



Interest of Slowly Digestible Starch on carbohydrate metabolism: meta-analysis

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Background and Objectives:

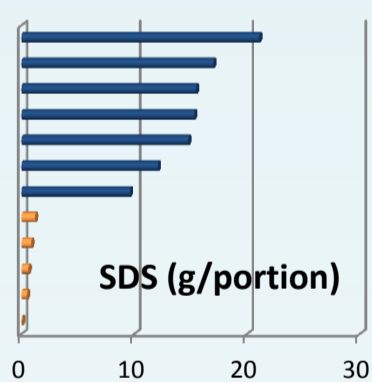
Decreasing glycaemic response is interesting in the prevention of metabolic diseases and has been considered as relevant by the EFSA. However, process and food composition influence dramatically the carbohydrate fate and then the metabolic consequences of carbohydrate rich foods. High slowly digestible starch (SDS) foods have been shown to provide low glycaemic response. A meta-analysis of 5 intervention studies has been done to evaluate the strength between SDS and glycaemic response, and SDS and appearance rate of carbohydrates from cereal foods.

Methods:

Five studies (from literature review + unpublished data), including from 12 to 38 non diseased subjects for a total of 91 subjects, were selected. All studies were randomised clinical trials with well characterised cereal products regarding macronutrient and starch digestibility (SDS content). Tested meals were consistent between studies. They were composed by a cereal product with or without SDS, a dairy product, a hot beverage and potentially a fruit juice. All the other macronutrients were adjusted between meals. We extracted the data to a database, and synthesized the evidence via meta-analyse and meta-regression model. The odd ratios (OR) with 95% of confidence for the adjusted random-effects models investigated the association between SDS and postprandial metabolism as glycaemic response (on five studies), insulin response and appearance rate of carbohydrates (Ra) (on three studies).

Results:

Cereal products containing high SDS (from 9 to 21g/portion), vs low SDS (from 0 to 1g/portion)



are 4,5 times more likely to generate low glycaemic response (and 2,6 times more likely to generate low insulin response)

Table 2: Odd Ratio of the 3 clinical trials for SDS and Appearance Rate of Carbohydrates from cereal products

	Odd Ratio (Fixed Model) CI, 95% (CI- ; CI+)	Weight %	P value
Study 1	9 (1,41 ; 57,1)	24,9	<0,05
Study 4	28,4 (4,9 ; 162,7)	28,0	<0,001
Study 1b	12,7 (3,3 ; 48,6)	47,1	<0,001
Synthesis	14,6 (5,8 ; 36,7)	100%	<0,001

Table 1: Odd Ratio of the 5 clinical trials for SDS and Glycemic response

	Odd Ratio (Fixed Model) CI, 95% (CI- ; CI+)	Weight %	P value
Study 3	2 (0,33 ; 12,0)	15,4	0,44
Study 1	2 (0,38 ; 10,4)	18,1	0,41
Study 4	6,4 (1,5 ; 27,2)	23,6	<0,01
Study 2	7,5 (1,38 ; 40,7)	17,2	<0,05
Study 1b	6,4 (1,6 ; 25,5)	25,7	<0,01
Synthesis	4,5 (2,2 ; 9,0)	100%	<0,001

The link between slow exogenous Ra and high SDS was even stronger with an OR of 14,6 (while it was slightly lower with disappearance rate (OR=4,2)). Strong relationship (69%) was obtained between exogenous Ra and glycemia.

Conclusions:

High Slowly Digestible Starch (> 9g/portion) in cereal foods, included in a small meal, induced a lower postprandial glycaemic response, through a slower appearance rate of exogenous carbohydrates, and with a concomitant low insulin response. This meta-analysis reinforces the interest of SDS on its impact on carbohydrate metabolism in order to prevent the risk of metabolic disease genesis.

References:

Studies 1&2: Vinoy *et al.* JACN -2013-32(2);79-91. Study 1b: submitted. Study 3: submitted.
Study 4: Nazare *et al.* BJN-2010-103;1461-70

Keywords:

Slowly Digestible Starch, Glycemic Response, Postprandial metabolism, Stable Isotope method, Appearance rate