Accepted Manuscript

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Ryan C. Renshaw, Georgios A. Dimitrakis, John P. Robinson, Samuel W. Kingman

PII:	S0260-8774(18)30388-1
DOI:	10.1016/j.jfoodeng.2018.08.037
Reference:	JFOE 9387
To appear in:	*Journal of Food Engineering*
Received Date:	02 March 2017
Accepted Date:	31 August 2018

Please cite this article as: Ryan C. Renshaw, Georgios A. Dimitrakis, John P. Robinson, Samuel W. Kingman, The relationship of dielectric response and water activity in food, *Journal of Food Engineering* (2018), doi: 10.1016/j.jfoodeng.2018.08.037

The relationship of dielectric response and water activity in food

Ryan C. Renshaw[a,b], Georgios A. Dimitrakis[b], John P. Robinson[b], Samuel W. Kingman[b]

[a] e2v technologies (uk ltd), 106 Waterhouse Lane, Chelmsford, Essex, UK, CM1 2QU

[b] Energy and sustainability research division, Faculty of engineering, University of Nottingham, University park, Nottingham, NG7 2RD

Keywords: Dielectric, sorption, water activity, multilayer, monolayer, food

Abstract

This study has deduced a correlation between points of inflection of water activity and loss factor with respect to moisture content. A point of inflection in loss factor with respect to moisture content was found to coincide with the sorption isotherm point of inflection that defines the transition from multilayer to solution in every instance analysed, with an average difference of just 0.01kg.kg^{-1}. Food can support microbial growth and chemical reactions in water activity levels above this critical transition. This correlation was discovered using published dielectric and sorption data for specific foods at similar temperatures. It was found that low sugar foods containing high levels of hydrocolloids generally exhibited different behaviour from fruits. This shows that microwave heating behaviour will be different in fruits compared to low sugar foods with high hydrocolloid content when drying to achieve a certain water activity and therefore shelf life.