

Pattern Recognition Approach Based on Metabolite Profiling Using In vitro Cancer Cell Line

Authors : Amanina Iymia Jeffree, Reena Thriumani, Mohammad Iqbal Omar, Ammar Zakaria, Yumi Zuhanis Has-Yun Hashim, Ali Yeon Md Shakaff

Abstract : Metabolite profiling is a strategy to be approached in the pattern recognition method focused on three types of cancer cell line that driving the most to death specifically lung, breast, and colon cancer. The purpose of this study was to discriminate the VOCs pattern among cancerous and control group based on metabolite profiling. The sampling was executed utilizing the cell culture technique. All culture flasks were incubated till 72 hours and data collection started after 24 hours. Every running sample took 24 minutes to be completed accordingly. The comparative metabolite patterns were identified by the implementation of headspace-solid phase micro-extraction (HS-SPME) sampling coupled with gas chromatography-mass spectrometry (GCMS). The optimizations of the main experimental variables such as oven temperature and time were evaluated by response surface methodology (RSM) to get the optimal condition. Volatiles were acknowledged through the National Institute of Standards and Technology (NIST) mass spectral database and retention time libraries. To improve the reliability of significance, it is of crucial importance to eliminate background noise which data from 3rd minutes to 17th minutes were selected for statistical analysis. Targeted metabolites, of which were annotated as known compounds with the peak area greater than 0.5 percent were highlighted and subsequently treated statistically. Volatiles produced contain hundreds to thousands of compounds; therefore, it will be optimized by chemometric analysis, such as principal component analysis (PCA) as a preliminary analysis before subjected to a pattern classifier for identification of VOC samples. The volatile organic compound profiling has shown to be significantly distinguished among cancerous and control group based on metabolite profiling.

Keywords : in vitro cancer cell line, metabolite profiling, pattern recognition, volatile organic compounds

Conference Title : ICBBE 2017 : International Conference on Biomechanics and Biomedical Engineering

Conference Location : Kuala Lumpur, Malaysia

Conference Dates : February 12-13, 2017