



ASSOCIATE PARLIAMENTARY FOOD & HEALTH FORUM



The health benefits of dark chocolate & a chocolate tasting

4-5.30pm, Tuesday 11 December 2007

The Jubilee Room, House of Commons

Minutes

Introduction

Lord Rea welcomed members and guests to the meeting and explained that three presentations by Professor Roger Corder, Sara Jayne Stanes and Chantal Coady, would be followed by a chocolate tasting kindly provided by members of the Academy of Chocolate. He then introduced Roger Corder.

Professor Roger Corder, William Harvey Research Institute, Barts and the London Queen Mary's School of Medicine and Dentistry

After qualifying as a pharmacist in 1978 Roger obtained an MSc in Pharmacology in 1981 and was awarded a PhD in 1986 for his studies of neuropeptide Y. He undertook research for five years in Geneva, before returning to London in 1991 to take up a position of senior scientist leading endothelin research at the William Harvey Research Institute. He became Professor of Experimental Therapeutics in 2000. Roger is also the author of *The Red Wine Diet*.

Roger began by explaining that experimental therapeutics is the attempt to discover new ways of preventing and treating disease. He suggested we have come a long way in the treatment of disease with medicine, but there is still a long way to go from a diet perspective both in treating disease and promoting healthy ageing.

The traditional concept of a healthy food is that it is a substance with certain nutritional components which are balanced against taste and sensation. Functional foods are foods which have additional nutritional benefits beyond what would normally be expected, for example a food fortified with vitamin B12 might be claimed to help prevent cognitive decline.

Roger showed a slide of Jeanne Louise Calment who lived to be almost 123 years of age. Her diet was not exceptional, but she claimed her longevity was due to olive oil, drinking a glass of red wine daily and to eating up to 1 kg of chocolate a week. Her doctor advised her at the age of 119 to cut back on the chocolate because it was "unhealthy" and she died a few years later!

The question Roger and others are asking is could the health benefits associated with dark chocolate enable it to be regarded as a functional food?

A number of early population studies identified a high saturated fat intake as a key risk factor in cardiovascular disease (CVD). This led to calls for a low-fat diet, as a healthy alternative, but this was based on little hard evidence from randomised controlled trials. What many failed to appreciate sufficiently was the importance of the difference between different types of fat – saturated fats, polyunsaturated fats and mono-saturated fats. We should not make this mistake in

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future diet recommendations, which should only be based on detailed clinical research to demonstrate positive health benefits.

The Zutphen Elderly Study investigated cardiovascular mortality in men consuming cocoa daily. The researchers found a 50% reduction in CVD mortality among those eating more than 2.25 g of cocoa a day. This study did not allow for other possible confounding factors, but a reduction of 50% is very large – even statins, now widely prescribed for those with high cholesterol levels, only reduce the risk of CVD by 30% in high risk groups and by less in low risk patients.

Norman Hollenberg of Harvard University was interested in the treatment of high blood pressure. His investigations demonstrated that Kuna Indians living on the San Blas Islands of Central America do not show age related increases in blood pressure, whereas those moving to the mainland do (see slide 7 for detailed results). This is thought to be due to their habit of drinking an average of 5 cups of cocoa a day.

Another researcher, Taubert conducted a short (14 day) trial to test whether chocolate which was polyphenol-rich had any effect on patients with high blood pressure. Although this was not a double-blind, randomised controlled trial, when the patients consumed a polyphenol-rich dark chocolate blood pressure fell markedly for the period during which they consumed the chocolate and it rose again when they stopped eating the chocolate (see slide 8).

Phenols are unsaturated hydrocarbon rings with attached hydroxyl groups and polyphenols are simply molecules with multiple phenol groups. The main polyphenols in chocolate are Epicatechin, Procyanidin-B2 and oligomeric procyanidins such as tetra-epicatechin. Polyphenols are part of the flavanoid group; green tea and red wine are also rich sources of flavanoids. Dark chocolate is particularly rich in procyanidins.

