

HEALTH PROTECTING COMPONENTS OF COCOA

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Abstract

Cocoa and cocoa based products are consumed in great demand worldwide due to its unique flavour and aroma. The favourable effects of some components of cocoa powder and chocolates have been studied by several scientists all around the world. Researchers focused on those components that have beneficial effect on different organs of the human body. Dietary fibre is both preventive and therapeutic for bowel functional diseases. Soluble cocoa products are good sources of dietary fibre that may be supplemented with this dietary component. Polyphenols are products of the secondary metabolism of plants. These compounds are reported to exhibit anticarcinogenic, anti-inflammatory, anti-atherogenic, antithrombotic, immune modulating and analgesic activities, among others and exert these functions as antioxidants. Here we are presenting our results regarding the total phenolic content and dietary fibre content of eight cocoa and cocoa based products.

Key words: cocoa, polyphenols, antioxidant capacity, dietary fibre

INTRODUCTION

Cocoa and cocoa based products are consumed in great demand worldwide due to its unique flavour and aroma. (Hii et al, 2009).

Theobroma cacao is the name given to the cocoa tree and belongs to the family Sterculiaceae. Cocoa trees are found wild in the rain forest of the western hemisphere from 18°N to 15°S, which is from Mexico to the southern edge of the Amazon forests (Wood and Lass, 1985).

Free radicals are mainly organic molecules, responsible for tissue damage, aging, and possible for a number of diseases. Some free radicals arise normally during metabolism. Normally, the body can handle free radicals, but if the free-radical production becomes excessive, damage can occur, that accumulates with age. Antioxidants, the components of many foods, act as scavengers, helping to prevent cell and tissue damage. The antioxidants, like vitamins E and C, are believed to help protect the body from free-radical damage. Other chemicals and components found in natural sources of antioxidants may also be responsible for the beneficial effects.

Several beneficial results are assigned to polyphenols that can be found in vegetables, fruits, wines and beverages, such as black and green teas or cocoa and dark chocolates. Based on some results, cocoa can be considered particularly rich source of antioxidants (Wollgast and Anklam, 2000, Counet et al., 2004). Lee et al, (2003) found that cocoa and cocoa

based products show greater antioxidant capacity than red wine or tea. Various review papers can be cited that cover topics such as on health benefit aspects (Dreosti, 2000; Rawel and Kulling, 2007), prevention of cardiovascular disease (Ding et al, 2006; Keen et al, 2005, Steinberg et al., 2003), antiinflammatory impact of flavanols (Selmi et al, 2008) and issues on the exact contribution of polyphenols to human health (Mhd Jalil, A.M. and Ismail, A. 2008).

Polyphenols are products of the secondary metabolism of plants. These compounds are reported to exhibit anticarcinogenic, anti-inflammatory, anti-atherogenic, antithrombotic, immune modulating and analgesic activities, among others and exert these functions as antioxidants (Gomez-Caravaca, 2006).

Dietary fibres are polysaccharides that are not digested by the human enzymes, because they are not able to hydrolyze them. These components: pectin, cellulose—get unchanged to the large intestine, where will be metabolized by some bacteria. These compounds have important role in the prevention of colon cancer, obesity and cardiovascular diseases. Foods containing fiber that does not digest easily, can delay glucose absorption, blood-sugar level will increase moderately after a meal, glucose tolerance can enhance (Rodler, 2005).

MATERIAL AND METHOD

The experiments were performed in February, 2012, at the Central Laboratory of Centre for Agricultural and Applied Economic Sciences, Faculty of Agricultural and Food Sciences and Environmental Sciences, Debrecen.

For this study were analyzed the following 8 cocoa and cocoa based products samples:

1. Szerencs cocoa powder
2. Bonbonetti Gold cocoa powder
3. Tesco Majestic cocoa powder
4. Aro cocoa powder
5. TUTTI Holland cocoa powder
6. La Festa hot chocolate drink
7. Nesquik drink
8. Canderel Cankao drink.

Methods of analysis

Sample preparation -samples were defatted prior to analysis because of their original fat content (6.45-22.82% w/w). Oil was separate by

repeated extraction using cyclohexane, the remaining solvent was removed by vacuum distillation.

Total Phenolic content was determined by a colorimetric procedure - Folin-Ciocalteu method. For the determination of total phenolic compounds 10 ml mixture of methanol and distilled water (80:20) was added to 1 g defatted sample and stirred for 10 minutes, than filtered through Whatman n°4 paper.

