

DIFFERENT PERSPECTIVES OF STEVIA AS AN INNOVATION IN THE FOOD AND BEVERAGE SECTOR

**FRECO Project Seminar
8th February 2013**

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OUTLINE



1. Introduction
2. Theoretical Overview of Innovation
3. Markets and Regulations
4. Stevia Innovations along the Supply Chain: Farm-To-Table
5. Presentation and Perception of Stevia Products
6. Conclusion

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1. INTRODUCTION



What is stevia?

- A perennial shrub originates from Paraguay and Brazil
- The leaves provide an extraordinary sweet essence
- Has remarkable health characteristics



Why of relevance?

- Natural, low calorie alternative to sugar
- Recent market approval in the US and EU
- Many product introductions after policy change

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2. THEORETICAL OVERVIEW OF INNOVATION

2.1 DEFINITION AND LEVEL OF INNOVATION



Definition of Innovation:

“An innovation refers to any good, service, or idea that is perceived by someone as new. The idea may have a long history, but it is an innovation to the person who sees it as new.” (KOTLER and KELLER 2000)

Way of Classifying Innovation



Source: Own depiction, based on COOPER 2010, p. 13 cf. BOOZ-ALLEN and HAMILTON

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2.2 INNOVATION IN THE FOOD SECTOR



The Market

- The food industry invests little money in R&D
- The fewest are radical whereas most are incremental innovations

Challenges

- Consumers are conservative in their consumption pattern
 - Demand-pull rather than discovery-push innovation
- > many radical innovation relate to findings in other sectors
- Quick emergence of me-too products
 - Mainly large enterprises invest in the development of radical innovations

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2.2 INNOVATION IN THE FOOD SECTOR



Success Factors

- 1) Understanding of users's needs
- 2) Attention to marketing and launch publicity
- 3) Efficiency of development
- 4) Effective use of outside technology and external scientific communication

Trends

- Health and wellness is a major trend in the food and beverage sector
- Important attributes which are driving German consumers are price, safety and values

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3. MARKETS AND REGULATIONS

3.1 THE JAPANESE MARKET



1950s -1960s	1980s	Today
<ul style="list-style-type: none">■ early 1950s: stevia entered Japanese market■ 1960s: ban of artificial sweeteners	<ul style="list-style-type: none">■ 1981: annual consumption of over 2000 tons of stevia■ 1988: stevia products reached market share of 41% in potently sweet substance	<ul style="list-style-type: none">■ Japan only provides for 1/3 of stevia itself → imported rest from: China, Taiwan, Thailand, Korea and Brazil■ Today: over 3000 tons per annum → second largest consumer of stevia worldwide

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3.1 THE JAPANESE MARKET



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Why so successful in Japan?

Over 40,000 clinical studies performed

Effect

- 1) Extension to other markets in Asia
- 2) Proved to be safe and adaptable
 - No doubts due to studies
 - adjustable use of stevia due to Japanese experience
- 3) Japan represents first industrialized market to fully accept stevia
- 4) Builds basis for introduction in other markets: US and EU

3.2 THE U.S. MARKET



1991	1995	2008
<ul style="list-style-type: none">■ FDA (Food and Drug Administration) banned stevia completely	<ul style="list-style-type: none">■ FDA modified restrictions : allowed stevia as a dietary supplement	<ul style="list-style-type: none">■ May: suddenly Cargill and Merisant asked for GRAS-approval (Generally Recognized as Safe)■ December: FDA granted GRAS-Status

- Slower and more cautious market development and legislation procedure
- Economically and politically powerful artificial sweetener producers

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3.2 THE U.S. MARKET



Why?

- The same request from consumers was denied for a long time
- Big companies found success in natural sweetener after their market was threatened by sucralose

First products:

- SoBe Life Water (Pepsi Cola North America with PureVia by Merisant)
- Sprite Green (Coca-Cola Co. with Truvia by Cargill)

Market:

- **2010:** 1.8% of sweetener sales
revenue of \$210 million
- **2011:** 9.1% of sweetener sales
Revenue of \$1.2 billion