The Corder research group is exploring the hypothesis that procyanidins trigger a positive response in the vascular endothelium which protects against CVD.

The main cause of CVD is atherosclerosis, which may provoke no symptoms until a patient suffers from angina, heart attack or a stroke. Vascular function in people with hypertension, high LDL cholesterol, diabetes and in smokers is typically associated with dysfunction of the endothelium, the inner lining of blood vessels. In patients with high blood pressure the blood vessel wall thickens and becomes stiffer, which helps to preserve the integrity of the vessel wall, but this worsens the blood pressure and make the vessel more susceptible to atherosclerotic lesions as well as increasing the likelihood of other cardiac problems. Flavanoids appear to reverse this process, making the blood vessels less prone to atherosclerosis, so blood pressure falls as the blood vessels dilate. Flavanoids also appear to have an anti-thrombotic effect (by stimulating the production of anti-thrombotic enzymes), making the platelets less sticky and therefore less likely to clot. Together these properties reduce the likelihood of heart attack and stroke.

The quantity of polyphenols present in dark chocolate vary significantly, by more than 50%, according to the origin and variety of chocolate. The temperature and duration of the fermentation process is also very important because it can destroy up to 90% of the flavanoids present in the cocoa bean.

Milk chocolate, to which sugar and fat has been added, cannot be considered a healthy food and the health properties of dark chocolate will vary according to its flavanoid content. Unfortunately it is not easy to assess the flavanoid content of chocolate. There is no simple correlation with the cocoa content, because cocoa solids also contain cocoa butter, which has no beneficial health properties.

Roger estimates that the ideal daily consumption of flavanoids may be 500mg, but you might need to consume 2000 calories worth of dark chocolate to achieve this, which is a long way from being optimal. However, some high flavanoid chocolate is now being produced where 25 – 30g contain 500 mg of flavanoids. Only this could be considered suitable to class as a functional food. We

need a standard method of measuring the flavanoid content of chocolate and, ideally, chocolate labels should provide consumers with accurate information about its flavanoid content.

The population studies already undertaken have produced interesting and encouraging results, but what is really needed now are more rigorous, randomised controlled trials so that well established evidence can be used as the basis for dietary recommendations.

Lord Rea introduced Sara Jayne Stanes and Chantal Coady.

Sara Jayne Stanes OBE

Sara is the Director of the Academy of Culinary Arts, Britain's leading association of head chefs and restaurant managers whose principal aims are raising standards of food, cooking and, most importantly, education. Sara is also a chocolatier and Chairman of the [Academy of Chocolate](#), launched in 2005 to encourage chocolate lovers to "look beyond the label". She is the author of *Chocolate the Definitive Guide*, the story of chocolate from pod to palate, and *Chocolate*.

Chantal Coady,

Chantal is the founder of Rococo Chocolates, the founder of the Campaign for Real Chocolate 1986; and co-founder of The Chocolate Society. Chantal has also written three highly successful books including: *Real Chocolate*, *The Chocolate Companion* and *Chocolate - The Food of the Gods*. She visits Grenada on a regular basis to work with the Grenada Chocolate Company and the Grenada Organic Cocoa Regeneration Project on the island.

History of chocolate

Sara said that she had been introduced to "real" chocolate – fine, dark chocolate – twenty years ago, when she met Michel Roux, the Patron of the Academy of Chocolate.

The history of chocolate goes back to the dawn of civilisation. Its beneficial properties were recognised as early as the 5th century BC by the Olmec people and the Mayan and Aztec peoples used it for medicine. They drank xoco-atl, meaning "bitter water", a fatty, grainy drink made from the crushed roasted and ground cocoa beans. When the Spaniards invaded, they discovered the "chocolate" drink and that cocoa was used as a currency. The Spaniards took cocoa back to Europe, but for centuries it was very expensive and the bitter drink was the preserve only of the very wealthy. It was nuns and priests who moved from Europe to the New World who discovered the customs of the indigenous people and the beneficial properties of their chocolate drink. In the 16th century nuns in Puebla, Mexico were the first to introduce sugar to the drink to make it more palatable. As late as the 17th century, cocoa in Britain was still the preserve of apothecaries, many of whom were Quakers. It was this connection which led to the development of the highly successful Quaker chocolate manufacturers, Cadbury, Fry and Rowntree.