Briefly, 0.5ml of sample was mixed with 2.5ml Folin reagent, and 2ml sodium carbonate solution (75g/L) was added after five minutes (Jonfia-Essie et al.,2007). Absorbance was read at 760 nm (Spectronoc Genesys 2 spectrophotometer). Gallic acid was used for calibration (0-100 mg/l), results were expressed as mg of gallic acid equivalents/100g originate product.

Total dietary fibre content was determined by enzymatic method, using Megazyme Total Dietary Fibre Kit containing α -amylase, protease and amylo-glucosidase enzymes.

RESULTS AND DISSCUSIONS

Results of the determination of total phenolic content are shown in Fig1 and Fig 2. In the case of cocoa powders there are quite big differences in the antioxidant activity.

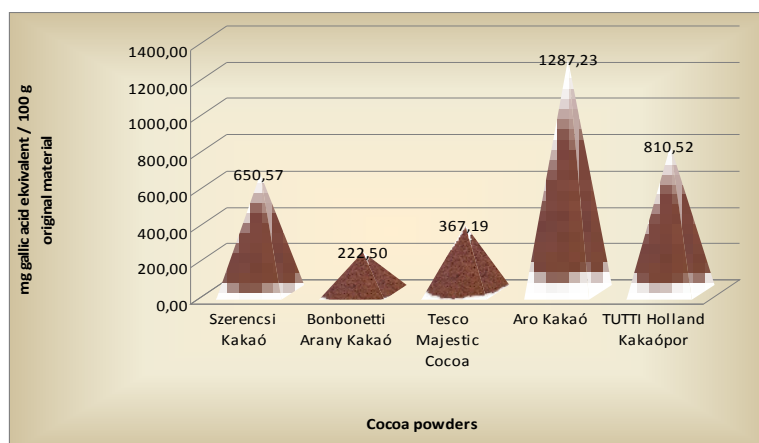


Fig. 1 Total phenolic compound content of the cocoa powder products

Results prove that the quality, the beneficial effect of a food product does not always appear in the brand. In our case a not very famous cocoa product proved to be the best, regarding the total phenolic content.

The total phenolic compound content of the cocoa containing drinks were lower than in case of cocoa powders with the exception of Bonbonetti

Gold cocoa. These products may contain additives that also show some degree of antioxidant activity (Fig. 2).