U.S. Market

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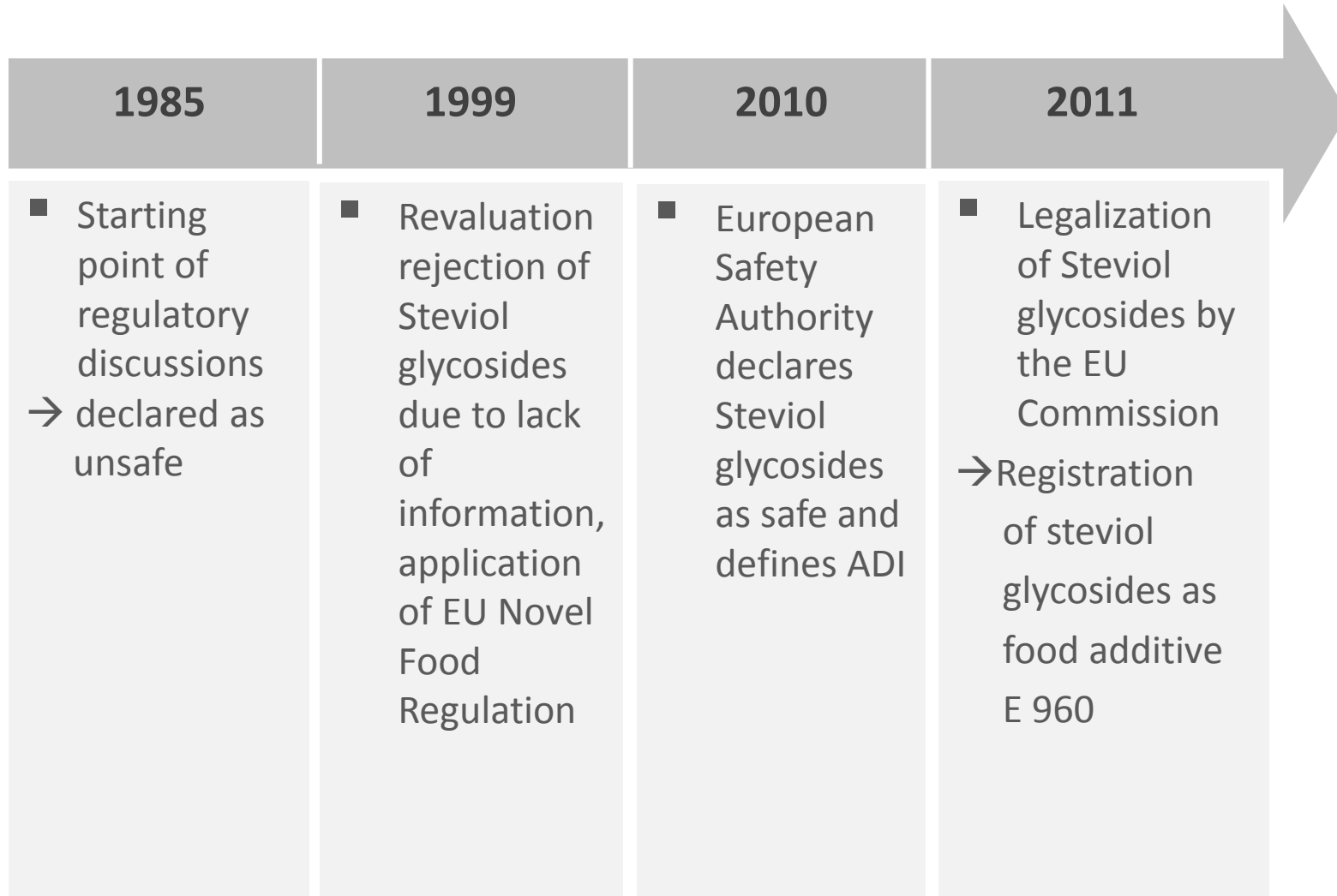
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3.3 THE E.U. MARKET



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Why?

- Lack of information and trust in stevia
- Official ADI declaration by FAO / WHO

**Pioneer
France**

Interim approval in 2009
→ most developed market for stevia in the EU

Expectations

Legislation of stevia will have fast impact on
the global stevia market
→ EU = largest sweetener market worldwide

3.4 THE GLOBAL MARKET



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Production

1. China
 2. Paraguay
 3. Brazil
 4. India
 5. Egypt
- = new players

Consumption

1. US
2. Japan
3. China
4. France

3.4 THE GLOBAL MARKET



Product Launches

Companies

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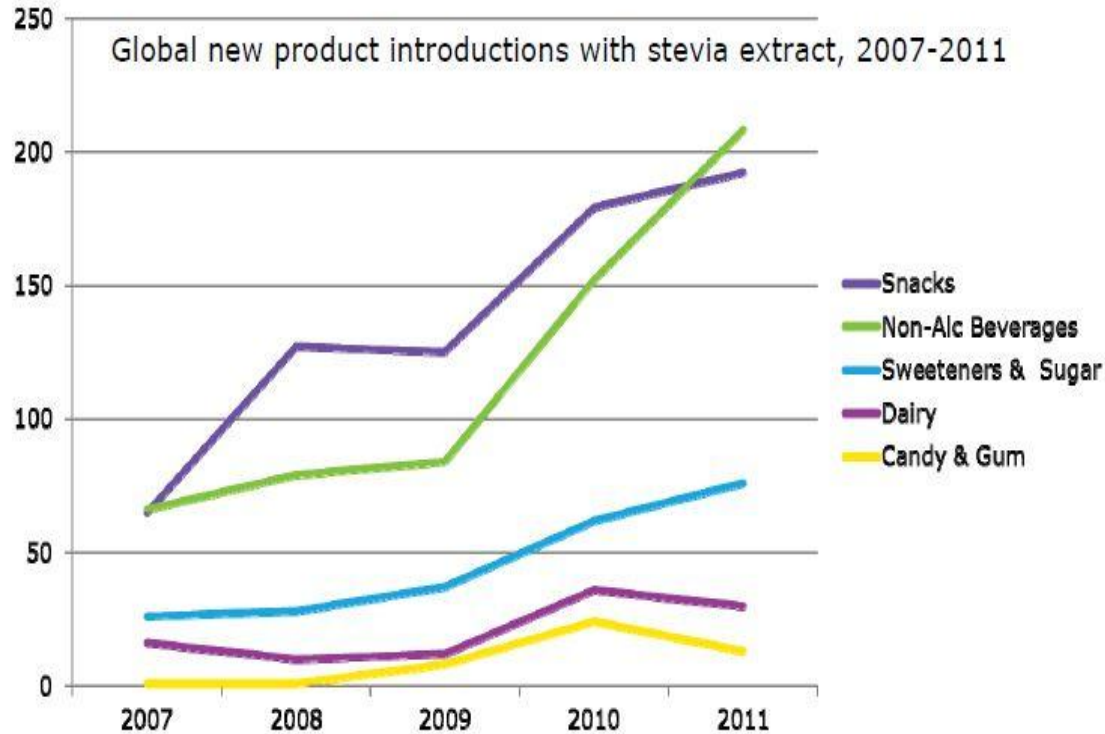
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- GLG
- Pure Circle
- Cargill
- Merisant



