

## AÇAÍ IS A HIGHLY FUNCTIONAL FRUIT

The rapid growth in the consumption of Açaí outside of the Amazon in recent years is largely due to scientific evidence supporting long-held beliefs in the Amazon that the berry endows energy, vitality and good health. Açaí three main functional benefits are its antioxidant properties, its concentration of omega-6 and omega-9 essential fatty acids and its profile of energy release to the consumer. In addition, Açaí has a wide spectrum of other nutritional elements, including fibre, proteins, vitamins and minerals.

### Antioxidants

Antioxidants are vital in our diet to protect our bodies against the damaging effects of an excess of substances called “free radicals”. Everyone produces free radicals in the process of creating energy, which is quite natural. However, excess may be produced by various factors, such as stress, tobacco smoking, pollution, sunlight, radiation, illness and so on. These surplus free radicals may cause cell damage and this may predispose to cancer and other illnesses, and it is thought to be how the ageing process takes place. Free radicals can also oxidise polyunsaturated fats in the body which can cause further damage. The oxidation of LDL cholesterol may be a factor in the build-up of plaque in the arteries, a factor in cardiovascular heart disease. The antioxidants present in our diet helps to neutralise the free radicals in our body and stop them producing their damaging effect.

An especially rich source of antioxidants are in fresh fruit and vegetables. These may be present in the form of vitamins A, C and E, in the mineral selenium, and increasingly they are being identified in a range of phytochemicals, or plant chemicals. There are literally thousands of different types of phytochemicals, and they include the substances responsible for giving the plant its colour, flavour and odour.

Açaí has been found to contain a remarkable concentration of antioxidants. In fact, research conducted by a leading laboratory in the USA, Brunswick Laboratories, that specialises in measuring the antioxidant activity of different foods, found Açaí to contain an antioxidant capacity that is superior to most other, if not all fruits. The method undertaken to analyse and measure the power, or activity, of antioxidants in a food is the Oxygen Radical Absorbance Capacity (ORAC). A study conducted on 22 fruit showed Açaí to have by far the highest ORAC reading of a range of fruit tested, as demonstrated in the graph below, showing the top 5 results as well as some other fruit typically consumed:

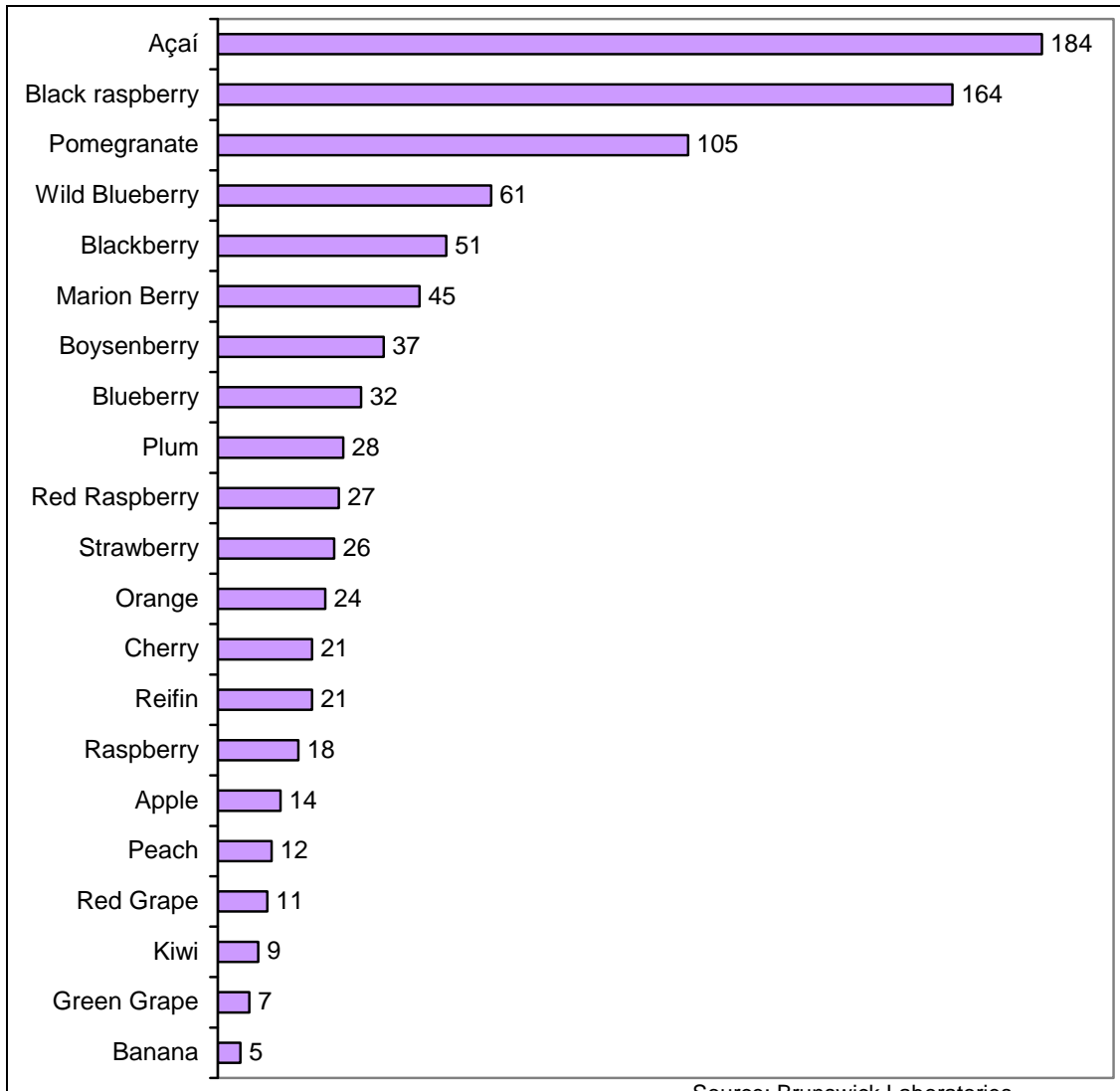


Figure 1: ORAC values of selected fruit.

Tests have shown that many fruit owe their high levels of antioxidant capacity to a group of phytochemicals, or more specifically, flavonoids, present in high concentrations in Açai called anthocyanins, who's antioxidant and radical-scavenging actions were found in one study published in Biochem Pharmacol to have the strongest antioxidising power of 150 flavonoids studied.

Anthocyanins are pigments responsible for the bright colours that occur in flower petals, fruits and vegetables, especially those with a deep red-blue-purple colour. It is this pigment that causes the deep purple colour of Açai, as well as a range of other berries, fruit and vegetables. It is also what causes the red colour of red wine, another rich source of anthocyanins, which is thought to contribute to the French paradox, i.e. France has one of the lowest incidences of heart disease of any westernized society despite a prevalence of smoking and a diet high in saturated fat and cholesterol. It has been suggested that this is due to the quantity of red wine that the French consume with their meals, that acts to counteract the harmful effect though the action of the antioxidants contained within the red wine. Interestingly, Açai is known to possess around 30 times more anthocyanins than red wine.



More and more research has concentrated on the biological activities of anthocyanins in our food, and the possible health benefits in protecting against some chronic diseases, including cancer, cardio- and cerebrovascular, atherosclerosis, and diabetes. Studies on antioxidant capacities of anthocyanins revealed that they could act in scavenging free radicals, metal chelation, protein binding, and other mechanisms, such as potential radiation-protective, chemoprotective, vasoprotective and anti-inflammatory effects. In all they have been shown to protect many

body systems, and to possess some of the strongest physiological effects of any plant compounds.

The primary anthocyanin in Açai is cyanidin-3-glucoside. Cyanidin-3-glucoside has been found in some studies to help in the reversal of age related neurological deficits. It has also been found to function as a potent antioxidant *in vivo* in recent Japanese animal studies. In other animal studies, cyanidins protected cell membrane lipids from oxidation by a variety of harmful substances. Additional animal studies confirm that cyanidin is four times more powerful an antioxidant than vitamin E.

Consumers are becoming more and more aware of the importance of antioxidants, which has meant that foods high in antioxidants have seen large increases in demand over the last few years. Some fruit reputed for their high levels of antioxidants are blackberries and pomegranates. Research has shown that Açai has around 6 times the antioxidant level of blueberries and nearly twice the antioxidant level of pomegranates.

