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Total Oxidant Scavenging Capacities of *Euterpe oleracea* pulp

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Euterpe oleracea and its products

Figure 1
Açai palm with fruits

Euterpe oleracea Mart., Arecaceae, is a palm widely spread in the Amazonian estuaries and floodplains of South America. To the local inhabitants the palm is known as "Açai" and it is currently the worlds most import source of palm hearts. The grape-sized and dark-purple fruits (see **Fig. 1**) are used for the creation of several dishes like ice-cream, pies and jelly. The major product is a beverage made from the pulp by diluting it with different amounts of water (see **Fig. 2**); the most important trade qualities are Açai grosso, medio and fino. Açai products have a high nutritional value, because lipids can account for up to 50% of the dry matter. Their taste is described as unusual but savoury and they enjoy great popularity throughout northern South America [1, 2]. A launch of Açai products to the European market is currently under preparation.

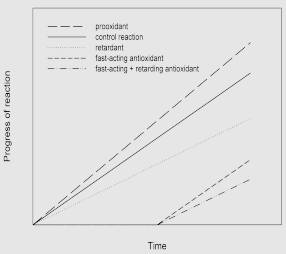
Figure 2
Açai liquid

Analysis of antioxidant capacities

The analysis of antioxidative capacities was carried out with the TOSC (Total Oxidant Scavenging Capacity) assay [3,4] in a modified and automated version [5]. This assay is based upon the ethylene yielding reaction of KMBA (α-keto-γ-methiolbutyric acid) with three reactive oxygen species (peroxyl radicals, hydroxyl radicals and peroxynitrite, respectively). The time course of ethylene production was monitored during one hour by repeated headspace GC with a Combi-PAL autosampler (see **Fig. 3**). The kinetic curve that best fits the experimental data and the area beneath it were calculated. TOSC values were quantified by comparing the areas for (uninhibited) control and sample reaction: a sample without antioxidative capacity has a TOSC value of 0%, a complete suppression of ethylene formation corresponds to a TOSC value of 100% and prooxidants obtain negative TOSC values. Samples were analysed in at least five different concentrations to cover the TOSC range as complete as possible. Curves were fitted through the experimental TOSC values and the corresponding concentrations. Based on these equations, concentrations were calculated, that match TOSC values of 20, 50 and 80%, respectively. In addition, fast-acting anti-oxidants and retardants [6] were distinguished by kinetic (see **Fig. 4**).

Figure 3
GC with Combi-PAL autosampler (CTC)

Figure 4
Fast-acting antioxidants, retardants and prooxidants



Materials

Açai pulps from 2000 and 2001 were freeze-dried in Brazil directly after preparation. The pulps were suspended with UHQ water and sonicated. Açai grosso and medio were obtained as commercial products. All samples were centrifuged and filtrated afterwards. The concentration of the resulting solutions was determined by freeze-drying. Diluting of solutions was also made with UHQ water.

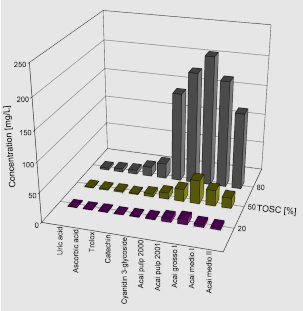


Figure 6 Antioxidative capacities towards peroxynitrite

Results

All Açai products were very active against peroxyl radicals (see **Fig. 5**). The inhibition of peroxynitrite and hydroxyl radicals was also significant but lower (see **Fig. 6** and **7**). All undiluted commercial products (Açai grosso, medio I and II) suppressed the reaction of peroxyl radicals completely. For hydroxyl radicals, this could only be observed for Açai grosso and medio II. None of the three inhibited peroxynitrite entirely. These findings can be explained by the fact, that Açai is only for peroxyl radicals a fast-acting antioxidant, while it works as a retardant towards per-oxynitrite and hydroxyl radicals (see **Table 1**).

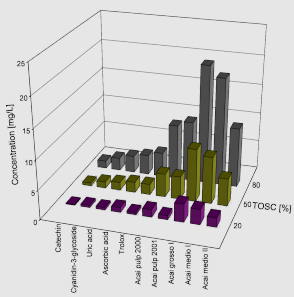


Figure 5 Antioxidative capacities towards peroxyl radicals

	Peroxyl radicals		Peroxynitrite		Hydroxyl radicals	
	fast-acting	retarding	fast-acting	retarding	fast-acting	retarding
Trolox	+	—	—	+	—	+
Uric acid						+/proox.
Ascorbic acid						
Catechin	—	+				+
Cyanidin-3-glyc.	+	+				
Açai pulps						

Table 1 Classification of compounds by reaction mode

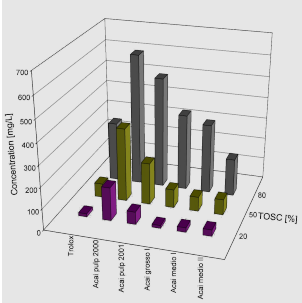


Figure 7 Antioxidative capacities towards hydroxyl radicals

Acknowledgement

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