

Annex I

**ESTIMATED DAILY INTAKE OF MODIFIED STARCHES FROM
EXISTING FOOD-USES BY THE U.K POPULATION**

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ESTIMATED DAILY INTAKE OF RS4-FIBRE* BY THE U.K. POPULATION AND CORRESPONDING INTAKES OF PHOSPHORUS FROM PROPOSED FOOD-USES IN THE E.U.

1.0 INTRODUCTION

Modified starches are currently employed in the food industry for the purpose of increasing the stability and shelf life of food products. As National Starch intends to include the modified starch RS4/fibre* in various food products, the current background intake of modified starches was determined. For the purpose of this determination, the food uses and use levels of all modified starches were assumed to be the same as those for E1413, a modified starch produced by National Starch. The food-uses of modified starches currently included savoury sauces and gravies (gravies, savoury sauces, and white sauces), sugar, preserves, and confectionary (fruit fillings), and prepared soups, dry soup mixes, and condensed soups (prepared soups, dry soup mixes, condensed soups).

Estimates for the intake of modified starches in the E.U. were based on the proposed use-levels and food consumption data collected as part of The National Diet and Nutrition Survey programme, a joint initiative between the United Kingdom (U.K.) Food Standards Agency and the Department of Health. Calculations for the mean and high-level (97.5th percentile) all-person and all-user intakes, and percent consuming were performed for all of the populations groups consuming modified starches. For the total intake of modified starches the per person and per kilogram body weight intakes were reported for the following population groups:

- children, ages 1½ to 4½ ;
- young people, ages 4 to 10;
- female teenagers, ages 11 to 18;
- male teenagers, ages 11 to 18;
- female adults, ages 16 to 64;
- male adults, ages 16 to 64.

2.0 FOOD CONSUMPTION SURVEY DATA

The data from the National Diet and Nutrition Survey (NDNS) programme employed in the current intake analysis included survey data collected for adults (aged 16 to 64 years) in 2000-2001 (NDNS 2000-2001) (Office for National Statistics, 2005), the National Diet, Nutrition and Dental Survey of Children Aged 1½ to 4½ Years, 1992-1993 (NDNS, 1992-1993) (UKDA, 1995), the National Diet and Nutrition Survey: Young People aged 4 to 18 Years (NDNS, 1997)

(UKDA, 2001), and the National Diet and Nutrition Survey: People Aged 65 Years and Over, 1994-1995; however, only the former three surveys were used to generate estimates in the current intake analysis. Combined, these surveys provide the most up-to-date data for evaluating food-use, food-consumption patterns, and nutritional status in the U.K., containing 4- or 7-day weighed food records for individuals selected using a stratified multi-stage random probability design, with sampling of private households throughout Great Britain using postal sectors (UKDA, 1995, 2001) or local authority wards (UKDA, 1991) as the primary sampling unit. Consumption data from individual dietary records, detailing food items ingested by each survey participant on each of the survey days, were collated by computer and used to generate estimates for the intakes of modified starches by the U.K. population. For a complete description of the surveys and statistical methods employed please see the report "Estimated Daily Intake of RS4-fibre* by the U.K population and corresponding intake of phosphorus from proposed-food uses in the E.U. which is provided as Annex F of the main Novel Foods dossier.

3.0 FOOD USAGE DATA

The individual proposed use-levels for modified starches employed in the current intake analysis are summarized in Table 3-1. Food codes representative of each proposed food-use were chosen from the food code list associated with each food consumption survey and grouped in food-use categories according to the food type, main and subsidiary food group classifications detailed within the NDNS reports (Office for National Statistics 2005; UKDA 1995, 2001).

Food Category	Proposed Food-Uses	Use-Level (%)
Savoury sauces and gravies	Gravies (typically frozen)	3
	Savoury Sauces (typically frozen)	3
	White Sauces (typically frozen)	3
Sugar, preserves, and confectionary	Fruit fillings (typically frozen)	3
Prepared Soups, Dry Soup Mixes, and Condensed Soups	Prepared Soups	3
	Dry Soup Mixes	3
	Condensed Soups	3

4.0 FOOD SURVEY RESULTS

Estimates for the total daily intakes of modified starches from all proposed food-uses are provided in Tables 4-1 on a per person basis (mg/day). In all of the population groups, between 3.9 and 19.2% of the group consisted of users of those food products in which modified starches are currently used (Table 4-1). Male adults had the greatest percentage of users of food products containing modified starches at 19.2% and the lowest percentage of users was reported in children with 3.9%. On a per person basis, the greatest mean all-person and all-user of modified starches occurred in male adults at 30.2 and 150.2 mg/person/day.

Population Group	Age Group (Years)	% User	Actual # of Total Users	All-Person Consumption			All-Users Consumption				
				Mean (mg)	Percentile (mg)			Mean (mg)	Percentile (mg)		
					90	95	97.5		90	95	97.5
Children	1½ - 4½	3.9	64	2.4	0.0	0.0	36.0	62.4	135.0	160.7	220.9
Young People	4-10	11.0	92	7.6	21.3	55.3	90.0	68.5	139.5	170.6	214.3
Female Teenager	11-18	16.4	73	16.3	53.6	122.1	174.4	97.7	195.0	219.9	257.1
Male Teenager	11-18	16.3	68	20.6	90.0	145.7	214.3	120.5	244.3	274.3	320.6
Female Adults	16-64	16.7	160	22.7	109.7	160.7	199.3	127.3	227.6	302.1	397.3
Male Adults	16-64	19.2	147	30.2	128.6	173.1	257.1	150.2	274.3	379.7	419.6

When heavy consumers (97.5th percentile) consumers were considered, the largest all-person and all-user intakes of modified starches were again determined to occur in male adults, 257.1 and 419.6 mg/person/day, respectively.

5.0 CONCLUSIONS

Consumption data and information pertaining to the current individual food-uses for modified starches were used to estimate the all-person and all-user modified starch intakes of specific demographic groups in the U.K. population. This type of intake methodology is generally considered to be 'worst case' as a result of several conservative assumptions made in the consumption estimates. For example, it is often assumed that all food products within a food category contain the ingredient at the maximum specified level of use. In addition, it is well established that the length of a dietary survey affects the estimated consumption of individual users. Short-term surveys, such as the 4-day children's survey, may overestimate consumption of food products that are consumed relatively infrequently, particularly when weighted to 7 days (Gregory *et al.*, 1995). Additionally, it should be noted that while 100% of the modified starches were assumed to be E1413, several types of modified starches are employed in the food industry and therefore, the actual background intake of E1413 is expected to be significantly less. E1413 is mainly used in frozen applications because of its freeze-thaw stability. Note also that of the chemically modified starches E1413 phosphated distarch phosphate is considered to be the only significant resistant starch (RS4). Furthermore, due to the low number of users reported within each population group, it is appropriate to consider the all-person intake to reflect the true background intake of modified starches. 150.2 and 419.6

In summary, on an all-person basis, the highest mean and 97.5th percentile intakes of modified starches by the U.K. population from all proposed food-uses in the E.U., were observed in male adults. The highest mean estimated intake of modified starch was 30.2 mg/person/day while the highest estimated intake at the 97.5th percentile was 257.1 mg/person/day. For all users the

mean and 97.5th percentile intakes are also highest in male adults at 150.2 and 419.6 mg/person/day respectively.

6.0 REFERENCES

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