefore, this work has attempted to develop a novel calibration standard for Laser Ablation ICP-MS method to be applied for human hair strand. The new calibration standard will provide a convenient way for direct solid analysis of hair strand making it easy for using hair as a sample for forensic and diagnostic studies.

**Keywords:** elemental fingerprint, source identification, ICP-MS

# Executive Summary

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Seven papers have been published in the international journals as follows:

1. Arkasuwan, C., Siripinyanond, A. & **Shiowatana, J.** 2011, "Inductively coupled plasma mass spectrometry with a continuous-flow dialysis simulated gastrointestinal digestion for study of arsenic bioaccessibility in shrimp", International Journal of Mass Spectrometry, vol. 307, no. 1-3, pp. 61-65.