### Essential Fatty Acids

Fatty acids can be divided up into three main groups:

- Saturated fatty acids;
- Polyunsaturated fatty acids; and
- Monounsaturated fatty acids.

Fats are essential in our diet, not only to provide our bodies with the energy needed to function, but also to help with the transport and absorption of the fat-soluble vitamins A, D, E and K. The consumption of too much fat in our modern diets is strongly linked with problems such as heart-disease, cancers, obesity and other illnesses. However, not all fats are the same! The problem with most peoples diet is that they are consuming too much of the wrong kinds of fats and probably too little of the healthy types.

Here's what you need to know:

**Saturated Fats:** are found in largest quantities in animal products such as meat, cheese, cream, milk, eggs, butter and lard, and of course in the many processed derivatives (ie biscuits, cakes, chocolate, pastries etc). It has been proved that a diet high in saturated fats can raise the level of the "bad blood cholesterol" LDL (low-density lipoprotein) which is a major risk factor in heart disease, as well as other ailments such as obesity and cancer.

**Polyunsaturated fats:** have the opposite effects of saturates by lowering LDL blood cholesterol. There are several types of polyunsaturated fats, including some *essential fatty acids* (EFA) so termed because they are needed for normal health, and since these fats cannot be manufactured by our bodies, they have to be obtained from our foods. Two such EFA are Linoleic acid (Omega-6) and Linolenic acid (Omega-3). Studies suggest that a good balance of these two EFAs must be consumed to prevent and control a range of

ailments. Omega-6s are typically found in nuts, seeds and vegetable oils. Omega-3s are found in fatty fish, such as salmon, tuna, mackerel and others.

**Monounsaturated fats:** are found in high levels in olive oil, nuts and avocados. Studies have shown that these fats have the best overall health benefits, since they not only lower the “bad” LDL cholesterol, but they also have been found to maintain, or even slightly raise, the levels of the “good” HDL (high-density lipoprotein) cholesterol. Unlike LDL, which causes the “furring” of the arteries and the formation of plaques that lead to atherosclerosis, heart disease and strokes, HDL actually helps to remove cholesterol from the tissues and delivers it to the liver for excretion. An EFA also belongs to this group of fats, and this is Oleic acid (Omega-9). There is evidence that a diet rich in these fats, such as the typical Mediterranean diet, is linked with lower heart disease, increased longevity and lower risk of some cancers. These oils are often rich sources of the antioxidant vitamin E.

Essential fatty acids are not commonly found in fruit, but in Açai, Oleic acid (Omega 9) and Linoleic acid (Omega 6) are found in proportions similar to olive oil with Omega-9 contributing 60% to total fat, and Omega-6 12%. This is significant, since olive oil is thought to be a contributing factor to the low incidence of heart disease in Mediterranean populations. The table below shows a comparison between the fats found in Açai and the fats found in olive oil:

Profile of lipo-soluble components in olive oil and Açai pulp		
Component	Olive oil	Açai pulp
Palmitic (saturated)	8 - 14	22
Stearic (saturated)	3 - 6	2
Oleic (unsaturated)	61 - 80	60
Linoleic (unsaturated)	3 - 14	12
Cholesterol (%)	< 0.3	2
α-tocopherol (mg/100g)	52 - 87	45

Source: Rogez H. Açai: Preparo, Composição e Melhoramento da Conservação. Belém: EDUFPA; 2000. p. 172

## Energy

The main source of energy from our food comes in the form of fats, which provide more than twice the calories per gram as either carbohydrates or protein. Whilst carbohydrates (especially in its simple form, sugar) delivered energy to our bodies as fast-releasing energy (causing the peak and crash, or high and low, associated with sweet foods), fats provide in a slow energy release after consumption, meaning that it provides more sustaining and longer lasting energy.

Açai is unique for a fruit in as much that it contains no sugar, but a high level of essential fatty acids. This explains why Açai is generally considered an energy food, and had been much revered by the sports and fitness world. The slow releasing energy from Açai makes it an ideal food for endurance sports, where stamina and sustained energy is important. It also makes in an ideal breakfast, providing the individual with the energy needed to start the day.



