$$\eta = A e^{-B\left(\frac{t}{t_0}\right)} \tag{3}$$

$$\eta = -C\left(\frac{t}{t_0}\right) + D \tag{4}$$

where t is temperature, t_0 = 1 °C; A, B, C, D are constants dependent on kind of material, and on ways of processing and storing .

Table 2
Coefficients A, B, C, D of regression equations (3, 4), and coefficients of determination

Measurement Coefficients	**First measurement**	**Second measurement**	**Third measurement**
A	24.378 4	24.522 7	24.740 3
B	0.013 183 6	0.013 237 2	0.013 322 7
R^2	0.987 173	0.992 260	0.992 312
C	0.262 424	0.263 636	0.267 576
D	23.998 8	24.118 2	24.331 2
R^2	0.980 412	0.989 489	0.988 368

SOME ELECTRICAL PROPERTIES OF DRIED QUINCES CYDONIA OBLONGA

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ABSTRACT

The electrical measurements are utilized at appraisal of various fruits quality. Samples of dried quince were delivered by Faculty of Agriculture of University in Novi Sad. The samples were dried in osmotic drier on the beginning and in convective drier after it. Electrical resistance, impedance and capacitance were measured by LCR meter Good Will LCR-821. Measurements had been realized

at frequencies from 100 Hz to 200 kHz. Frequency dependencies of electrical properties were determined for all samples. The capacitance, resistance, impedance and relative permittivity as well decrease powerly in dependence on the frequency. The differences between values of capacitance belonged to different quinces are very small. We can deduce that the method of drying ensured the same properties of all apricot pieces.

INTRODUCTION

The electrical measurements are utilized at appraisal of various fruits quality. For example Gordeev (1998) developed an apparatus for investigation the electrical parameters of fruit tissue, viz. polarization capacity and conductivity. Vozáry et al. (1999) described the impedance parameter characterized apple bruise. Mészáros et al. (2005) measured the impedance spectra of apple slices during drying and correlated impedance parameters to moisture content in the different drying periods. Electric capacity measurement was utilized for watermelon quality determination by Kato (1997). Muha et al. (2005) investigated of apricots maturity by non-destructive methods. Arnold et al. (1998) described electrical impedance methods for assessing fruit quality. Montoya et al. (1994) utilized a technique for measuring the electrical conductivity of intact fruits. They measured the electrical conductivity of avocado fruits during cold storage and ripening. The health state of some fruit can be observed on ground of their electrical properties. Than et al. (1996) investigated the effect of pineapple blackheart on electrical resistance of pulp tissues. The electrical resistance of pulp from harvested pineapples with blackheart was lower than that of tissue from healthy pineapples. Resistance decreased with increase in disease severity. The measurement of the electrical resistance thus provides a rapid and convenient method of diagnosing the blackheart. Hlaváčová and Hlaváč (2003) measured the electrical properties of apricot flesh. It was found that the decay of apricot flesh influences its electric conductivity, impedance and capacity, which are caused by damage of cell membranes. The impedance decreased on values from 250 Ω till 900 Ω for decayed apricots; on the contrary the impedance of flesh intact with decay attained the values more than 13 kΩ.

MATERIAL AND METHOD

Samples of dried quince were delivered by Faculty of Agriculture of University in Novi Sad. Quince is a fruit with hard flesh, with many pips or seeds; it has high pectin content, and a wonderful fragrance. The samples were dried in osmotic drier in sugar solution with concentration of 0.85 and temperature 45 °C

during 120 min on the beginning. Outcome moisture content wet basis was about 32 %. During the soaking in concentrated solution three mass transfer flows were taking place. One was water outflow from the tissue to the surrounding solution, the second was solute movement from the medium to the bioproduct, and the third mass transfer flow was the leaching of food solutes to the medium.

