

Book Review

The Science of Chocolate (Second Edition)

By Stephen T Beckett

240pp., RSC Publishing, Cambridge, 2008, £24.95, ISBN 978-0-85404-970-7

Producing chocolate in its various forms is a major industry and this book came out of a short review in *School Science Review* written by the author in 1988: the book is now in its second edition which attests to the interest and fascination, presumably from a number of different groups of people. As well as the story of chocolate there are some experiments with chocolate and chocolate products. The history of chocolate of course goes back to the Aztecs of Mexico and the Incas of Peru perhaps 2000 or more years ago. The original form however, was a rather astringent, fatty and unpleasant tasting drink rather than an attractive, sweet dark bar that may have aphrodisiac properties (at least it contains antioxidants). The drink was brought back to Spain in the 1520s and at this stage sugar was added to make it more palatable. It is mentioned in Pepys' Diary in 1664 and by 1727 milk was being added. In 1828 Van Houten developed the cocoa press which enabled a lot of the fat to be removed, and soon plain eating chocolate was being manufactured by Joseph Fry in Bristol. Notably many of the early manufacturers (Rowntree, Cadbury, Hershey) were Quakers. (From time to time the established church was of course against it.) Although the origin of the cocoa plants was South America, in 1879 some plants were taken to West Africa (the Gold Coast, now Ghana) and from there onwards West Africa became a major source of the beans. (In fact you can find out quite a lot about chocolate as well as its history in a few pages in Harold McGee's famous book (McGee, 1987)).

The book goes through the details of the manufacturing process starting from a consideration of the ingredients. This might give lecturers using the book the opportunity to enliven their lectures by considering the chemistry of the sugars and fats involved. There are extensive sections on the various processes involved and it is clear that these are well studied as might be expected of a major industry that has to go to great lengths to ensure consistency of the product on a world-wide basis. As a biochemist I found my interest flagging a bit when reading about 'conching', fat eutectics, viscometry, non-lauric fat cocoa, tempering, moulding and enrobers, and was glad to get on to nutrition and health aspects (including tooth decay and acne) as well as psychoactive compounds. But the book would certainly be most useful background reading for any graduate planning for a career in Mars Bars for example. Some of the experiments offered at the end look fairly simple to me and could be done in schools: others look rather more complicated such as determining the coefficient of expansion of chocolate. (I was not completely clear why we needed to find out about this and the experiments seemed rather pointless.)

I have two complaints that surprised me. One is that although this text is produced by the Royal Society of Chemistry, and although the author says he has included some chemistry, in fact there is surprisingly little chemistry in it. This is not because the chemistry of chocolate is unknown (and the author admits that he is a physicist): this would have been an opportunity to use a well-known substance (i.e. chocolate) to illustrate some important physical and organic chemistry. There is some but I thought there could have been more perhaps at the expense of information about how Toblerone bars are packaged, for example.

The other that it is curious that in a small section of the book there are a number of grammatical howlers. Surely in a second edition these should have been spotted and expunged. They include *spectra* as singular rather than *spectrum*, *effect* for *affect*, *loose* for *lose*, *too* rather than *to*, and one or two more. Was the copy editor asleep over these pages (24–28)? The writing is inelegant in a number of places, for example: “The high shear destroys a lot of the particles releasing a lot of the fat”. And *etc.* is used too frequently — as used by students writing essays to indicate that they know more than they do! How can students be expected to write good English if the books don’t do it?

Overall I found this to be an interesting read, and I think the book would be useful to graduates thinking of a career in the food industry (and not just the chocolate industry specifically), to schoolteachers looking for some interesting experiments, and to lecturers (Chemistry, Biochemistry, Botany, Food Science) looking for interesting facts to enliven their lectures.

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Reference

McGee H (1987) *On Food and Cooking: the Science and Lore of the Kitchen*. pp. 397–409, London, Unwin, ISBN 9780044-40277-0