THE EFFECT OF DIFFERENT SOWING TIMES ON CORN SILK TEA

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Corn silks, a by-product of corn, are an important herb used traditionally by many countries to treat many diseases. They are also used as traditional medicine in many parts of the world because of corn silks were used as a source of phenolic component and beverages (diuretic and antiseptic) all over the World. This study aim is determination of proper using method the corn silk image and FTIR at different sowing time of corn. The result of this study show that properties of raw, lyophilized products and evaporated materials are not changed at different sowing time. Also probably, to lyophilized products can be use food additive and prepare tea again with adding water.

Keywords: tea, corn silk, sowing time, FTIR.

INTRODUCTION

Corn is one of the warmest climate cereals in the world and one of the most important people, animals and plants used in the industry. It is known that corn was used kernels and plant with animal which is an indispensable feed source for animals due to its high efficiency in the field and industry. Besides, people have used them for various purposes. Especially as a grain cookie, boiled and flour are the most used parts.
Corn silk is made from stigmas, the yellowish thread like strands from the female flower of corn. In addition, the use of corn silk has been in medicine and in the world and in our country for many years. Corn silk, a by-product of corn, is also a medical product used as a beverage because it is a source of phenolic components (Liu *et al.*, 2012; Sarepoua *et al.*, 2015; Zulkadir *et al.*, 2016; Al-Khayri *et al.*, 2022).

The corn tassel consists of 6.26% protein, 10.1% fat, 11.06% ash and 70.26% carbohydrate (Mohsen and Ammar, 2009). For many years corn tufts have been used in diuretics, antilithiatic, uricosurics and antiseptics. It is used in the treatment of edema and urinary incontinence (Ebrahimzadeh *et al.*, 2003; Hasanuddin *et al.*, 2012). It also consists of proteins, vitamins, carbohydrates, calcium, potassium, magnesium and sodium salts, volatiles oils and steroids such as sitosterol and stigmasterol, alkaloids, and saponins (Ebrahimzadeh *et al.*, 2008).

After the corn harvest, many crops remain on the field. Corn tassel is one of these products. The corn tassels are a vast part of the plant, which could be considered as a great source of products. Currently, many studies have focused on agricultural and industrial wastes in the search for natural antioxidants (Zaho *et al.*, 2013).

Preparing commercial preparations, the material obtained as lyophilized can be better preserved and stored for a long time. Fourier transform infrared (FTIR) methods were used for rapid characterization and classification of different materials. FTIR spectroscopy is rapid, easy to handle and provides easy sampling. So, usage of this technique in food analysis increases nowadays (Gordon *et al.*, 2007; Popescu *et al.*, 2009; Rohman and Man, 2010;).

To accomplish this, we determined surface characteristics of corn stalk powder, determined proper using method the corn silk, determination of the state of these substances inside the corn tassel, determination of the remaining substance after the tea water was evaporated. FTIR and XRD in conjunction with physical characterization measurements are used to examine.

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MATERIALS AND METHODS

Corn silks are taken dent corn (*Zea mays* var. *indentata* Sturt). Corn silk were obtained from the farm of the Faculty of Agriculture, Mustafa Kemal University, Hatay, Turkey (Figure 1). This corn investigation was planted second crop seasons.

Figure 1. Corn silk

Sample Preparation

After harvest, corn silks were dried, milled to a size of 1 mm with porcelain mortar, packaged in glass jars and stored at room temperature (25) till use. Then, all samples (P1: 1st June, P2: 15th June and P3: 10th July) with three different fractions; A (original raw materials), B: (lyophilized after prepare tea) and C: (evaporated residue after boiled tea) were analyzed with FTIR.

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SEM Analysis: One of the key equipment present with in the CSSNT-UPB group, namely a Hitachi SU 8230 Scanning Electron Microscope was used to perform sample analysis. For analysis was used 1kV voltage. Secondary electron images were acquired at 300x magnification.

FITR measurement conditions: FTIR analysis was used Spectrum Two IR Spectrometer from PerkinElmer. Mid infrared ray wave (MIR; 400~4000 cm^{-1}); Scan resolution 1 cm^{-1}; Frequency range 450 – 4.000 cm^{-1}; No. of spectrum 10. FTIR analysis was used Spectrum Two IR Spectrometer from PerkinElmer.

RESULTS AND DISCUSSION

A scanning electron microscope (SEM) is a type of electron microscope that produces images of a sample by scanning the surface with a focused beam of electrons. Scanning Electron Microscope (SEM) images are given Figure 2.

