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INTRODUCTION

The respective areas of competence at ILGI, Institute of Food and Beverage Innovation ILGI (ZHAW Wädenswil), cosmetics, nutrition and technology complement each other perfectly. After distinguishing between definitions and terms such as functional foods and special foods, the food law landscape in Switzerland and Europe must be considered. Against this background, potential active ingredients (such as natural carotenoid mixture and lycopene) are selected on the basis of their chemical-physical and toxicological properties and combined with regional and/or exotic food ingredients, e.g. grape seed flour and oil, tomatoes and super fruits like Goji berries. Product prototypes (a savoury bread and a sweet muffin version) were produced in the Backwarentechnikum (school of baked goods) and were subjected to sensory testing by a semi-trained panel and judged as good or with “like”. The savoury bread proved to have a tannin-astringent finish so to improve its sensory profile, the content of the rich polyphenolic grape seed flour must be optimized. The colour of the sweet muffin version with the carotenoid mixture had to be well explained to the panelists to improve the acceptance level of the product. Fortified foods cannot replace a balanced diet, however they can perform a useful complementary function where a diet is suboptimal in terms of vitamins and/or other nutrients. In this project, it could be demonstrated that in Switzerland a connection between the claim “skin and beauty” and the selected ingredients can be inferred. The added ingredients must be chosen carefully, as in the conservative limit for isolated β-carotene recommended by the Scientific Committee on Food - SCF, due to a lack of data as to how high doses might affect heavy smokers. Here, the additional daily intake of β-carotene can be controlled via the portion size of a muffin. Skin measurements made by Raman spectroscopy provide a view into the skin, non-invasively enabling correlations between absorption/intake and concentration of carotenoids to be made. Appropriately designed user studies are required to demonstrate a positive effect on the skin.

BEAUTY FROM WITHIN

In the field of nutrition, health is a driving purchasing motive. The development of the “Lifestyle to Health Style” (1) adds welcome revenue to the economy. After years of watching from the sidelines, the EU authorities, finally had to intervene to protect consumers, especially in the food sector, by means of “Health Claim” regulations. In the past year, about 1,600 health claims made, only 200 were declared admissible on the basis of any proven effect (evidence) (2). A similar discussion about evidence with respect to claims effectiveness of cosmetics is currently being carried out, the results of which will flow into EU cosmetics legislation.

In the field of cosmetics, holistic approaches are sought. Functional foods, whether in the form of nutritional supplements or

“Beauty Muffins” – a new approach to cosmetics? Opportunities and limitations of enriched foods in Swiss law

KEYWORDS: Beauty from within, functional foods, Beauty Foods, Anti Aging

ABSTRACT: In the field of nutrition, health has become a driving purchasing motive. Beauty and vitality ("Better-aging") are deeply rooted needs in an aging population. The market for “beauty from within” has been in a growth phase for years. The product types range from dietary supplements to functional foods. Above all, food with the functional additive "beauty" has particular potential. Even though the EFSA (European Food Safety) has in recent times placed severe limitations on the type of "health claims" which can be made, Euromonitor International has confirmed over the last few years the upwards trend with "beauty functionals" in the American, European and especially in the Asian market. Within the context of an internal innovation project (duration 2009 to 2010) at the Institute of Food and Beverage Innovation ILGI (ZHAW Wädenswil) the question emerged as to whether it is possible to create sensorily appealing “Beauty pastry” - taking into account current Swiss law and the technical feasibility. It should be mentioned that Switzerland, as a non-EU country, is committed to the reduction of trade barriers and to adapting Swiss food legislation to European law. This has led in recent years to constant revision of existing regulations, a continuing process which has resulted since the completion of the above-mentioned project in 2010 in changes in Swiss law to the claims being made, to labeling and to what essential substances may be added to food. The current state of affairs is elucidated below.
TRADITIONAL BAKED GOODS AS A NEW VEHICLE OF FUNCTIONALITY?

Within the context of an internal innovation project at the Institute of Food and Beverage Innovation ILGI (ZHAW Wädenswil) the question emerged as to whether it is possible to create sensorily appealing "beauty pastry" - taking into account current Swiss law (for the period 2009/10) and the technical feasibility. The respective areas of competence at ILGI: cosmetics, nutrition and technology complemented each other perfectly.

The product under development is based on grains, and being enriched with phytochemicals and other skin-relevant substances, this will fit the definition of a conventional food according to the current Swiss legislation pertaining to active ingredients concentrations, composition and the claims which can be made.

LEGAL SITUATION IN SWITZERLAND AND THE EU - HEALTH AND NUTRITION CLAIMS

The first matter to consider is the question as to which category the developed product is assigned by law. The categories of traditional food and/or special food (with sub-category dietary supplements) can be placed on the market without registration or license, if their composition, applications and labeling (including claims) are described in Swiss food legislation. The manufacturer is subject to self-regulation. (7) This determines the claims which can be made about the effect of added essential or nutritionally valuable substances.

