**STUDY OF THE VARIATION OF PIPERINE AND ESSENTIAL OIL COMPOSITION IN CEYLON BLACK PEPPER (*Piper nigrum*) WITH DIFFERENT GEOGRAPHICAL CONDITIONS IN SRI LANKA.**

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*Piper nigrum* L, commonly known as Ceylon black pepper is one of the most important traditional spices in Sri Lanka. Mainly low and mid-country wet and intermediate agro-climatic zones are the most appropriate zones for pepper cultivation. Piperine and essential oil are major compounds found in black pepper which affect its quality where piperine is the major secondary metabolite responsible for its pungency. Climatic conditions, soil properties, variety, management practices are the factors affect for piperine and essential oil content of black pepper. The experiment was carried out to study the variation of piperine and essential oil composition in Ceylon black pepper with different geographical conditions in Sri Lanka. Black pepper samples in semi-matured stage were collected from Central, Uva and Southern provinces. Temperature, relative humidity, rainfall, soil pH, bulk density, Cation Exchange Capacity (CEC) data were collected. Samples were tested to determine the piperine and essential oil content at Industrial Technology Institute and results were obtained. Simple linear regression analysis was performed to investigate any significant effect among piperine content and essential oil content with above factors. Soil maps were created corresponding to each province representing soil pH, bulk density and CEC values. Results shown the highest piperine and essential oil were obtained in Central province and lowest were obtained in Southern province. There was no significant effect (*p* > 0.05) in rainfall, soil pH, CEC with piperine and essential oil content of black pepper. However, there is a significant effect (*p* < 0.05) in temperature, relative humidity and soil bulk density with piperine and essential oil content indicating these factors affect for the piperine and essential oil content of black pepper. Piperine and essential oil content in black pepper depend on the relative humidity, soil bulk density and temperature according to the study.

Key words: *climatic conditions,* *essential oil*, *Piper nigrum L, Piperine*