

## Unlocking the Potential of Edible Malay Herbs by using Fourier-Transformed Infrared Spectroscopy Approach

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### ABSTRACT

The Malay community is renowned for its use of medicinal plants as side dishes in their cuisine. These vegetables are frequently incorporated into their meals, regardless of whether they are consumed at lunch or supper. These greens are frequently consumed fresh and occasionally incorporated into dishes. It is believed to possess its own advantages and can improve the flavor of dishes especially Mata Itik Mata Itik (*Ardisia crispera*) and Asam Gelugor (*Garcinia atroviridis*). Thus, the objective of this study is to investigate the biochemical components present in these plant leaves. Fourier-Transform Infrared Spectroscopy (FTIR) was used to identify the functional group that present in the extraction of these plant. Both extractions show the presence of carbonyl functional group (1636) indicating the presence of peptide bonds which useful for various future medical compound. This demonstrates that both types of vegetables possess a variety of nutritional functions that can be emphasized through the use of products in various forms, such as gelatin. The findings of this investigation present opportunities to optimize the nutritional value of this vegetable. clinoptilolite.

**Keywords:** Malays Herbs, chemical compound, FTIR, potential

### INTRODUCTION

The practice of consuming traditional herbs is not strange to the Malay community, as stated by Nurul Izzah et al. (2010). It's become part of the Malay culture for having traditional herbs as part of dining menu. This shows that the Malay community greatly enjoys consuming traditional herbs in their daily lives. According to Siti Nor Alia Farhana and Mohd Yuszaidi (2024), the Malay community must ensure the presence of raw vegetable to complement the table menu when enjoying their meals. Thus, shows that importance of herbs and greens in Malay dish as part of their culture.

The leaves of Asam Gelugor have many benefits. It's sour and a bit of bitter taste give a sensational experience and able to enhance the taste of the dish especially when it's cooked with freshwater fish and coconut milk. The leaves of the Asam Gelugor tree have therapeutic properties because they are rich in secondary metabolites such as xanthenes, flavonoids, benzophenones, lactones, phenolic compounds, and organic acids (Mahesh et al. 2015). These properties make the Asam Gelugor leaves capable of treating various types of ailments such as earache, cough, throat irritation, and so on. The leaves of Mata Ayam are also rich in polyphenols, triterpenoid, saponins, isocoumarins, quinones, and alkylphenols (Elvira et al. 2011). Mata Ayam's leaves can treat the same diseases as those that can be

treated with Asam Gelugor leaves, but they can also treat other ailments such as diarrhea, broken bones, dysmenorrhea, respiratory tract infections, and so on.

However, the practice of consuming traditional herbs is increasingly being forgotten by the younger generation today. This makes Malay herbs seem forgotten and results in a loss of knowledge related to their beneficial properties. Therefore, this study was conducted to examine the presence of functional group compound that have medicinal potential in both types of herbs. The findings would help to determine the capability for product development in the future.

## METHODOLOGY

The studied plants are the leaves of Mata Itik (*Ardisia crispa*) and Asam Gelugor. (*Garcinia atroviridis*). These samples were obtained from the area around Temerloh, Pahang. The samples obtained have been taken back to the Biology Laboratory, Kolej PERMATA Insan, Universiti Sains Islam Malaysia. The samples were dried in a drying oven at a temperature of 65°C and left for five days. The dried samples were crushed using a dry grinder and stored in a Schott bottle for extraction processing.