Recent tests by Food and Crop in Christchurch have shown that Açai possesses a very low Glycaemic load of 0.5. This means that a single serving of 100g of Açai will generate a blood sugar response equivalent to 0.5g of pure glucose. An apple is typically around 14.0. This low GL, combined with a high energy content (typically around 350kJ per serving) makes Açai suitable as a sustaining energy product.

It is not unusual to find Açaí mixed with Guarana, and there is good reason for this. Guarana (pronounced gwa-rah-nah) is another berry native to the Amazon jungle. The Guarana berry is closely related to the coffee bean, and contains a compound very similar to caffeine, called guaranine. This is reported to be 50 more potent in its stimulant effects as caffeine, and had been said to increase metabolism, physical endurance, stamina and memory. Guarana also contains theobromine, a caffeine-like compound thought to contribute to the euphoric feeling experienced by some people when consuming chocolate. It has commonly been used as a stimulant, as well as for appetite suppression and pain relief.

Since the guarana provides instant energy, without the peak and crash associated with sugar, mixing Açaí and guarana creates a perfect synergy for energy enhancement.

### Other Nutritional Benefits

Açaí is also rich in a variety of other nutrients, such as:

- **Dietary fibre:** a 100g serving of Açaí contains as much fibre as 3 slices of wholegrain bread. Fiber promotes a healthy digestive system. Low fibre in the western diet is thought to be a contributing factor to the high incidence of cancer and heart disease. Soluble fibres may help lower blood cholesterol; insoluble fibres are thought to help reduce the risk of developing certain types of cancers
- **Protein:** the same serving of Açaí also delivers a protein profile similar to an egg, with what has been reported to be an almost perfect essential amino acid complex. Protein is essential for growth and development in children, for cell maintenance and repair (especially for muscle tissue), for the regulation of all body functions and for various other functions. The table below shows a comparison between the protein found in Açaí and the protein found in eggs:

<b>Profile of protein components in eggs and Açaí pulp</b>		
<b>Component</b>	<b>Eggs</b>	<b>Açaí pulp</b>
Proteins (g/100g of drymatter)	12.49	13.00
<i>Amino acids (mg/g of protein)</i>		
Isoleucine (Ile)	5.66	5.57
Leucine (Leu)	8.86	9.11
Lisine (Lys)	7.45	6.92
Methionine (Met)	3.24	1.93
Phenilalanine (Phe)	5.51	7.04
Treonine (Thr)	4.98	6.36
Valine (Val)	6.32	7.04
Arginine (Arg)	6.22	5.61
Histidine (His)	2.46	2.55
Alanine (Ala)	5.78	5.95
Glycine (Gly)	3.49	5.05
Proline (Pro)	4.13	6.05
Serine (Ser)	7.71	6.04
Tyrosine (Tyr)	4.23	4.24
Aspartic acid (Asp)	10.42	10.69
Glutamic acid (Glu)	13.56	9.85

Source: Rogez H. Acai: Preparo, Composição e Melhoramento da Conservação. Belem: EDUFPA; 2000. p. 175

- **Calcium:** Açaí contains more calcium than standard milk at 10% of the RDI (required dietary intake). Adequate calcium intake is vital throughout life, for the healthy maintenance of our bones, for smooth muscle function (including the heart), for blood clotting and for nerve function.
- **Vitamin E:** also a powerful antioxidant, there is 20% of the RDI of Vitamin E in a single serving of Açaí . Vitamin E has been shown to increase the body's immune response, and may therefore help protect against diseases and cancer. Vitamin E is also important in maintaining healthy skin and for helping the healing process of all damaged tissue.
- **Iron:** A serve of Açaí contains 10% of the RDI for Iron. Iron's main function is to carry oxygen from the lungs to all the cells of the body though its role in creating haemoglobin. Iron can also increase resistance to infection and help the healing process.
- **Magnesium:** at 9% of our RDI, the Magnesium in Açaí helps to release energy and absorb nutrients in our foods. It also works with calcium to maintain healthy bones. In addition, it helps in regulating nerve and muscle function.
- **Beta-sitosterols:** Preliminary evidence suggests that Beta-sitosterols (the predominant sterol in Açaí ) may help prevent immune weakness resulting from physical stress

### References

Rogez H. Acai: Preparo, Composição e Melhoramento da Conservação. Belem: EDUFPA; 2000.

Wills J. The Food Bible. London: Quadrille Publishing Limited; 2002