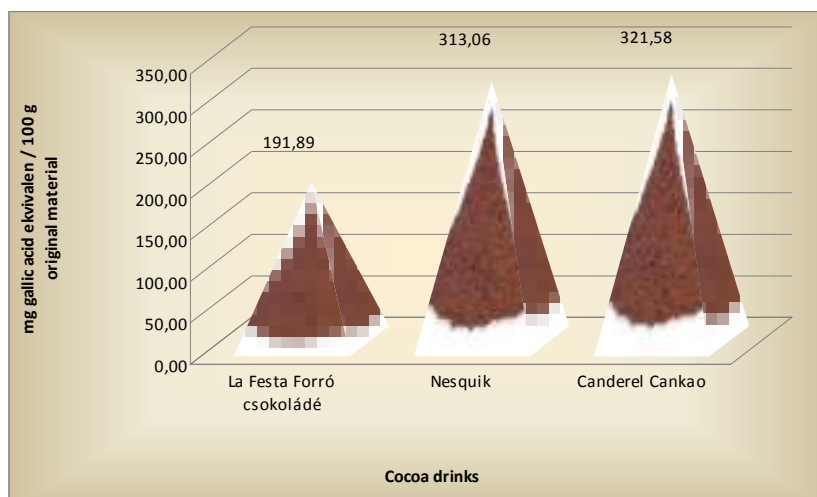


Fig. 2 Total phenolic compounds content of the cocoa containing products

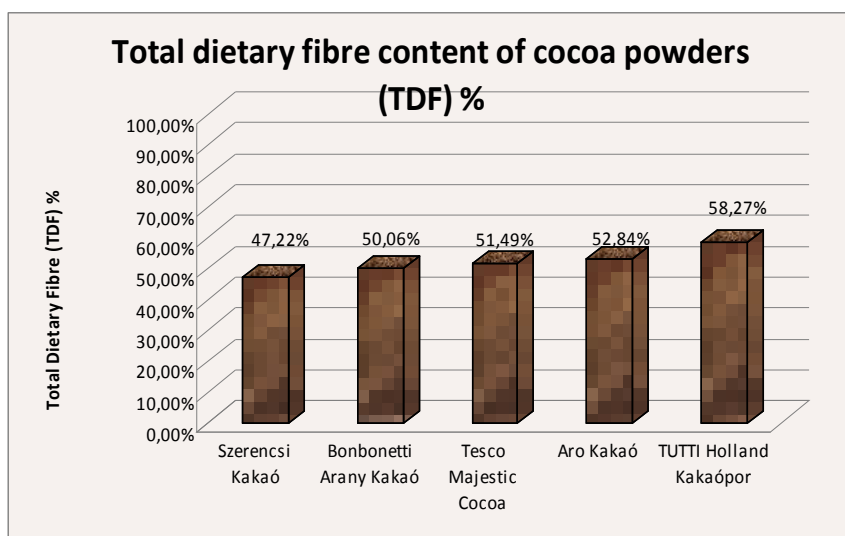


Fig. 3 Dietary fibre content of the cocoa powders

Evaluating the dietary fibre contents of different cocoa products we can find, that there are very little differences among cocoa powders, but cocoa containing drinks show variability.

Data of Fig.5 can help to evaluate the dietary content of cocoa products. The figure shows that right after brans cocoa powders contain the biggest amount of dietary fibre

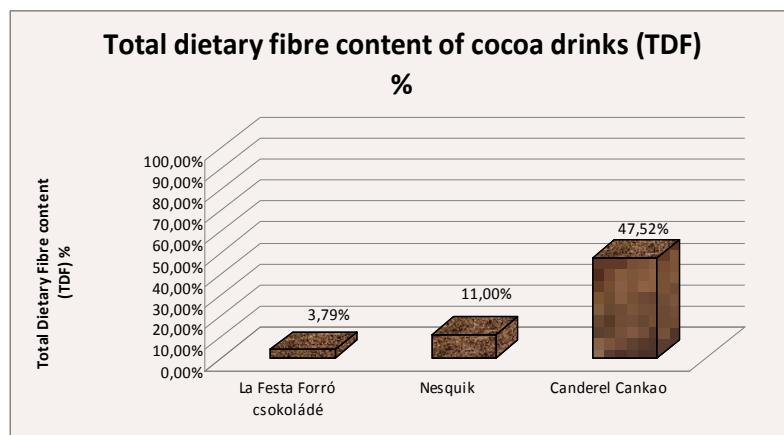


Fig. 4 Dietary fibre content of the cocoa containing products

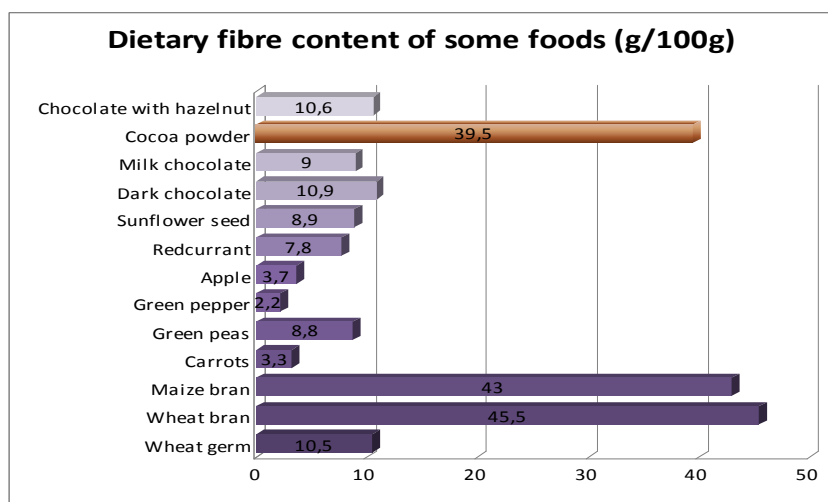


Fig. 5 Dietary fibre content of some foodstuff (Rodler, 2005)

CONCLUSIONS

Evaluating our results we can stay that cocoa powders are good source of antioxidant (222,5 – 1287,2 mg of gallic acid equivalents/100g originate product), but cocoa based drinks contain less amount of phenolic compounds (191.9- 321.6).

Dietary fibre contents of the examined cocoa powders were between 48.2 and 58.3%, while this value was lower in two cocoa drinks (3.8 and 11.0 %). Comparing the dietary fibre content of cocoa and other fibre rich food products results show that cocoa can be a very good source of dietary fibre.

Summarising the results we can establish that cocoa and cocoa based products can be important sources of antioxidants and dietary fibre. This

fact is especially important for younger-age group of consumers, in which cocoa based drinks are generally preferred.

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