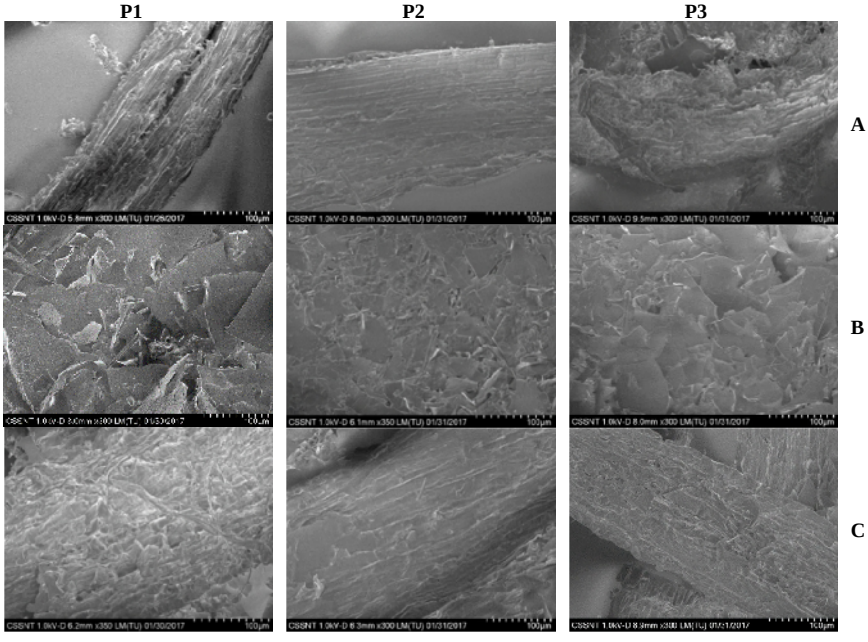

Figure 2. SEM images of corn silks

(P1: 1st June; P2: 15th June; P3: 1st July; A: Original; B: Lyophilized; C: Evaporated)

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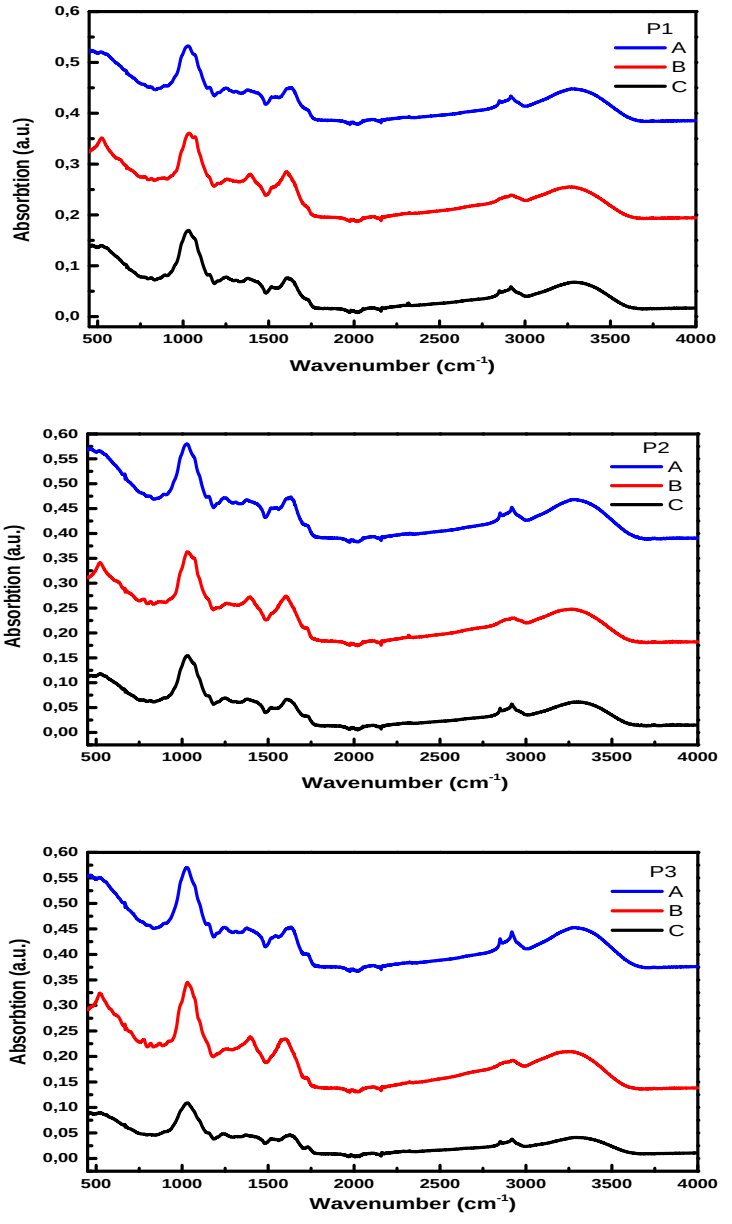

Figure 3. FTIR spectrums of corn silks

(P1: 1st June; P2: 15th June; P3: 1st July; A: Original; B: Lyophilized; C: evaporated)

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It was determined that there was not much change in appearance of SEM images in original and evaporated silk materials of corn silk. But lyophilized materials were seen a looks like small cracks (Figure 2).

The FTIR is used a fingerprint at different materials. The FTIR spectrum 500-4000 cm^{-1} is shown in Figure 3, the result show that no change is produced in the corn silk material. Absorption values were found to be approximately 55, 30 and 10 a.u. in original corn silk, lyophilized and evaporated materials first sowing time.

In all three graphic curves, the images of the active ingredients in corn silk at different wavelengths were determined. It is seen that there is no change in the substances in the corn silks.

FTIR results show that, active ingredients are not affected by sowing times. At the same time, it was clearly seen that depending on the processes performed as A, B, C, the original to lyophilized and evaporation gradually decreased. However, this homogeneously decreasing occurs for all active ingredients without being converted to each other. Hrebicik *et al.* (1995) reported that small molecular changes occurred according to FTIR analysis in their study in rice and oats. Corn varieties and silk developmental stages showed significant variations investigation parameters (Duangpapeng *et al.*, 2018).

CONCLUSIONS

In the results of working, it has been determined that the active substances in the silk can be homogeneously dispersed in water. It has been concluded that all water-soluble substances can be easily stored, used in lyophilized products and food additives, and also corn silks tea can be prepared again by adding hot water with powdered product.

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