

FTIR ANALYSIS OF DRIED APRICOT (APRICOT CHIPS) AS AN AGRICULTURAL PROCESSED PRODUCT

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Abstract

The study investigates the chemical structure and functional groups of dried apricot (apricot chips) using Fourier Transform Infrared (FTIR) spectroscopy. The FTIR spectrum was recorded in the range of 4000–400 cm^{-1} to identify major functional groups associated with carbohydrates, organic acids, and bound moisture. The results revealed the presence of hydroxyl ($-\text{OH}$), aliphatic $\text{C}-\text{H}$, carbonyl ($\text{C}=\text{O}$), and $\text{C}-\text{O}$ functional groups, which are characteristic of polysaccharides, organic acids, and residual moisture in dried agricultural products. The obtained spectral data confirm that dried apricot retains its essential biochemical components after drying, indicating its suitability for long-term storage and further processing.

Keywords: *dried apricot, FTIR spectroscopy, agricultural products, functional groups, food processing.*

1. Introduction

Dried fruits play an important role in the agricultural processing industry due to their extended shelf life, high nutritional value, and export potential. Apricot (*Prunus armeniaca* L.) is widely cultivated and processed into dried forms such as apricot chips (o'rik qoqi), which are rich in carbohydrates, organic acids, dietary fiber, and bioactive compounds.

Understanding the chemical structure of dried apricot is essential for evaluating the effects of drying and storage processes on product quality. Fourier Transform Infrared (FTIR) spectroscopy is a rapid and non-destructive analytical method widely used to characterize functional groups and molecular structures in food and agricultural products. Therefore, this study aims to analyze the FTIR

spectrum of dried apricot and to identify its main functional groups relevant to storage and processing technologies.

2. Materials and Methods

2.1. Sample preparation

Dried apricot samples were obtained after conventional drying under controlled conditions. The samples were finely ground to ensure homogeneity before analysis.

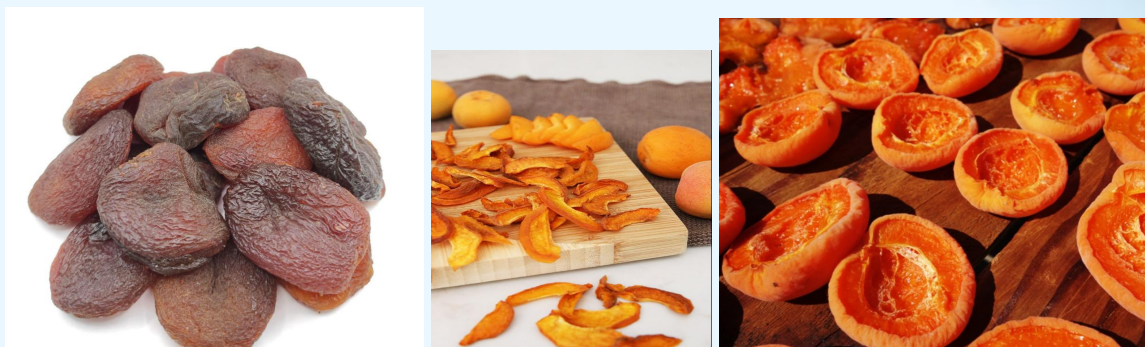


Figure 2. Samples of dried apricots.

2.2. FTIR analysis

FTIR spectra were recorded using an FTIR spectrometer in the range of 4000–400 cm^{-1} . The results were expressed as transmittance (%T) versus wavenumber (cm^{-1}). Major absorption bands were analyzed and assigned to corresponding functional groups based on standard infrared absorption references.