The apothecaries were familiar with the beneficial properties of cocoa and used it to treat the poor and ill, who flocked to the cities as the industrial revolution progressed. From the 1820s, John Cadbury in Birmingham, Joseph Fry in Bristol and Joseph Rowntree in York were developing industrial scale machines to grind the cocoa and separate it from the cocoa butter. They discovered "chocolate" as a by-product when they mixed the cocoa butter and cocoa.

Chocolate production

Chocolate production starts with the cocoa pods which grow on trees. They can vary in colour from dark red to orange and green. The cocoa beans in the pod are covered in a milky liquid. When the pods are picked, the beans are extracted. When they are exposed to the air, the beans become oxidised and taste bitter.

The cocoa beans are allowed to ferment for 5-10 days depending on the variety and the customs of the cacao farmer. They are then laid out evenly, often in the open, and raked regularly to dry under the sun. The fermentation and drying process are vital steps in the journey to develop the extensive profiles of aromas and flavours. (The cocoa bean naturally contains over 300 different flavours and 400 aromas) They are then sent to the chocolate factory where they are roasted at temperatures approximately 140C for about 45 minutes. The higher the temperature, the more bitter the chocolate. The best chocolate is made from beans roasted at a lower temperature for a long time, resulting in a richer flavour.

After roasting, the outside of the bean is discarded and the cocoa nibs are ground in mills into a paste. A quantity of sugar will be added and the 'dough' will go through a refining process which reduces the particles of the mix to below 20 microns in size, producing the silky quality associated with fine chocolate. The chocolate is then stirred by giant paddles in what is known as the conching process to produce liquid chocolate which, when it is tempered and set, is silky and smooth.

The Grenada Chocolate Company¹

Chantal has been visiting Grenada for the last five years to support the production of chocolate on the island. Grenada is the source of most of the global production of nutmeg and there are many alternative sources of employment, so the cocoa producers must be fairly rewarded if they are to be encouraged to produce cocoa. Moreover, manual labour in Grenada is associated with bonded labour and slavery so that stigma needs to be overcome.

Chantal briefly described the chocolate production process at the Grenada Chocolate factory (see slides).

Chantal and her colleagues are working to develop responsible chocolate production and consumption. The Grenada Chocolate Company is a small cooperative which enables cocoa farmers to produce and sell their own cocoa production. They are paid a fair price for the cocoa and they share in the profits of the company. Chantal emphasised that fine chocolate is not cheap. The real cost of an organic equitably traded 113g bar of fine dark chocolate is around £5.

Responsible chocolate production is vital and will become increasingly important to secure cocoa supplies for the UK as demand for chocolate from China grows. Paying a fair price for the cocoa also stimulates production.

The Grenada Organic Cocoa Regeneration Project has produced its first harvest and the cocoa has been turned into a chocolate, which members tasted following the presentations.

Sara cited the example of Amedei, a small but ethically minded chocolate company in Tuscany and the 'cacao' farmers of Chuao, a small plantation on the northern shores of Venezuela. In 1990, when Amedei first began its negotiations with the 'campesinos' they were receiving £1.5 dollars a kilo for an annual yield of 7 tonnes. Now seven years later, Amedei pays \$8 a kilo and the yield has increased to 25 tonnes per. The farmers have been encouraged to look after the trees by regularly pruning and weeding and using these composted 'trimmings' to fertilise the crops. The plantation is about to receive its organic status. Amedei is delighted with a better quality, increased quantity of beans and content in the knowledge that the lives of the farmers and their standards of living have been transformed. They have proper healthcare, their children are all better educated. This is a model of environmental sustainability in the chocolate world.