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4. Stevia Innovations along the Supply Chain: Farm-To-Table

SUPPLY CHAIN OF STEVIA PRODUCTION: FROM CULTIVATION TO FINAL PRODUCTS



Innovations:

- technological change
- detection and fulfillment of needs and wants
→ marketing perspective

Innovations can take place at different steps of the supply chain

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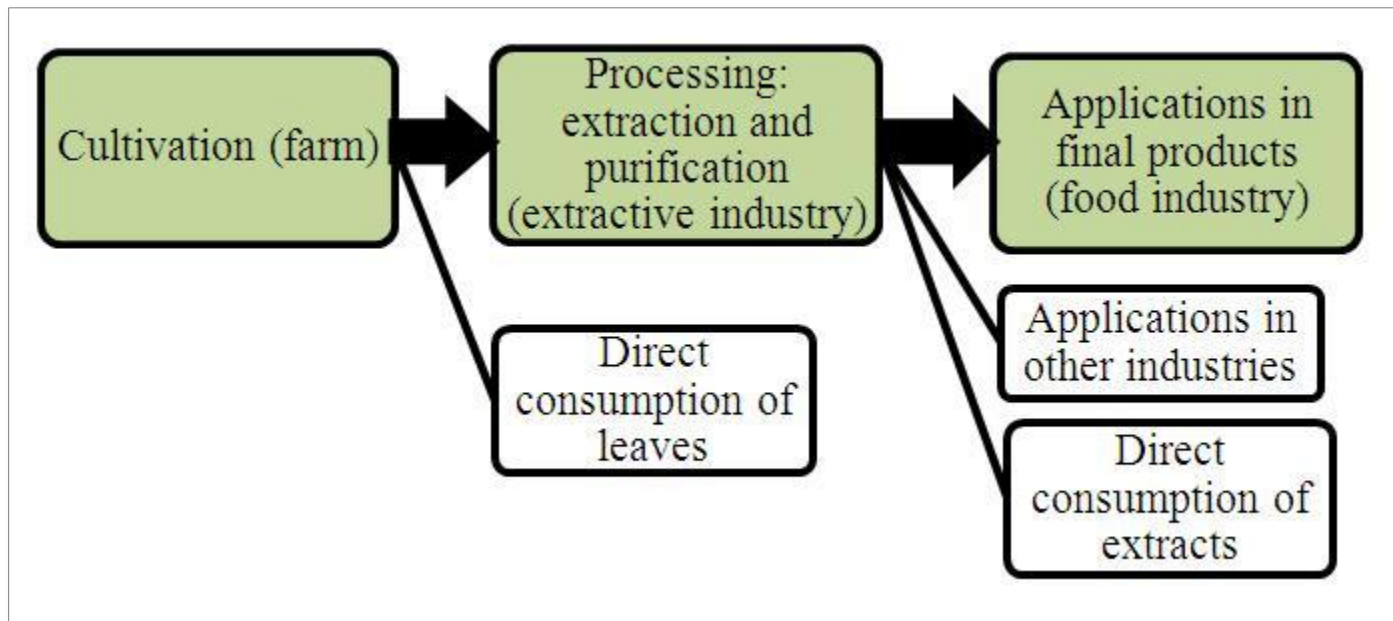
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SUPPLY CHAIN OF STEVIA PRODUCTION: FROM CULTIVATION TO FINAL PRODUCTS



Stevia supply chain up to the final consumer



Source: own depiction

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OBJECTIVES



1. Provide overview of different innovations along the supply chain

- Cultivation
 - Processing
 - Applications in final products
- } “technological”
- } “marketing”

2. Why are innovations taking place rapidly in final food products?

3. Analysis of implementation of stevia applications and future perspectives

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4.1 INNOVATIONS IN THE CULTIVATION PROCESS



Innovations on Cost Reduction

Dripping Irrigation



Improve Productivity, Lower Risk, Decrease Operational Cost

Trickle Irrigation



Organic Production, Preventing Water Waste, Lower Cost

Harvesting



Using Special Instruments in Order to Reduce Labor Cost

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4.1 INNOVATIONS IN THE CULTIVATION PROCESS



Innovations on Quality Improvement

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Careful selection of planting and propagation materials , preventing plant diseases in cultivation process of stevia leads to harvesting leaves with high glycosides content.

