

## Production and characterization of polysaccharide films with the addition of grape and jambolan (*Syzygium cumini*) juices

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### Abstract

This study aimed to produce and characterize oral application films formulated with polysaccharide (high methoxyl pectin - PA and hypromellose - HP), grape juice and jambolan juice. The films were conditioned in desiccators containing saturated saline solutions, simulating relative humidity (RH) ambients from 11% to 90% in order to determine the adsorption isotherms. The tri-parametric GAB model was used to get the experimental data adjustment.

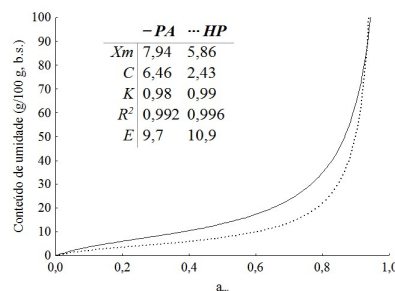
**Key words:** Films of oral application; isotherms; jambolan

### Introduction

The oral application films are alternatives to make stable and cheap products. Firstly, they were developed as films to refresh the breath and, then, used by pharmaceutical industry as tools for drugs liberation. The films can be produced by the casting technique, that consist of spreading a polymeric solution (film-forming solution) using a mold. After being dried, liquid is eliminated and pellicle or thin film is produced. The study of the film isotherms allows getting its behavior in a water activity range. Therefore, the improvement on the production and the commercialization of edible films of oral application is possible, optimizing variable that might affect, for instance, the dryer time, its shelf life, and determine the packaging type and its characterization (Alexandre et al., 2007).

### Results and Discussion

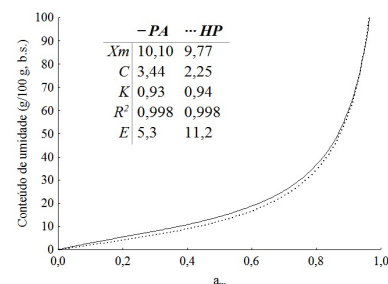
According to Figures 1 and 2, it's possible to compare the adsorption curves of PA and HP films that were made with grape juice and jambolan juice, respectively. Goula et al. (2008) show that the amount of monolayer humidity represents the relative humidity storage condition that results in a better stability and quality. At the lowest values of  $X_m$ , the reaction rates of deterioration are minimized, except oxidations. In both graphs, the films that were made of HP hydrocolloid obtained lower value of  $X_m$  when compared to films made of PA.



**Figure 1.** Adsorption isotherms of PA and HP films containing grape juice. GAB adjustment.

According to Gabas et al. (2007), in the GAB model, the constant C is inversely related to the interaction force between adsorbate and adsorbent. Lower values of constant C represent higher interaction, and higher values do lower interaction. It's possible to observe a

higher value of constant C at the films made of PA hydrocolloid, as well as higher variations for the constant C in the films made of grape juice.



**Figure 2.** Adsorption isotherms of PA and HP films containing jambolan juice. GAB adjustment.

Similarly, the constant K is related to the interaction forces between adsorbate-adsorbent, however directly related, according with Timmermann (2003). The author says that values higher than one for the constant K are physically unsuitable, indicating an infinite solution. At all films made and adjusted by GAB model, values of K near to one were obtained.

### Conclusions

The obtained isotherms were type III, typically compared to those which have higher content of sugar in its composition. The model that best fit the experimental data of the adsorption isotherm process was the GAB one.

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