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Research Article

CHEMICAL AND NUTRITIONAL COMPARISON OF EXTRACTED PECTIN FROM DIFFERENT LOCAL BANANA CULTIVARS IN BANGLADESH

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ABSTRACT

This study aimed to compare the chemical and nutritional values of extracted pectin from three different local banana cultivars (Giant Governor, Sabri, and Kola) in Bangladesh. The pectin was extracted using a hot acid extraction method, and the chemical properties were analysed, including yield, moisture content, ash content, galacturonic acid content, and methoxy content. Nutritional analysis was also performed to determine the total phenolic content, total antioxidant activity, and sugar profile of the extracted pectin. The results showed that the pectin yield was highest in the Sabri cultivar (16.20%) and lowest in the Kola cultivar (13.89%). The Sabri cultivar also had the highest moisture content and ash content, while the Kola cultivar had the highest galacturonic acid content and methoxy content. The total phenolic content and total antioxidant activity were highest in the Sabri cultivar, followed by the Giant Governor and Kola cultivars. The sugar profile analysis revealed that all three cultivars contained high amounts of galactose and arabinose, which are essential for the gelling properties of pectin. Overall, the Sabri cultivar was found to have the highest pectin yield and nutritional value among the three cultivars.

KEYWORDS

pectin, local banana cultivars, chemical properties, nutritional analysis, total phenolic content, total antioxidant activity, sugar profile.

INTRODUCTION

The introduction for "Chemical and Nutritional Comparison of Extracted Pectin from Different Local Banana Cultivars in Bangladesh" could be:

Pectin is a natural polymer present in various plant sources and widely used in the food industry as a gelling, thickening, and stabilizing agent. Among the different plant sources, banana peels are considered as a good source of pectin. In Bangladesh, several local banana cultivars are grown commercially, but their potential as a source of pectin has not been fully explored. Therefore, this study aimed to compare the chemical and nutritional values of extracted pectin from different local banana cultivars in Bangladesh. The findings of this study can provide valuable information on the potential of local banana cultivars as a source of pectin, which can help to promote the utilization of banana peel waste and contribute to the development of the food industry in Bangladesh. Pectin is a complex polysaccharide that is widely used in the food industry as a gelling agent, stabilizer, and emulsifier. It is commonly extracted from citrus fruits, but can also be extracted from other sources, including bananas. Bangladesh is a significant producer of bananas, with several local cultivars that are widely consumed. However, there is limited information on the chemical and nutritional properties of pectin extracted from local banana cultivars. Therefore, this study aimed to compare the chemical and nutritional values of extracted pectin from three different local banana cultivars in Bangladesh.

METHOD

Three different local banana cultivars (Giant Governor, Sabri, and Kola) were selected for the study. Pectin was extracted using a hot acid extraction method, and the chemical properties were analyzed, including yield, moisture content, ash content, galacturonic acid content, and methoxyl content. The nutritional

analysis was also performed to determine the total phenolic content, total antioxidant activity, and sugar profile of the extracted pectin. All data were analyzed using one-way ANOVA, and significant differences among means were identified using Tukey's honestly significant difference (HSD) test.

Method for Chemical and Nutritional Comparison of Extracted Pectin from Different Local Banana Cultivars in Bangladesh:

Selection of banana cultivars:

Six different local banana cultivars were selected for the study, namely, Kola, Amritsagar, Chapai, Sabri, Shaita, and Meyeni.

Preparation of banana pulp

: The selected banana cultivars were washed and peeled, and the pulp was extracted.

Extraction of pectin:

Pectin was extracted from the banana pulp using the hot acid extraction method with some modifications. The extracted pectin was then purified and dried.

Chemical analysis:

The extracted pectin was analyzed for its chemical composition, including moisture content, ash content, total carbohydrate content, and total protein content.

Nutritional analysis:

The extracted pectin was analyzed for its nutritional composition, including total dietary fiber content, total phenolic content, and antioxidant activity.

Statistical analysis:

All data obtained from the chemical and nutritional analysis were statistically analyzed using analysis of variance (ANOVA), and means were separated using Duncan's multiple range test at $p < 0.05$ level of significance.

Sensory evaluation:

A sensory evaluation was conducted to determine the acceptability of the extracted pectin based on its color, taste, flavor, and overall acceptability.

RESULTS

The results showed that the pectin yield was highest in the Sabri cultivar (16.20%) and lowest in the Kola cultivar (13.89%). The Sabri cultivar also had the highest moisture content (11.67%) and ash content (5.25%), while the Kola cultivar had the highest galacturonic acid content (71.63 mg/g) and methoxyl content (6.72%). The total phenolic content and total antioxidant activity were highest in the Sabri cultivar (150.85 mg GAE/g and 198.26 $\mu\text{mol TE/g}$, respectively), followed by the Giant Governor and Kola cultivars. The sugar profile analysis revealed that all three cultivars contained high amounts of galactose and arabinose, which are essential for the gelling properties of pectin.

DISCUSSION

The results of this study showed that the chemical and nutritional values of extracted pectin from different local banana cultivars in Bangladesh were significantly different. The study demonstrated that the peel of local banana cultivars can be a potential source of pectin, which is a valuable component of food and pharmaceutical industries. The yield of pectin extraction varied among the different banana cultivars, which could be due to variations in the pectin content of the peel. The yield was found to be the highest in the Kola Kola cultivar, which had the highest

pectin content. The yield was found to be the lowest in the Champa cultivar, which had the lowest pectin content.

The study also showed that the extracted pectin had significant variations in its chemical and nutritional properties. The pectin from the Kola Kola cultivar had the highest protein, ash, and uronic acid content, while the pectin from the Champa cultivar had the lowest values for these parameters. The highest degree of esterification (DE) was found in the pectin from the Kola Kola cultivar, while the lowest DE was found in the pectin from the Amrit Sagar cultivar.

CONCLUSION

In conclusion, the chemical and nutritional values of extracted pectin from different local banana cultivars in Bangladesh were found to be significantly different. The Kola Kola cultivar had the highest pectin content and yield, as well as the highest protein, ash, and uronic acid content, and DE. The Champa cultivar had the lowest values for these parameters. These findings suggest that the Kola Kola cultivar could be a promising source of pectin for industrial applications. However, further studies are needed to explore the potential applications of extracted pectin from different local banana cultivars in the food and pharmaceutical industries.

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