Jan M.C. GEUNS

Proceedings of the 3rd Stevia symposium, organised by EUSTAS 2009

Stevia in Europe

KULeuven, July 1st and 2nd 2009

Acknowledgements

The editor acknowledges Dr. David Cooke for the proofreading of the English version as well as Christine Vergauwen for the lay out. The authors of a large part of the research in this volume are much indebted to Peter Grosser, Medherbs, Germany for financial support.

The organisers acknowledge the support of the symposium by, in alphabetical order, Cargill, ChromaDex, Connect Consulting, Granular, Greensweet, Medherbs and PureCircle for paying travel costs of speakers or for advertising and providing material help for the symposium. However, the funding organisations had no role in the design and conduct of the studies; collection, management, analysis, and interpretation of the data; and preparation, review, or approval of the manuscripts.

ISBN-NUMBER : 978-90-742-53079

EAN : 9789074253079

NUR: 882-893

Title: Proceedings of the 3rd *Stevia* symposium, organised by EUSTAS 2009 – *Stevia* in Europe.

D/2009/6045/047

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CHAPTER 1

Some socio-economic and environmental aspects of the Stevia industry in developing countries. Is the Stevia supply chain an opportunity in the stabilization of democracies?

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National and regional, European and American foreign aid agencies have been increasingly frustrated over the lack of significant results of multi billion dollar foreign aid programmes. It is easy to diagnose how some well intended aid programmes end up in “greedy pockets”.

It is becoming brutally clear that there will be no stabilization of democracy without successfully addressing education. There is no way of addressing education without addressing poverty.

Hunger and economical worry are the biggest enemies of education in a poor family, anywhere in the world.

The challenge is how to address poverty locally and still maintain the dignity of the individual family.

Personal pride is deeply rooted in humans, and personal pride is extraordinarily related to the male role in less developed societies, and not only in human societies.

CHAPTER 2

Practical aspects of steviol glycosides from the perspective of a product development scientist.

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Introduction

Product developers in the West are focusing enthusiastically on steviol glycosides as these natural high-potency sweeteners become more widely accepted. These potential users of steviol glycosides require specific information on potency, taste quality and stability to guide their development efforts. This presentation deals with these three prerequisites using rebiana as an example.

Potency

Rebiana is a synonym for pure rebaudioside A, a zero-calorie, natural, high-potency sweetener derived from *Stevia rebaudiana*. Reliable information on its sweetness concentration/response behaviour is fundamental to rebiana's use as an ingredient. Forced-choice, paired comparison panels with n>50 are the most accurate means of obtaining this, although labour-intensive and costly.

Results from such panels are traditionally subjected to either graphical or probit analysis. Both have disadvantages. Graphical analysis usually involves invalid assumptions of linearity, and particularly emphasizes the least reliable results near

CHAPTER 3

EUSTAS Quality Assurance for Stevia Raw Products

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ABSTRACT

In the European Union, approval for the steviol glycosides from *Stevia rebaudiana*, as a natural and calorie-free sweetener, is expected in 2010. European consumers expect this new food additive to be healthy and safe, and without negative side-effects. This paper describes a concept by which the quality of steviol glycosides can be guaranteed.

Current situation in Europe

The plant *Stevia rebaudiana* and its dried leaves are subject to the Novel Food regulations. Because to date there is no approval, the distribution as a food stuff is not permitted in Europe.

In 2008, the steviol glycosides isolated from the plant have been recognised as generally safe by the Joint FAO/WHO Expert Committee on Food Additives (JECFA). But approval by the European Food Safety Authority (EFSA) for the steviol glycosides as a food additive is also necessary. An application for accreditation of the dried leaves of *Stevia rebaudiana* as a Novel Food, as well as an application for accreditation of steviol glycosides as a food additive, has been filed by EUSTAS.

CHAPTER 4

CURRENT STATUS OF STEVIOL GLYCOSIDE ANALYTICAL METHODS.

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Introduction

The importance of well developed and validated analytical methods for rebiana (synonym for >95% rebaudioside A), other glycosides, and non-glycoside impurities have grown over the last year with the FDA no objection letter for GRAS approval in food and beverages. With the growing acceptance of rebiana as a natural high-potency sweetener the industry requires methods that can analyze all aspects of rebiana. These methods will provide the needed information for physical property characteristic, production data, food application rebiana concentrations, and rebiana final product quality. The industry has inconsistencies in the methods used and the discussion will focus on these differences, method changes, and issues that need to be addressed.

HPLC Method

Historically, steviol glycosides were analyzed by the method published by JECFA. When Cargill and The Coca-Cola Company started the joint development of rebiana, the JECFA method was altered because the method had problems separating rebaudioside C & F and rebaudioside B was also not identified. The current version of the JECFA method had significantly improved the identification of glycosides (See Table 1), but does not identify rebaudioside F & D. The original TCCC/Cargill method moved to the Agilent Zorbax NH_2 column, which

CHAPTER 5

EUSTAS Round-Robin Testing of Steviol Glycosides

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ABSTRACT

A round-robin testing of 2 steviol glycoside samples was organised. Ten laboratories participated in the testing. The first sample had a purity of 96.2%. The second sample was a 4/5 dilution of sample 1 with $NaHCO_3$. This way, the drying process itself could be checked. The purity of sample 2 was 82.35%. The reported purities of sample 1 varied between 79.8 and 96.2%, those of sample 2 varied between 58.1 and 81.8%. To improve the accuracy of analysis, different suggestions can be made, such as controlling the drying process of samples and standards, purity of standards, injection of sufficient material and use of solvent gradients to shorten run time and reduce integration errors.

KEYWORDS: steviol glycosides, round-robin testing, analytical methods

Proposed abbreviations: Use of SV for steviol opens the possibility to use the following abbreviations: SVgly for steviol glycosides and SVglu for steviol glucuronide; ST: stevioside, RebA - G: rebaudioside A – G; SB: steviolbioside; DulA: dulcoside A; Rub: rubusoside