**Rapid Micro
Propagation or in
Vitra Technique**



Cultivation of homogeneous
stevia leaves with high
sweetening level

4.2 INNOVATIONS IN PROCESSING



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Consumer Preference

- Non- Toxic Nature
- Sugar like taste profile
- Low Caloric Value
- Heat and PH stability
- Naturality

Drawback of existing technology

- Time consuming
- Low energy efficiency
- Low cost efficiency
- Less quality in taste and color
- Complexity



4.2 INNOVATIONS IN PROCESSING



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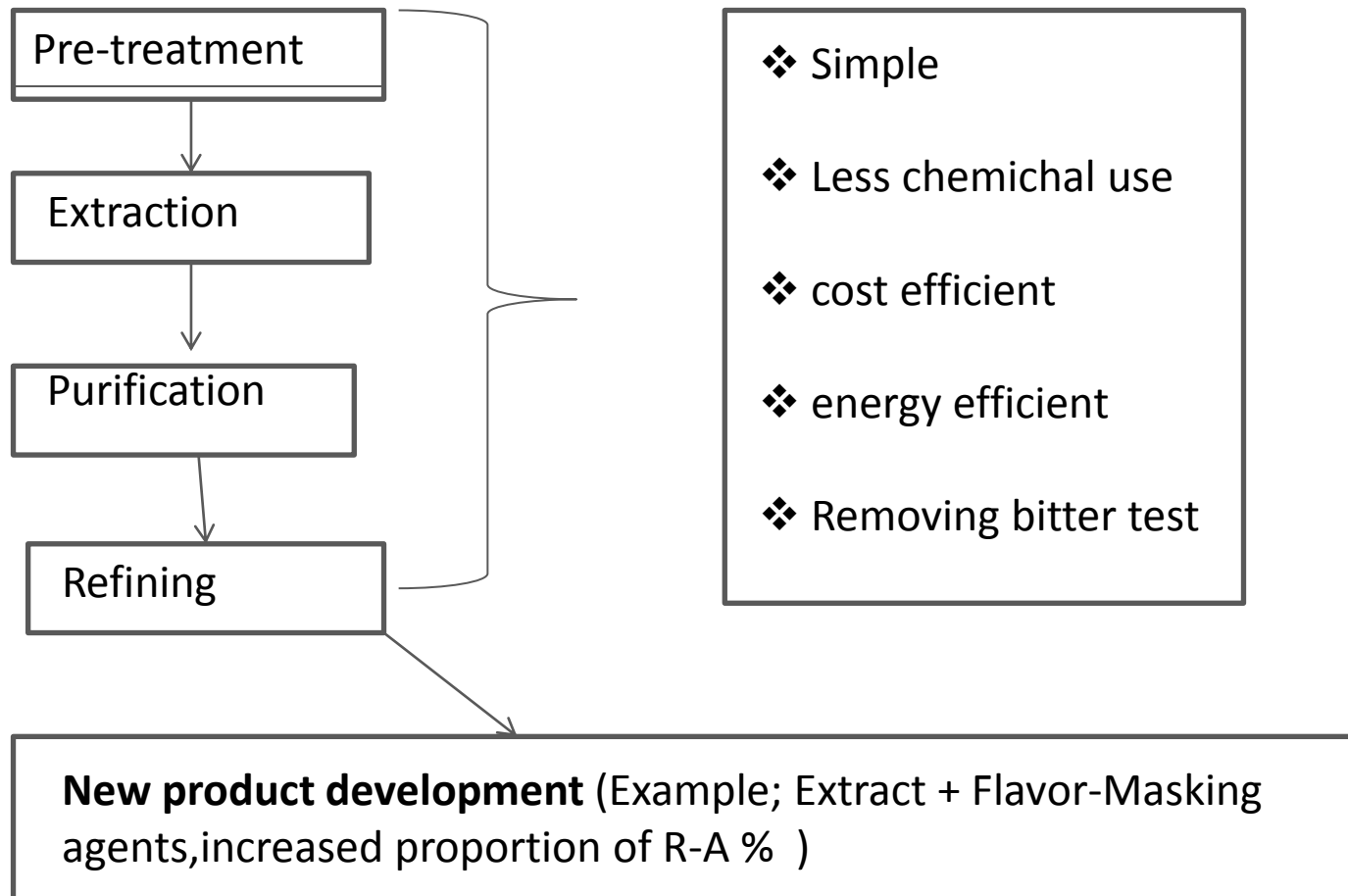
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4.3 INNOVATIVE APPLICATIONS OF STEVIA IN FINAL FOOD PRODUCTS



Main markets for stevia:

- food (and beverage) industry → sweetener
- health industry
- sub-products

General forms of stevia products and where they are mostly used:

- **fresh leaves:** herbal teas and direct consumption → may be purchased loose or in tea bags
- **dried leaves:** the same uses as fresh leaves + also industrial purposes (to extract the stevioside)
- **powdered or ground leaves:** in bulk form, in tea bags + used as a flavor enhancer or sweetener
- **plant leftovers:** processed into animal feed or fertilizers.

