A Novel Method for the All-in-one Measurement of Dietary Fibre in Food Products, Including Resistant Starch

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Summary

The term “dietary fibre” was first introduced by Hipsley in 1953, as the non-digestible carbohydrates and lignin that are intrinsic and intact in plants, added in food products. Research, carried out by H.C. Trowell in the seventies of the last century, indicated a relationship between dietary fibre and its beneficial health effects in humans, e.g. preventative towards colon cancer, coronary heart diseases etc. Since then, many years of debate and discussion about the definition of dietary fibre, its beneficial impact on health and development of analytical methods, took place.

In 2008/2009, the CODEX Alimentarius Commission, setting standards for WHO/FAO, and the European Union adopted similar definitions of dietary fibre. Both definitions include all carbohydrate polymers which are neither digested nor absorbed in the human small intestine. Codex and EU also agreed on claims of dietary fibres in food; at least 3 g of fibre per 100 g is needed in order to claim a certain food product to be “source of fibre”. Since the seventies, numerous in vitro digestion methods have been developed in order to simulate the small intestinal transit. Till recent, AOAC Official Method 985.29 (Lee & Prosky, 1981) was generally accepted to be the standard method for measuring dietary fibre. However, this gravimetric analysis only measures resistant starches partially and non-digestible oligosaccharides, like resistant maltodextrines, in a minor extent. In 2007, the EFSA (European Food Safety Authority) recommended from that point of view the following:

For practical purposes, it would be advisable that analytical methods could actually correspond better to the physiologically resistant starch present in foods and that a single assay could be used to quantify all components of dietary fibre. This challenged TNO to develop an alternative method for the measurement of total DF in food products, which includes resistant starch and non-digestible oligosaccharides. The new method, which we nicknamed “as eaten”, is largely based on the physiologically relevant steps in food digestion. It includes a mimic of chewing, stomach transit and small intestinal enzymatic degradation. Recently, the AOAC adapted a new method for measuring dietary fibre (AOAC Official Method. 2009.01, McCleary). Although similarities between the new adapted method and the TNO “as eaten” method exist (e.g. usage of pancreatic enzymes), the main difference is that the TNO method “as eaten” includes food pre-treatment steps (cooking/boiling etc.) as well. In this presentation we will demonstrate the impact on measuring the total dietary fibre in several food products (bread, spaghetti and beans) when TNO’s method “as eaten” is applied instead of the AOAC method 985.29. Significant differences in dietary fibre content were observed for Dutch white bread, which according to this method may be addressed as a “source of fibre”.

Beamer-Presentation shown at the meeting.

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