<table>
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<tr>
<th>Legal Regulation</th>
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<td>Lebensmittelgesetz, LMG</td>
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<td>Nutritional information in food with respect to vitamins and minerals</td>
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<td>Empfehlungen und Richtlinien der Eidg. Ernährungskommission (EEK) zuhundem des BAG</td>
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<td></td>
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<td>Einstufung pflanzlicher Stoffe und Zubereitungen als Arzneimittel oder als Lebensmittel, BAG</td>
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<td>Praxishandbuch Functional Food 2007</td>
<td>EFSA list, official approval by the EU Commission in 2012</td>
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Table 1. Swiss legal regulations and other reference works considered. (Abreviations: BAG: Bundesamt für Gesundheit, Federal Office for health (Bern, Switzerland), EDI: Eidgenössisches Departement des innen, Federal Department of Home Affairs (Bern, Switzerland))

The regulations in the food sector (see Table 1) clearly separate medicinal products. They are designed to prevent fraudulent and misleading claims being made and thereby protect the health of consumers, as well as to protect the "traditional" foods such as bread, milk, etc. in their quality and appearance. Vitamins and minerals, and trace elements concentrations can be increased and, within narrow limitations, claims about their effect (Health claims in accordance with Appendix 8 of the Federal Department of Home Affairs (FDHA) ordinance on the labeling and advertising of foods, stuffs (LKV), or according to separate approval) can be made. Some of the promising phytochemicals are discussed in the ordinance on special food. They can be added. Except for highlighting their nutritional value, they should not be credited with having any special effect, as is partially possible in the EU. The approximately 200 health claims permitted in the EU, with few exceptions, will be included in future in the Swiss LVK regulations as soon as possible. Until now, only 30 of these claims have been permitted in Switzerland. Appropriate conditions have been passed by the national government (2, 8).

A selection of the positive claims allowed in Switzerland for vitamins and minerals (focusing on skin-related substances) is shown in Table 2. Based on the EDI (FDHA) ordinance on the labeling and advertising of food, Reference No. 817.022.21 dated 23 November 2005 (as of 1
An interesting legal argument concerning the interpretation of product classification in the EU for food products with added cosmetic value. (January 2013) and the ordinance on the addition of skin-relevant substances to food (SR 817.022.32). See Table 1 and the claims which could be made at a later date. Underlying the aging of skin, are, among other things, oxidative processes (10). For this reason, the taking of antioxidative flavonoids such as lycopene (15mg daily for 10 weeks), or beta-carotenoids (15 to 30mg daily for 12 weeks) was investigated in efficacy studies. These antioxidants protect the skin from UVB-induced erythema (12) and photo-oxidative damage (13) respectively. Further studies have been compiled in the article by A. Marini (2011) (11). Individuals with higher levels of lycopene in the skin show significantly smaller amount of furrows and wrinkles than individuals with lower concentrations (14). Also interesting are studies of the skin via Raman spectroscopy, which reveal how the content of antioxidants such as "beta-carotene and lycopene" in the skin are significantly altered by topical application and oral intake (10).

In addition, these substances had to be assessed to determine their chemical and thermal stability, since core temperatures can exceed 100°C during the baking process. Furthermore, various processing methods have been discussed as to how to avoid high temperature exposure, as is the case with subsequent cold filling or a coating process following the actual baking process.

Table 2. List of the claims permissible in Switzerland for vitamins and minerals (focusing on skin-relevant substances) according to the Swiss ordinance reference numbers 817.022.21 and 817.022.32. "Italics" correspond to the particulars of the prevailing law while conducting the experiments in 2009/10. Effective from 1 January 2013, in accordance with 817.022.21 AF, the newly permitted health claims in the third column apply. (here highlighted in colour) although the list according to (2) is not yet complete.

January 2013) and the ordinance on the addition of essential or physiologically beneficial substances to food 817.022.32 of 23 November 2005 (as of 1 November 2010).

An interesting legal argument concerning the interpretation of product classification in the EU for food products with added cosmetic value, or Nutricosmetics, and related problems of misleading advertising claims has been presented by the lawyer Reinhart A. (9): "Claims of efficacy can only be made when these have a sufficient scientific basis. Notions of beauty can be very subjective and it is very difficult to objectively prove a cosmetic effect. This raises the question as to whether a particular claim is a health-related claim within the meaning of "health claims" according to the relevant ordinance (LKV SR 817.022.21 and SR 817.022.32, see Table 1) and the claims which could be made at a later date. Underlying the aging of skin, are, among other things, oxidative processes (10). For this reason, the taking of antioxidative flavonoids such as lycopene (15mg daily for 10 weeks), or beta-carotenoids (15 to 30mg daily for 12 weeks) was investigated in efficacy studies. These antioxidants protect the skin from UVB-induced erythema (12) and photo-oxidative damage (13) respectively. Further studies have been compiled in the article by A. Marini (2011) (11). Individuals with higher levels of lycopene in the skin show significantly smaller amount of furrows and wrinkles than individuals with lower concentrations (14). Also interesting are studies of the skin via Raman spectroscopy, which reveal how the content of antioxidants such as "beta-carotene and lycopene" in the skin are significantly altered by topical application and oral intake (10).

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A compliant claim for the salty-savoury "Beauty muffins" must refer only to studies. A compliant claim for the sweet "Beauty muffins" with goji "contains grape seed flour and cold-pressed grape seed oil". Making a connection to a health and beauty enhancement effect must be left to the consumer themselves. Specifying lycopene as an active ingredient. for example "contains tomato (extract)", "contains grape seed flour and cold-pressed grape seed oil", it is important to highlight lycopene as an active ingredient, for example "contains lycopene", this requires authorisation and the submission of efficacy studies. A compliant claim for the sweet "Beauty muffins" with gogi berries and natural carotenoid mixture can, in addition to a "soft claim", make "hard claims" such as Vitamin A helps to maintain normal skin connected to information on the nutrition declaration.

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