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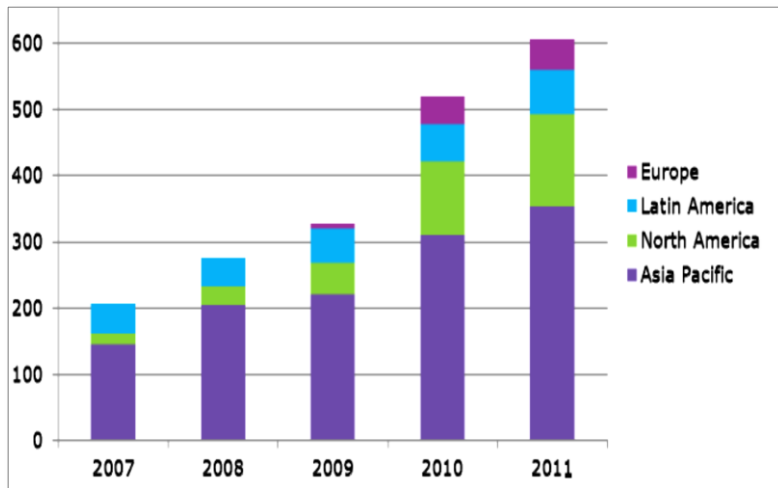
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4.3 INNOVATIVE APPLICATIONS OF STEVIA IN FINAL FOOD PRODUCTS



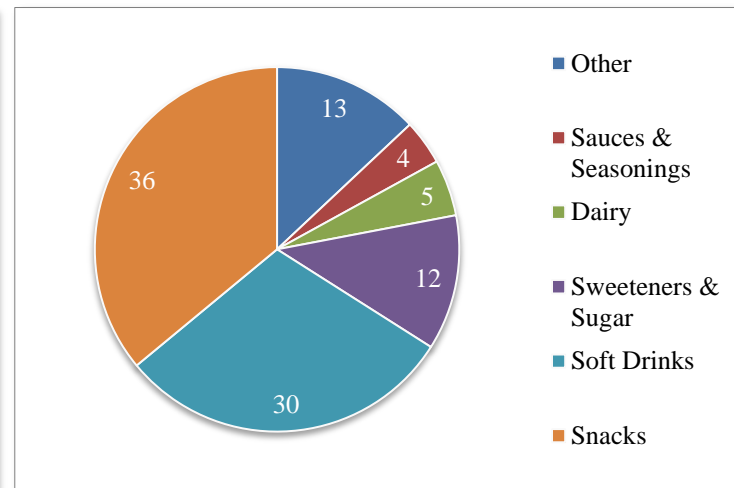
Product innovations growing fast (2007-2011)

By region



Source: Mintel Group (2011)

By food category



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4.3 INNOVATIVE APPLICATIONS OF STEVIA IN FINAL FOOD PRODUCTS



But why?

Consumers

- ✓ Marketed properties of stevia
- ✓ “Natural nutrition” trend in food markets (higher prices)

BUT: consumers’ expectations vs. actual product ingredients (next section)

Producers

- ✓ Advantages in costs and production:
 - costs 5 times less than sugar
 - required many times less to get same sweetness
 - extract not degraded during the heat processing
 - long shelf life
- ✓ “me-too” products

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Future perspectives

Today

"mainstream ingredient"

Tomorrow

continue developing in the “better-for-you” and naturally healthy soft drinks market (+30% in 2011-2016)

If

- political regulation
- research and health concerns
- being competitive

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4.3 INNOVATIVE APPLICATIONS OF STEVIA IN FINAL FOOD PRODUCTS



Implementation of an innovation: winners vs. losers



Close collaboration with the scientific community



Increasing efficiency of development



Following the trend of the food and drink sector



Taking into account consumers' needs

Next Section

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5. Presentation and Perception of Stevia Products

5. PRESENTATION AND PERCEPTION OF STEVIA PRODUCTS



(1) Brief insight into stevia product marketing

- Presentation of stevia products by the companies
- Focus on packaging

(2) The consumers' perception of stevia product packaging



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5.1 STEVIA PRODUCT MARKETING



Positive characteristics of steviol glycosides
(compared to conventional sugar)

and

Reputation of stevia for being natural
(compared to conventional sweetener)



Potential for the food and beverage industry
to create a promising & profitable market by
promoting a healthy image of
stevia products

Calorie free

Not causing
cavities

Higher
sweetness
intensity

No influence
on blood
sugar level

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5.1 STEVIA PRODUCT MARKETING



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Concerns and discrepancies

Declaration of steviol glycosides on packaging

Possibility of consumer cheating: additional use of conventional sugar/sweetener besides stevia

Reputation of stevia for being natural: steviol glycosides attained through a complex chemical procedure

5.2 THE CONSUMERS' PERCEPTION: OBJECTIVE



Do consumers perceive stevia products as healthy as the companies intend to communicate through their marketing?

H1: Consumers perceive stevia products through their packaging as more healthy compared to the non-stevia version.

H2: The better consumers feel informed about stevia by the packaging, the more likely they will buy stevia products.

H3: Participants who haven't heard of stevia before would rather consider it as a marketing-gag.

H4: The more the consumers value natural products, the more likely they will be willing to buy stevia products.

H5: Participants who have heard of stevia before are more likely to see it as a great innovation.