¹ www.grenadachocolate.com

Chocolate tasting

Sara and Chantal then talked members through a tasting of several fine chocolates kindly provided by members of the Academy of Chocolate: Damian Allsop, Amedei, Martin Christy (Seventypercent.com), William Curley, the Grenada Chocolate Company, Bill McCarrick (Sir Hans Sloane), Rococo and Paul A Young.

They emphasised that, as in wine-tasting, an appreciation of fine chocolate should involve looking at it, smelling it and tasting it. Like good wine, fine chocolate should have an intense, fruity, sometimes subtle, flavour and the flavour should linger cleanly in the mouth. The melt-in-the-mouth sensation and the “snap” of fine chocolate are indicative of good quality chocolate.

Questions

Sophie Tranchell of Divine Chocolate asked if anything can be done during chocolate production to protect the flavanoid content and whether chocolate can be tested to assess its flavanoid content. **Roger** said that the flavanoid content could be assessed at every stage of production, but the fermentation and roasting of the cocoa bean, that is integral to the production of chocolate, will inevitably destroy some of the flavanoids. If the roasting is carried out for a shorter period and at lower temperatures, less flavanoids would be destroyed. **Sara** pointed out that the flavanoids are associated with the bitter, astringent taste of the cocoa bean and so there is a balance to be struck between the enjoyment of dark chocolate and the health benefits associated with it.

Lord Rea asked whether it is likely that the public can be persuaded to buy healthier, but expensive fine dark chocolate in preference to cheaper, mass produced milk chocolate. **Chantal and Sara** both thought this was possible, though it would require better information and education. They pointed out that it was only relatively recently that most people in the UK began using olive oil habitually.

Lord Rea asked whether the chocolate manufacturing industry or the Food Standards Agency had shown any interest in the production of fine dark chocolate and the health benefits of it. **Roger** said that the FSA had told him they were only interested in chocolate if there was a food safety issue. **Sara and Chantal** mentioned that some large chocolate producers had bought smaller, higher quality chocolate companies, such as Cadbury’s acquisition of Green & Black in the UK and Hershey’s acquisition of Scharffenberger (artisan chocolate producer) in the US.

Baroness Gibson of Market Rasen asked how easy it is to become a cocoa farmer in Grenada and whether the Grenadian government was encouraging production as, for example, the Venezuelan government had promoted cocoa production not least as a means of diversifying away from drug production. **Chantal** said that cocoa production is not complicated but the finances are more difficult because cocoa plants take a long time to mature in comparison with bananas. The cocoa plant is also fragile, though it grows well in small holdings. Chocolate production can also be difficult in countries where the electricity supply is uncertain, which is one reason why the Grenada Chocolate Company is switching to solar and wind power to generate electricity. It can also be difficult for cocoa producers in remote parts of some countries, such as Guatemala, to get their production to market.

Guy Mason of Asda said that Asda does not have a greater profit margin on its fair-trade products than any other. He asked if there is a “league table” for the flavanoid content of chocolate. **Roger** said that Nestle had analysed the flavanoid content of their products and it was open to other manufacturers to do so, but we lack a standard assessment method. The position is also complicated by the fact that the flavanoid content of chocolate will diminish the longer its shelf-life.

Lord Rea asked if there is a natural flavanoid variation in red wine. **Roger** said there is (Madiran has a relatively high flavanoid content) and again the flavanoid content will fall as the wine ages.

Bruce Palling of the Economist asked if the flavanoid content of chocolate varies according to region and why chocolate and wine are so incompatible. **Chantal** said that chocolate will reflect its terroir in the same way as good wine and even within one region, the final taste of the chocolate will depend on the blend of different cocoa trees. Chocolate and wine are difficult to match because both have robust flavours, but some fortified wines and syrah can work well.

Lord Rea asked for the speakers to recommend a chocolate with a relatively high flavanoid content. **Roger** said Ecuadorean chocolate was relatively rich in flavanoids and there was general consensus that Lindt Ecuadorean with 75% cocoa would be a good choice.

Conclusion

Lord Rea thanked the speakers for their excellent presentations and members of the Academy of Chocolate for donating chocolate for the tasting and for the “goody bags” with which members left the meeting.

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