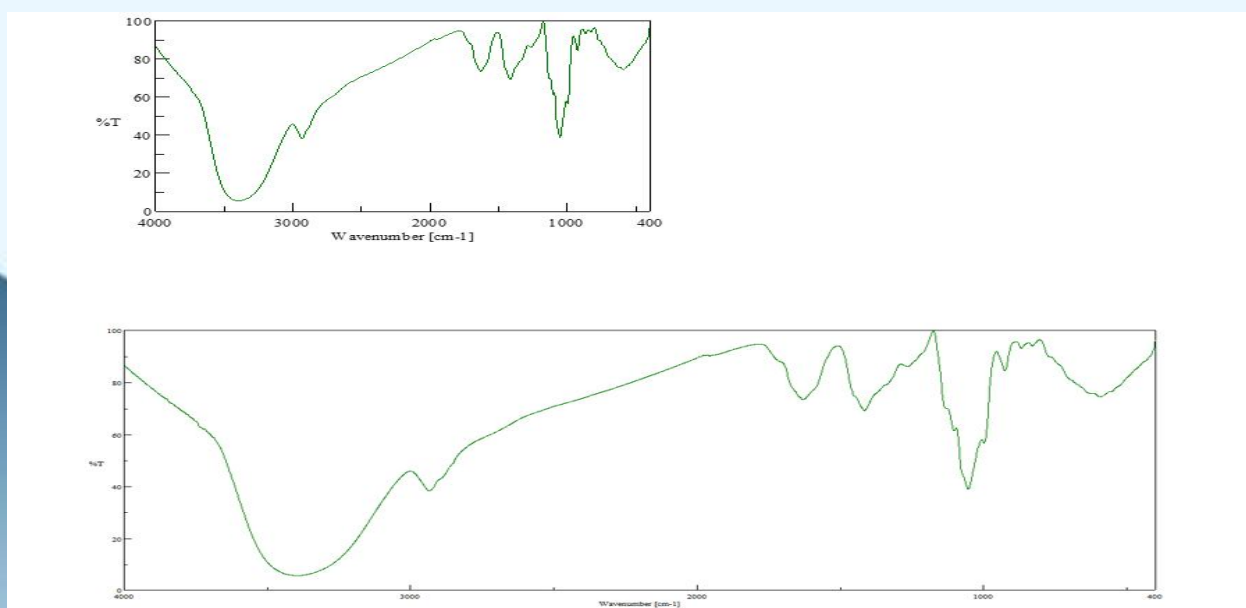


Figure 2. FTIR spectrum showing the main absorption bands of dried apricot

3. Results and Discussion

The FTIR spectrum of dried apricot showed several characteristic absorption bands indicating the presence of major biochemical components.

Broad absorption bands observed in the range of 3800–3700 cm^{-1} correspond to free hydroxyl ($-\text{OH}$) stretching vibrations, while a strong and broad band at 3399.89 cm^{-1} is associated with hydrogen-bonded $-\text{OH}$ groups. These bands indicate the presence of bound water and hydroxyl-containing polysaccharides such as pectin, cellulose, and hemicellulose, which are typical for dried fruit products. Absorption peaks at 3000.69 and 2935.13 cm^{-1} are attributed to aliphatic C–H stretching vibrations of methyl and methylene groups, confirming the presence of carbohydrates and minor lipid components.

A distinct absorption band observed at 1780.94 cm^{-1} is related to carbonyl ($\text{C}=\text{O}$) stretching vibrations, which are characteristic of organic acids and ester compounds. This result is consistent with the natural composition of apricot, which contains malic and citric acids.

The band at 1633.41 cm^{-1} can be assigned to the bending vibration of water molecules and partially to amide I vibrations, indicating the presence of structurally bound moisture even after drying.

In the region of 1505–1416 cm^{-1} , absorption bands correspond to C–H bending vibrations and possible contributions from phenolic compounds. The bands observed at 1289.18 and 1264.11 cm^{-1} are attributed to C–O stretching vibrations of polysaccharides.

The fingerprint region between 1200 and 1000 cm^{-1} exhibited multiple absorption peaks related to C–O–C and C–O bonds, confirming the dominance of carbohydrate structures. Lower wavenumber bands (955–591 cm^{-1}) are associated with skeletal vibrations of carbohydrate rings, reflecting the structural stability of dried apricot.

4. Conclusion

FTIR spectroscopic analysis of dried apricot revealed the presence of hydroxyl, carbonyl, aliphatic C–H, and C–O functional groups, which are characteristic of carbohydrates, organic acids, and residual bound moisture. The results confirm that the drying process preserves the fundamental chemical structure

of apricot while reducing free moisture. These findings demonstrate that FTIR spectroscopy is an effective tool for evaluating the quality and structural stability of dried agricultural products and can be successfully applied in storage and processing technology research.

References

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