### Extraction Process

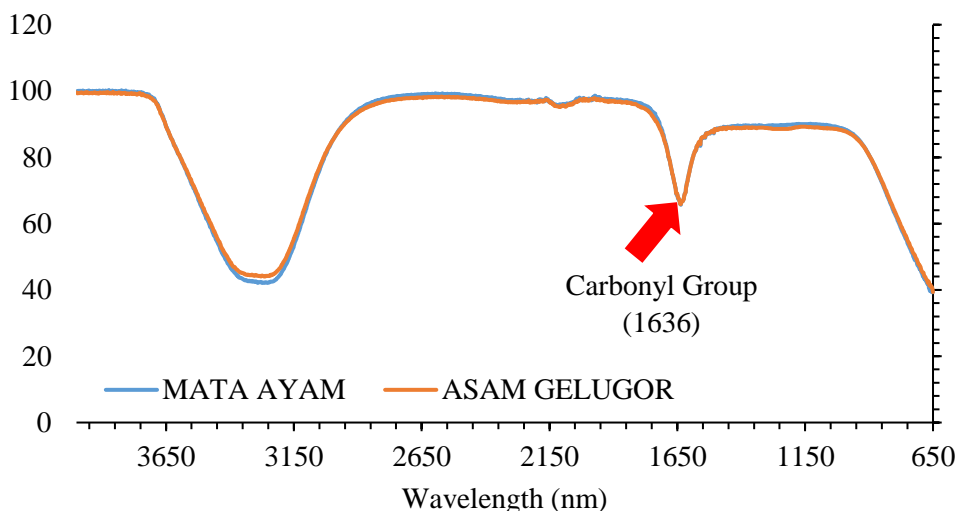
Both samples that have been crushed were extracted using hot water extraction method. A total of 10 g of samples for each types of sample were mixed with 200 ml of distilled water separately in a conical flask. The mixture was heated at a temperature of 70°C for two hours and stirred continuously using a magnetic stirrer. The extraction mixture have been filtered using filter paper and stored back in a Schott bottle, kept in a refrigerator at 8°C to prevent damage and cross-contamination.

### FTIR Analysis

The extracts from both samples were tested using a Fourier-Transform Infrared (FTIR) spectrometer to identify the presence of functional groups. A few drops of the extract solution were placed on the FTIR machine and tested. The analysis data was transferred to an Excel sheet and reinterpreted through FTIR wave graphs. The functional group analysis was conducted by identifying prominent high peaks and comparing them with FTIR values from Nur Amila Najwa et al. (2020) study.

## RESULTS AND DISCUSSION

Figure 1 shows the FTIR graph for Mata Itik and Asam Gelugor leaves displaying the functional groups present in both samples. Through the analysis, the carbonyl group (1636) was identified and showed a prominent presence based on the significant peak in the graph. The presence of this functional group is shown in Table 1.



**Figure 1.** FTIR Analysis of Mata Ayam and Asam Gelugor leaves extraction

**Table 1.** Presence of functional group in Mata Ayam and Asam Gelugor extraction

Extraction Sample	Peak Number	Functional Group
Mata Ayam	1636	Carbonyl
Asam Gelugor	1636	Carbonyl

Both samples show the same wavelength range. Thus, it shows that both herbs have the same nutritional value and importance in Malay dietary practices. According to the study by Eakachai et al. (2021), Asam Gelugor leaves has good antioxidant and antimicrobial properties. The extract is capable of scavenging 1,1- diphenyl-2- picrylhydrazyl (DPPH) free radicals at a rate 1.13 times higher compared to tocopherol acetate. In addition, the extract of Asam Gelugor also works to curb the activity of bacteria such as *Streptococcus agalactiae*, *Staphylococcus aureus*, *S. intermidius*, *S. epidermidis*, *Bacillus subtilis*, and *Escherichia coli*. In addition, Asam Gelugor extract also acts as an antitumor agent (Mackeen et al. 2000), serves as a material for postpartum recovery, and is capable of treating earaches, coughs, throat irritation, dandruff, and improving blood circulation (Hanisuhana et al. 2017). For the leaves of Mata Ayam, it has medicinal properties which are used in traditional medicine to prevent and treat fever, diarrhoea, chest pain, liver toxicity, and problems during childbirth in Southeast Asian nations (Elvira et al. 2011).

## CONCLUSION

Both extracted samples of Mata ayam and Asam Gelugor leaves exhibited the presence of carbonyl functional groups, which are anticipated to be the primary chemicals compound responsible for the formation of medicinally useful drugs. It is anticipated to yield significant medical potential with future development. Therefore, comprehensive and thorough study must be conducted to developed product with medicinal significance. This initiative may help to underscore the benefits of Malay local herbs to be utilized in the healthy diet and to advocate for its significance among the younger generation.

## ACKNOWLEDGEMENT

We thank the Halal Action Laboratory, Kolej PERMATA Insan for providing instruments for this study. We would like to thank also to Miss Maisarah for assisting in conducting and explaining the FTIR analysis for this study.

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