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The relationship of dielectric response and water activity in food

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1 **The relationship of dielectric response and water activity in food**

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

9

10 **Abstract**

11

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

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