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RESEARCH TITLE (14pt 1,5 space)

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IMPLEMENTATION OF IMAGE ANALYSIS FROM THIN LAYER CHROMATOGRAM OF PURPLE SWEET POTATO LEAF EXTRACT IN CHEMICAL FINGERPRINTING

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ABSTRACT

Background: Purple sweet potato (*Ipomoea batatas* L.) is a crop that contains rich amounts of anthocyanins and flavonoids. For maintaining its quality in preparations, fingerprint analysis using Thin Layer Chromatography (TLC) is commonly used. **Objective:** In this study, image analysis was implemented on the chromatogram to develop fingerprint profiles of the leaves of various types of purple sweet potatoes. **Methods:** Fingerprint analysis and acquisition of data were carried out by combining modern TLC equipment with software for image analysis. The *in-situ* fingerprint analysis using WinCats was compared with the image analysis results obtained in this study. The chemometric technique, cluster analysis, was performed to measure their difference in terms of sample classification. Cluster analysis was carried out to confirm that the clusters formed from image analysis were the same as those from WinCats. **Results:** The results obtained were two dendrograms, both showing the formation of two clusters, but with a different order of samples. This study concluded that the data obtained from image analysis using ImageJ software resulted in clustering with a similarity of 38.15%, while the data obtained from WinCats software resulted in classification with a similarity of 28.31%. Both methods had issues in determining the fingerprint profiles, as evidenced by the low level of similarity. **Conclusion:** These results indicate that image analysis has the potential to be implemented for fingerprint profile development. However, further analysis is needed to align the Rf values and confirm the compounds in the peaks.

Keywords: Average linkage; Cluster analysis; Dendrogram; Purple sweet potato; Thin layer chromatography

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INTRODUCTION

Purple sweet potato (*Ipomoea batatas* (L.) Lam.) is one of the crop commodities that is widely cultivated in Indonesia. In addition to being used as a food ingredient, the leaves of purple sweet potato may have pharmacological potential. The leaves of sweet potatoes are known to contain beneficial compounds such as minerals, vitamin E, beta-carotene, lutein, and polyphenols[1]. Several studies have reported that sweet potato leaves are a very good source of antioxidant polyphenolic compounds, including anthocyanins such as peonidin and cyanidin derivatives, and phenolic acids such as caffeic and chlorogenic acid[2]. Purple sweet potato leaves have a high anthocyanin content, but the amount depends on the type of sweet potato leaf. It is also known that purple sweet potato leaves of different types have different colors, which may be an indication of different anthocyanins that are implicated in a different fingerprint profile.

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METHODS

1. Types of equipment and Materials

The instruments used were glassware (Iwaki-Pyrex®), analytical balance (Kern-Alj®), bulb filler, ADC chamber (CAMAG), GF254 silica gel TLC plate, ATS (CAMAG), TLC Visualizer (CAMAG), UV lamp (CAMAG), and TLC Scanner 4 spectrodensitometer (CAMAG). The software used for chromatogram data analysis was ImageJ and Minitab 20.3.

The plant material used in this study was purple sweet potato (Ipomoea batatas L.) leaves of Sawentar, Antin-3, Beta-2, Sari, Papua-Salosa types obtained from the Balai Penelitian Tanaman Aneka Kacang dan Umbi, Malang, East Java; Aan type purple sweet potato leaves obtained from Aan Village, Klungkung, Bali, Indonesia; and Pering type purple sweet potato leaves obtained from Pering Village, Gianyar, Bali, Indonesia.

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RESULTS

1. Chromatogram Peak Pattern

In this study, chromatogram peak patterns were obtained from both image analysis and WinCats software data analysis. Based on the images, it can be seen that both data sets have a high similarity in terms of chromatogram peak patterns (Figure 1).
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CONCLUSION

The development of an efficient TLC method for fingerprint analysis requires a chemometric approach that begins with the application of experimental design, separation, data acquisition, and classification or clustering problems. In this study, TLC was combined with multivariate image analysis for fingerprint analysis and clustering of purple sweet potato leaf samples of various types.
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CONFLICT OF INTEREST

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