The samples were dried in convective drier after osmotic drying at temperature of 50 °C during 240 min. The method of drying is described by Babić Lj. et al. (2002). Final moisture content w. b. of quinces was about 20 %. For example these properties of dried fruits were noted: relative increase of sugar content and vitamin C content, and the taste improvement as well.
30 pieces of dried fruits were chosen and sliced on thickness of 5 mm. The dried pieces of fruits were located between 2 plates of capacitor. We measured the resistance, impedance and capacitance of samples by LCR meter Good Will 821 in the frequency range from 50 Hz to 200 kHz. The measured values were loaded by PC. Each electrical property was measured at all frequencies three times. Average value has been computed from these ones.

RESULTS AND DISCUSSION

Frequency dependencies of resistance, impedance and capacitance were constructed from measured values. For illustration, on Fig. 1 the frequency dependencies of impedance for 6 samples of dried quince are shown.

The impedance decreases powerly with frequency according to the equation

$$Z = Z_o\left(\frac{f}{f_o}\right)^{-k} \qquad (1)$$

where: Z – impedance, Z_o – reference impedance, f – frequency, f_o = 1 kHz, k – constant.

The coefficients of determination of this equation have high value for all samples. The frequency dependencies of resistance and impedance have the same shape and differences are negligible. It is evident that in this frequency range the reactances of quince haven't influence on their impedance.The frequency dependencies of capacitance for 6 samples of dried quince were studied, as well. The regression equation of these dependencies has the same shape as equation (1)

$$C = C_o\left(\frac{f}{f_o}\right)^{-k} \qquad (2)$$

where: C – capacitance, C_o – reference capacitance, f – frequency, f_o = 1 kHz, k – constant.

The coefficients of determination have high value for all samples in this case, as well. The displacement between frequency dependencies of capacitance for 6 samples is very small. Average relative permittivity calculated on the base of the capacitance and dimensions of samples has value about 12.

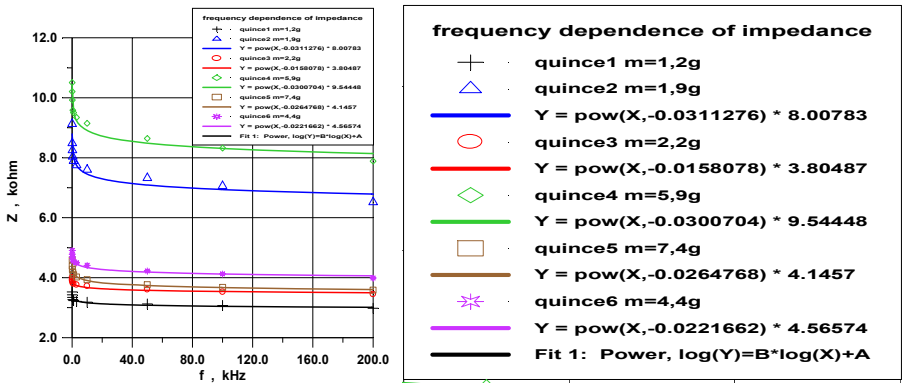

Figure 1
Frequency dependencies of impedance
for 6 samples of dried quince

Conclusion

The resistance, impedance and capacitance decrease with frequency. The regression equation has the shape of decreasing power function as (1), (2). These equations have high coefficients of determination. The differences between dependencies for resistance and impedance are negligible. It is evident that in this frequency range the reactance of quinces hasn't influence on their impedance. The displacement between frequency dependencies of capacitance is very small. From this we can dedicate that the method of drying ensured the same properties of all quince pieces. Electrical properties can be used at the control of quince pieces identical moisture content after drying.

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PHYSICAL QUALITY OF POTATO VARIETIES (SOLANUM TUBEROSUM L.)

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ABSTRACT

Ten potato varieties were studied for firmness of raw tubers and texture of the boiled product. Textural properties of selected varieties of potatoes were evaluated using unaxial compression test on a device Tira test 27025. Cylindrical specimens of the exact size were prepared from raw and boiled potatoes. The force needed for compression was recorded and assessed.