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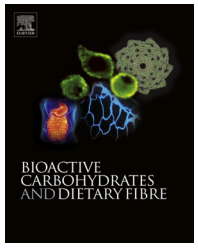

Food hydrocolloids and health claims

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ABSTRACT

This review evaluates the success and failure of the submissions made under article 13.1 to the European Food Safety Agency (EFSA) regarding possible health claims related to hydrocolloids. Submissions from various suppliers and end-users covering nine hydrocolloids were made in a number of categories. These highlighted the interest in expanding the use of food hydrocolloids from their traditional applications into more value added products. For a number of years a major stumbling block for many of the hydrocolloids to be utilised and labelled as a fibre ingredient was due to the uncertainty of what was legally constituted as dietary fibre. This was to a great extend resolved in 2009 by the Codex definition of a dietary fibre, which gave regulatory approval for the major commercial important hydrocolloids to be designated as dietary fibres. This unlocked the way to go a step further to obtain more specific health or nutritional claim for specific hydrocolloids or blends. However as this review shows to obtain a positive health claim from a legislative body require further rigorous scientific studies. The studies must relate to the target demographic and measure relevant biomarkers related to the wording of the claim.

Contents

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1. Introduction

Food hydrocolloids have been exploited for a number of years in food systems as thickeners, gelling agents, stabiliser, bulking agents, and emulsifiers (Phillips & Williams, 2009; Hoefler, 2004). They are used in a wide variety of foods such as beverages (emulsifiers), confectionery (coating agents, texturizing), dairy based products (stabilisers, thickeners), and bakery (bulking agents).

The sourcing, manufacturing and trading of hydrocolloids are a global business where production and processing sites can be found on all continents. The availability and quality determine the price of a specific hydrocolloid, which due to their sourcing might vary from season to season depending on the climate conditions during growth or harvesting.

This latter point have also been one of the main emphases of the research and development work done on hydrocolloids, especially within the industry, which has focused on improving the manufacturing processes (extraction, drying) and on standardising the quality either by processing improvements or blending of various quality grades of the available raw material. The importance of pre- and post-harvest practice is also becoming an important part of controlling the quality and consistency of hydrocolloids (Elrayah, Osman, Al-Assaf, & Ali, 2012).

Further, more specific development work has been focused on developing processing technology to manufacture instant soluble or quickly soluble products, to reduce dissolution times and atmospheric dust and thus improving their usages in industrial processes. This incremental improvement in quality and applicability, which leads to regular introduction of new and improved products available to the market, is led by a few companies. Others, often smaller suppliers, would then follow to match these best-in-class products. This business model gives a very short term advantage for the companies engaged in research and development regarding the traditional applications of food hydrocolloids and keeps them being traded as commodities. To open up new markets and be able to charge a premium for a unique product offering a logical step would be to move into specific health and nutritional claims, backed up with good science and legislative approval. Although some efforts, chiefly from the major Inulin suppliers, regarding the potential nutritional health benefits of these food ingredients have been studied, there is overall still a lack of research and development work in this area from the industry. This is understandable due to the cost and time involved in creating a sound scientific portfolio to back up a nutritional or health claim, which would be beyond the resources or in-house capability, for many of the manufacturers and traders in the hydrocolloid business.

In the academic literature the dietary fibre aspect of food hydrocolloids have been acknowledged for a long time (Phillips, 2013; Brownlee, 2011; Chawla & Patil, 2010). It has also been recognised that a diet high in dietary fibre brings substantial health benefits (Slavin, 2003), which led to the industrial and public awareness that dietary fibre is an important ingredient in a healthy diet (Gidley, 2013; Brownlee, 2011; Kendall, Esfahani, & Jenkins, 2010; Metha, 2009). This led to official recommendations that a certain amount of dietary fibre should be a daily part of the diet (Chawla & Patil, 2010; Redgwell & Fischer, 2005). Most recommendations (Gray, 2006; National Research Council, 2005) for adults suggest a fibre intake above 25 g/day. The particular level varies between countries due to analytical methods used to measure fibre content and the accepted definition of what constitute a dietary fibre. In the western world the intake often fall short of the recommended level. Nearly all food hydrocolloids would qualify as dietary fibre according to recognised analytical methods. However due to cost in use and that in many cases the inclusion levels needed to make a high fibre or source of fibre would create some formulation problems and affect perception of the food product; food hydrocolloids usage as a fibre source has been limited. Nevertheless, there is a successful and growing market for some hydrocolloids which are used to increase the fibre content in food products or sold separately in the supplement industry.

Moving beyond the dietary fibre concept and into a more specific health claim area has been more of a challenge. The lack of consistent and relevant human clinical trials studies became obvious in the recent evaluation of proposed health claims submitted to European Food Safety Agency (EFSA, 2007) under its article 13.1 programme. Most applications failed and this review article will look into the some of the reasons why most failed and why only a few of the submissions were successful. First, the current definition of dietary fibre will be reviewed, and some background to hydrocolloids as dietary fibre and healthy food ingredients will be described.

2. Definition dietary fibre

The basic property of hydrocolloids that lends them to be considered as a healthy food ingredient is that they are dietary fibres. The term dietary fibre was first coined more than fifty years ago (Hipsley, 1953). However it is only recently that an international recognised definition of what constitutes a dietary fibre has been reached (Codex, 2009). The processes that lead to this decision have been reviewed previously (Chawla & Patil, 2010; Phillips & Cui, 2011). It is obvious from this definition that most, if not all, current food hydrocolloids could be considered to be dietary fibres. The agreement of what constitutes a dietary fibre is a step forward for the food industry when they formulate a product with a claim based on the content of dietary fibre in the product.

The agreed definition that was reached is the following:

Dietary fibre means carbohydrate polymers[1] with 10 or more monomeric units[2] which are not hydrolysed by the

[1]When derived from a plant origin, dietary fibre may include fractions of lignin and/or other compounds associated with polysaccharides in the plant cell walls. These compounds also may be measured by certain analytical method(s) for dietary fibre. However, such compounds are not included in the definition of dietary fibre if extracted and re-introduced into a food.

[2]Decision on whether to include carbohydrates from 3 to 9 monomeric units should be left to national authorities.