IMPORTANCE OF MICROBIOLOGY IN THE DEVELOPMENT OF SUSTAINABLE TECHNOLOGIES IN MINERAL PROCESSING

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ABSTRACT

The importance of microbiology in today's mineral processing technology had been shown by biomining technology in which it capabilities to utilize lower grade ore as oppose to the conventional ones, and more environmental friendly. The understanding of biomining and its application in around the globe had been done through five selected case studies involving different scenarios of biomining technology is being applied such as in gold mining, copper mining and nickel and zinc mining. The selected mines is Newmont mine in Nevada, USA, Talvivaara mine in Finland, Fariview mine in South Africa, Chuquicamata mine in Chile and lastly Laizhou mine in Shandong Province, China. Their respective biomining technology also had been studied along with their respective capabilities in mineral processing to better understand of the capabilities and future development of biomining technology for many years to come. The comparison between the scenarios had made achievements to the objective of which to study the future of biomining technology in the developments of sustainable technologies in mineral processing.

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CHAPTER 1

INTRODUCTION

1.1 RESEARCH BACKGROUND

Mineral processing is the most commonly discussed in related to the mining industries. Nowadays, the demands to the earth metal and mineral are rising along with the development of the urban cities and technologies. The growth of economic in developing countries such as China has increased the demands of metal in 2000s and the demands continually increase further throughout several years after due to low level of investment in mining industries and increased demands in developing economies.

The growth in standard of living and in gross domestic product (GDP) also have been found to be related to the increasing consumption of metals in developing countries. This can be said as the growth consumption of metals grows at low rates when the GDP per capita is below than 5000 US dollar per year and however increase exponentially when the GDP per capita rises from 5000 to 10,000 US dollar per year. The consumption of metals however slows down when the GDP per capita exceeds 10,000 US dollar per year. Other countries also have shown an increases in GDP per capita in recent years and some of them which are Turkey, Mexico, and Belarus have already exceeded the GDP limits of 15,000 US dollar per capita. The rising demands of metals in developing countries can be assumed related to increase in population which further leads to the growth of mining industries estimated for years to come. This is shown below in figure 1.1-1.4 by the data of world's production of certain metals from 1994 to 2010 reported by British Geological Survey.