MICROENCAPSULATION OF JUSSARA EXTRACT RICH IN ANTHOCYANINS BY SPRAY DRYING
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Abstract
The spray drying process of jussara extract using maltodextrin 10 DE and gum Arabic as carrier agents can result in an anthocyanin rich microparticles for nutritional applications or natural colorant. The microparticles showed high anthocyanin retention and antioxidant properties.

Key words: Antioxidant capacity, maltodextrin 10 DE, gum Arabic.

Introduction
The Jussara fruit obtained from jussara palm (*Euterpe edulis* Martius) presents high content of polyphenols and anthocyanins, with high antioxidant capacity. The anthocyanins are water soluble pigments, non-toxic and show high potential for replacement of artificial colors or nutritional applications. The encapsulation techniques have been presented as an efficient method for stabilization of anthocyanins, protecting them from physical and chemical interactions with the external environment, besides allowing a longer shelf life and wide industrial application. In this context, the aims of this work were to obtain bioactive compounds from jussara pulp using an agitated bed and to realize the drying process in a spray dryer. The microparticles obtained after the drying process were characterized regarding moisture content, water activity, particle size, Scanning Electron Microscopy (SEM), color (*L*, *a*, *b*, *C* and Hue), anthocyanin retention and antioxidant capacity.

Results and Discussion
The hydroalcoholic extract of jussara was concentrated on a rotary evaporator to remove ethanol and for solid concentration. Anthocyanins were more sensitive to evaporation process, (7.0% loss) when compared to compounds polyphenolics. Reducing the amount of anthocyanins reflected in the loss of antioxidant capacity, according to the FRAP test. The total phenolic compounds showed an increase after the concentration process of jussara extract, as well as antioxidant capacity by DPPH method. The characterization of the microparticles produced by spray drying using maltodextrin (MD 10DE) and gum Arabic (GA) pure and combined (50% MD 10DE: 50% GA; 25% MD 10DE: 75% GA and 75% MD 10DE: 25% GA) resulted in a low moisture content, ranging from 2.94 to 4.14 (%) b.u., and a water activity below 0.26. The particles showed a bimodal distribution and mean diameter varied from 8.80 to 6.98 µm. Wall materials combined (50% MD 10DE: 50% GA; 25% MD 10DE: 75% GA and 75% MD 10DE: 25% GA) had high retention of anthocyanins and also high antioxidant capacity, which means that it is possible to correlate both properties on the particles. Microparticles with GA and MD 10DE pures had lower pigments retention and antioxidant capacity. The analysis for the parameter *a* in microparticles containing jussara extract is very relevant, since this parameter is related to red color and associated with the content of anthocyanins. In general, all samples showed a high *a* as well as the parameter *C*.

Figure 1 reveals the SEM microphotographs. The particles exhibited spherical shape and irregular surface and various sizes, typical characteristic of spray dried powders. It was observed that MD 10DE combined with GA formed particles with smoother structures, when compared to GA pure.

![Figure 1. SEM of microparticles prepared with GA (A), MD 10DE (B), 50% MD 10DE: 50% GA (C).](image)

Conclusions
The process of encapsulation by spray drying was effective for stabilizing the anthocyanins, not causing their degradation after drying. The microparticles showed high retention of anthocyanins and consequently high antioxidant capacity. The carrier agents MD 10DE and GA were efficient in the drying process, especially when used in combination.

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