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5.2 THE CONSUMERS' PERCEPTION: METHODOLOGY



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Source:
http://d1.stern.de/bilder/stern_5/wissen/2012/KW46/cola_bearbeitet_maxsize_330_330.jpg



Source: <http://shop.kaffee.net/images/produkte/i15/1562-Schwartau-Wellness-Erdbeere-260-.jpg>

Mean age
25.5 years

Sample size
n = 40

Survey

62.5 %
women

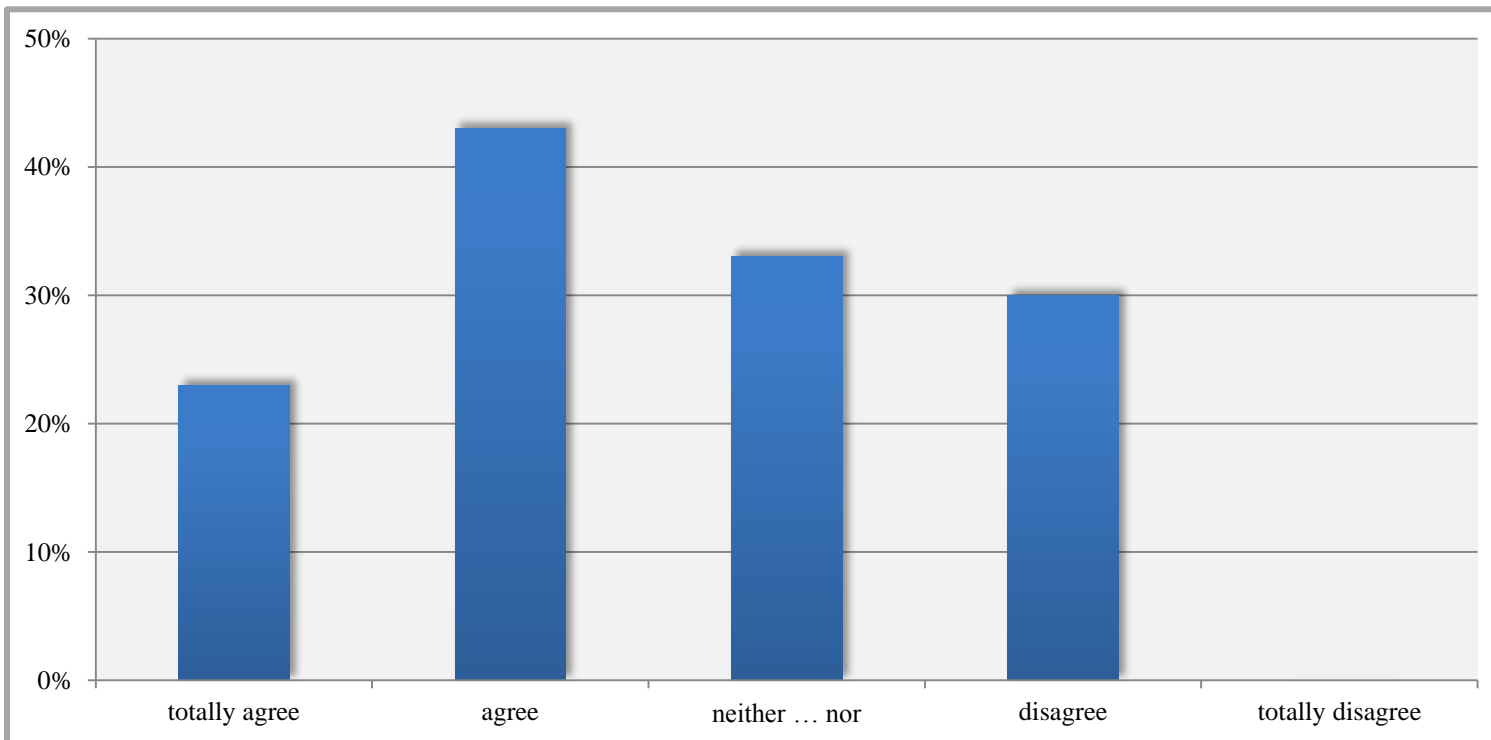
37.5 %
men

5.2 THE CONSUMERS' PERCEPTION: RESULTS



H1: Consumers perceive stevia products through their packaging as more healthy compared to the non-stevia version.

Do you agree with the statement that stevia is healthy?



Source: Own depiction based on the survey undertaken for this paper; n=40.

