

Euro-Global Conference on

# Food Science, Agronomy and Technology

*Theme:*

*Current Trends and Future Perspectives in  
the Food Sector: From novel concepts to  
industrial applications*

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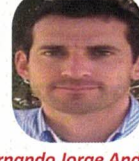
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Thank You  
All...



## The application of adsorption isotherms with proper fitting to interpret polyphenol bioaccessibility *in vitro*

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One of the ways of studying these complex reactions *in vitro* is to study the adsorption of polyphenols onto dietary fiber. The experimental results (the amount of polyphenols adsorbed onto dietary fiber  $q_e$ , and the amount non-adsorbed  $c_e$ ) can be modelled with adsorption isotherm equations. Parameters obtained from these equations can help in the attempt to interpret adsorption process and by that to interpret bioaccessibility *in vitro*. But, adsorption isotherms require proper fitting to lower the error of models and to obtain correct parameters of adsorption equations.

The aim of this work was to study the adsorption between apple polyphenols and  $\beta$ -glucan, to model the experimental data with Langmuir, Dubinin-Radushkevich, and Hill adsorption isotherms with improved fitting, and to use corrected parameters from adsorption isotherms to interpret the adsorption process. Polyphenols were extracted from the flesh and peel of apples by using ultrasound assisted extraction and adsorbed onto  $\beta$ -glucan until the adsorption reached the equilibrium. The amount of total free polyphenols before and after adsorption were determined by using Folin-Ciocalteu method. The  $q_e$  (adsorption capacity,  $\text{mg g}^{-1}$ ) and  $c_e$  (polyphenol concentration in equilibrium,  $\text{mg l}^{-1}$ ) were modelled with equations of adsorption isotherms. Experimental data fitting ( $q_e$  and  $c_e$ ) was conducted by using improved minimization of the sum of square errors. According to the results, polyphenols from peel adsorbed in a higher amount onto  $\beta$ -glucan than flesh polyphenols. Adsorption isotherms fitted according to the new, improved fitting, showed lower standard error and can be considered more accurate and precise for the interpretation of adsorption. According to new parameters, peel polyphenols showed higher theoretical, maximal adsorption capacity ( $q_m$ ) and theoretical capacity of saturation ( $q_s$ ). Parameter  $n_H$  points to the negatively cooperated bonding for almost all polyphenols. New, more accurate fitting allows safer insight into the bonding between polyphenols and dietary fibers and accordingly into the bioaccessibility explanation, *in vitro*.

### Audience Take Away:

- The audience will understand the importance of proper fitting of data from adsorption process.
- The results of this study are interesting for many areas in which adsorption isotherms can be applied (like in chemistry, ecology, biochemistry etc.).
- The presentation will also give an insight into the bioaccessibility process and its importance in polyphenol bioactivities.

### Biography

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