

## Total oxidant scavenging capacities of *Euterpe oleracea* Mart. (açai seeds) and their polyphenolic compounds

Roberta B. Rodrigues<sup>1</sup>(PQ), Ramona Lichtenthäler<sup>1</sup>(PG), Benno Zimmermann<sup>1</sup>(PQ), Menelaos Papagiannopoulos<sup>1</sup>(PQ), Heinz Fabricius<sup>1</sup>(TC), Friedhelm Marx<sup>1</sup>(PQ), Ossalin Almeida<sup>2</sup>(TC), José Guilherme S. Maia<sup>3</sup>(PQ). *F.marx@uni-bonn and gmaia@ufpa.br*

<sup>1</sup>Institute of Food Science and Food Chemistry, University of Bonn., D-53115 Bonn, Germany; <sup>2</sup>Departamento de Química, Universidade Federal do Pará, 66075-900 Belém, PA, Brazil <sup>3</sup>Departamento de Engenharia Química e de Alimentos, Universidade Federal do Pará, 66075-900 Belém, Brazil.

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### Introduction

Free radicals are implicated in several human illnesses like arteriosclerosis, cancer, Alzheimer's and Parkinson's disease and also in the ageing process. There is considerable evidence that the intake of antioxidants could help to maintain health and to prevent illnesses caused by oxidative stress. Because some artificial antioxidants the demand for alternative and safe antioxidants from natural sources is growing worldwide. A promising new source for natural antioxidants is the *Euterpe oleracea* Mart. palm (*Arecaceae*), known as "açai" with its greatest abundance in the Amazonian floodplains of Brazil. Its grape sized, dark purple fruit is used for preparing an active beverage. There are evidence that açai seed could possess benefits that are similar to those of grape seeds. These by-products of the wine are rich in polyphenolic compounds. We study the antioxidant capacity of açai seeds against the reactive oxygen species (ROS) peroxy, peroxyne and hydroxyl radicals, covering a broad spectrum of different reactivity. The Total Oxidant Scavenging Capacity (TOSC) assay was used to analyze previously the açai fruits<sup>1</sup> In addition the main compounds responsible for the antioxidant capacities were identified by LC-MS. The crushed seeds were digested with MeOH (3x300) at room temperature, during 3 days. The solvent was removed by a rotary vacuum evaporator at 30°C. 0.5 g of the dried extract was suspended with UHQ water to a final volume of 10 mL, sonicated and centrifuged for 10 min and filtrated through a folded filter for HPLC analysis. For TOSC analyses, the extract solutions were diluted with UHQ water to 5 different concentrations for each of the 3 ROS to cover the respective ranges of the antioxidant capacities. The diluting was done in duplicate in all cases and each solution was measured at least twice. Individual polyphenols were identified by multi step mass spectrometric fragmentation after HPLC separation and UV-Vis diode array detection.

The highest antioxidant capacity was found for the peroxy radical, followed by the peroxyne

and hydroxyl radicals. The different behavior of the extracts towards the 3 ROS can be explained by their highly different reactivity and half lives. Peroxy radicals are the least reactive with the highest life span. Therefore, they can be scavenged rather easily with lower amounts of antioxidants. For the more reactive peroxyne and hydroxyl molecules, higher amounts or more effective antioxidants are necessary for a comparable inhibition rate. Comparing the results of açai seeds with açai fruit pulps (based on dry matter) it can be concluded that the concentration of açai seeds (320 mg/L) for 50% inhibition against peroxy radicals is in the same order of magnitude of açai fruit pulp (300 mg/L). Against peroxyne and hydroxyl radical it can be deduced that the seeds have better antioxidant capacity than the fruits, since the concentration for 50% inhibition of peroxyne were 812 mg/L and 1,15 g/L, respectively, and the concentration for 50% inhibition of hydroxyl radical were 945 mg/L and 3.0 g/L, respectively. The HPLC-MS analysis allowed us to identify in the açai seeds 2 monomeric polyphenols (epicatechin and procatechuic acid), 5 proanthocyanidins (1 dimer, 1 trimer and 1 tetramer) and 2 different pentamers of epicatechin in appreciable amounts.

### Conclusões

From the high amounts of proanthocyanidins in açai seeds together with their expressive antioxidant capacity it is likely that açai seeds could possess similar benefits as, e.g., grape seeds. The concentration (18 mg/L) which is necessary for 50% inhibition against peroxy radicals is in the same order of magnitude as that which was found for Trolox (21 mg/L).

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### Resultados e Discussão

<sup>1</sup> Lichtenthäler R, Rodrigues RB, Papagiannopoulos M, Fabricius H, Maia, JGS, Marx F. *Int. J. Food Sci. & Nutr.* **2005**, **56**, 53.