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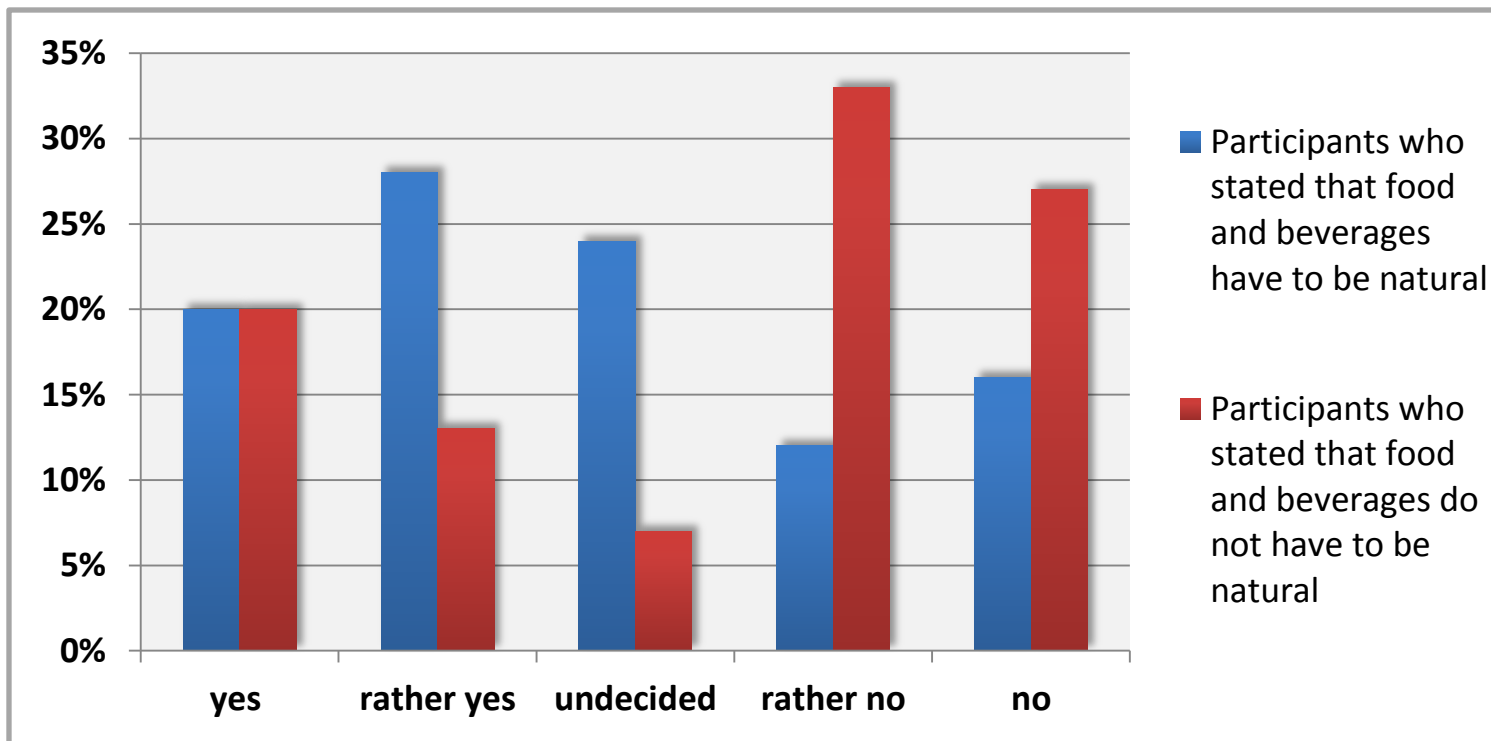
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5.2 THE CONSUMERS' PERCEPTION: RESULTS



H4: The more the consumers value natural products, the more likely they will be willing to buy stevia products.

Would participants for whom natural characteristics of food and beverages are important buy the stevia version of a product?



Source: Own depiction based on the survey undertaken for this paper; n=40.

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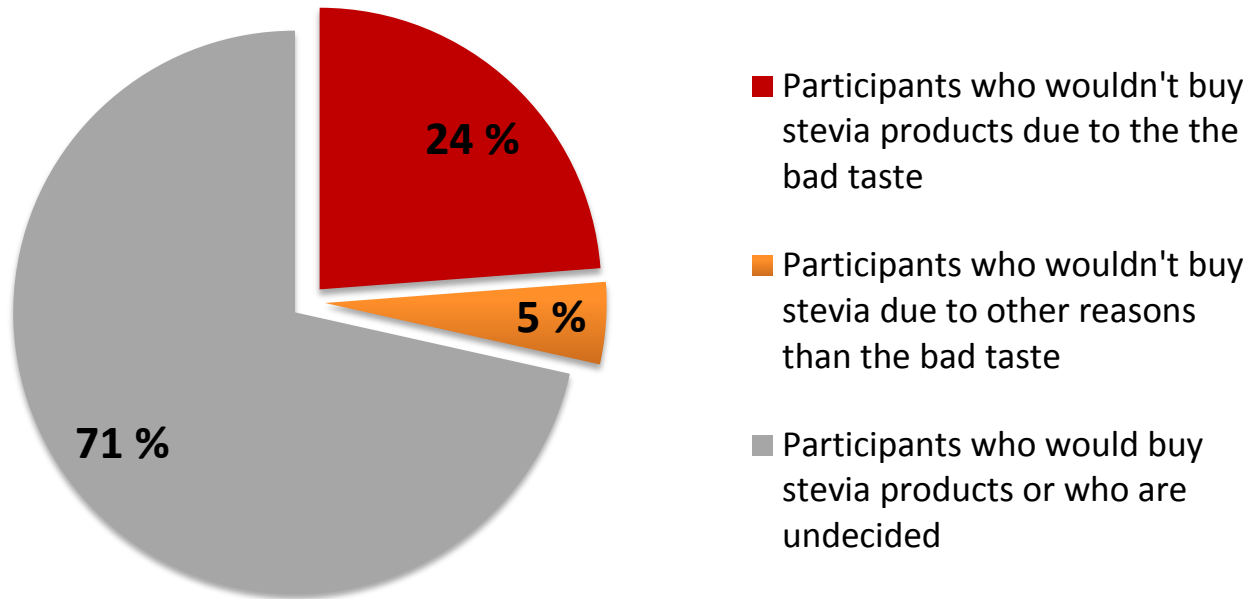
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5.2 THE CONSUMERS' PERCEPTION: RESULTS



Why wouldn't consumers buy a stevia product even if they value natural products and think that stevia is natural?

Participants who wouldn't buy stevia products due to the bad taste



Source: Own depiction based on the survey undertaken for this paper; n=40.

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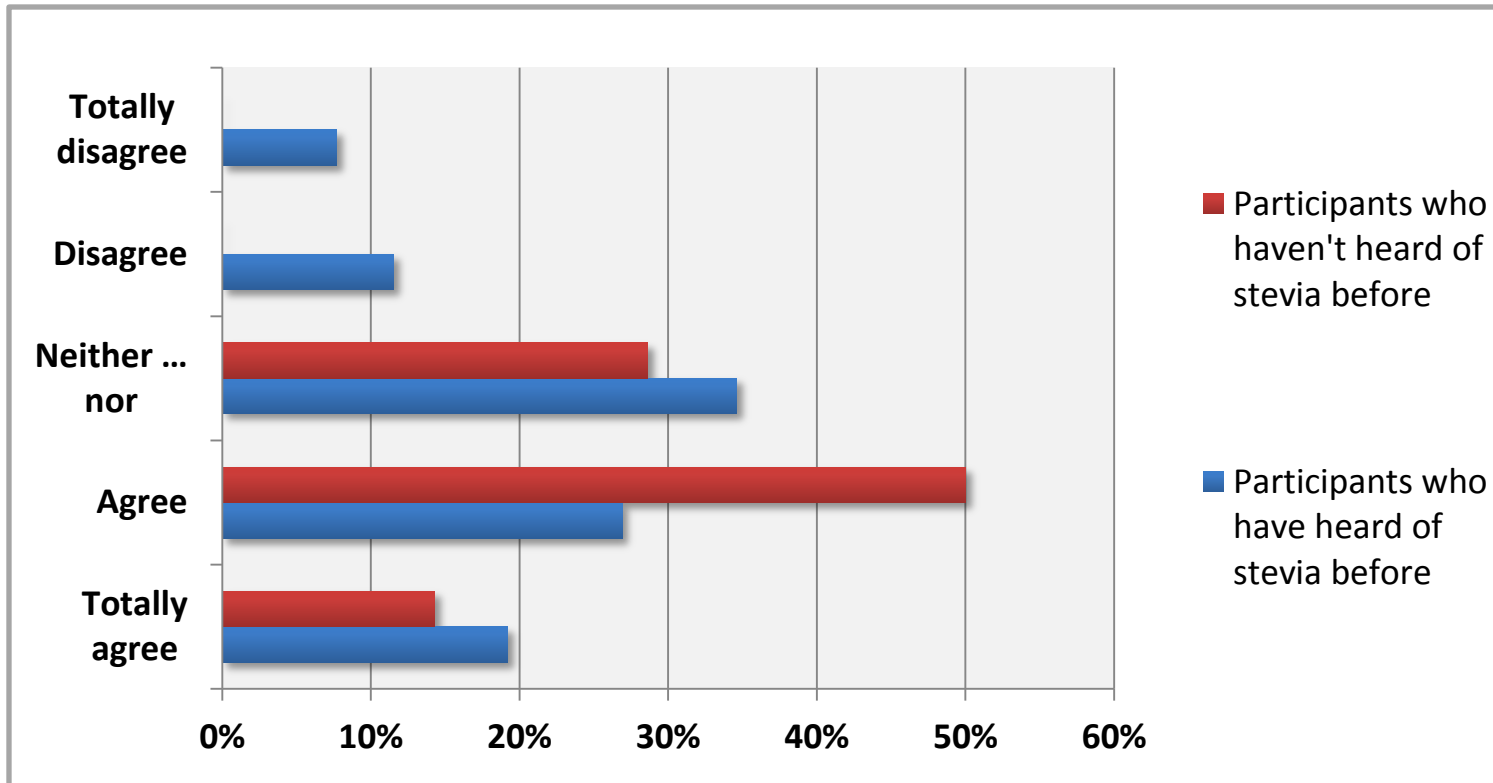
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5.2 THE CONSUMERS' PERCEPTION: RESULTS



H5: Participants who have heard of stevia before are more likely to see it as a great innovation.

Do the participants agree with the statement that stevia is a great innovation?



Source: Own depiction based on the survey undertaken for this paper; n=40.

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5.3 THE CONSUMERS' PERCEPTION



Discussion and limitations of empirical findings

Although stevia products are perceived as healthy, the bad taste remains an obstacle

Field study is not representative due to convenience sampling

Results are only based on the presentation of two selected products

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6. CONCLUSIONS



Stevia fulfills the most important discriminators for a successful innovation.

Innovative techniques in the cultivation process.

Health and wellness: major trends in new product development in the food and beverage sector.

Unfamiliar taste as an obstacle for stevia being a radical innovation in the food and beverage sector.

Still at an early stage of an ongoing process of acceptance and adaptation.

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A close-up photograph of a green plant with several small, white, star-shaped flowers. The leaves are bright green and have a serrated edge. The background is a soft, out-of-focus green.

DISCUSSION
-
QUESTIONS?

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