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D2.3.21
Status report on harmonised method of recipe calculation and new data

WP2.3.2 Ethnic Foods

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Partners in WP2.3.2

1. AFSSA – France
2. BGU – Israel
3. CESNID – Spain
4. DFVF – Denmark
5. INRAN – Italy
6. RIVM – Netherlands
7. UGhent – Belgium
8. UL – UK

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1. Introduction

Currently there is a lack of up- to-date data for dishes and other prepared foods (Bognar & Piekarski, 2000) especially on ethnic foods (Wharton, Eaton & Wharton, 1984; Smith, Knight, Sahota, Kernohan & Baker, 1993). Therefore more up- to-date food composition data is needed to fill the gaps in current data. Nutritional composition data from recipe calculations is needed to assess the dietary intakes of individuals or populations (Buzzard, Price and Warren, 1991) such as for ethnic groups. This is particularly important for investigating the increased prevalence of diet related diseases such as obesity, diabetes and cardiovascular disease in ethnic groups

Recipe calculations are an alternative method to chemical analysis because analysis is costly and recipe calculations are less time consuming (Vasilopoulou, Georga, Grilli, Linardou, Vithoulka, & Trichopoulou, 2003; Schakel, Buzzard & Gebhardt, 1997). There are seven recipe calculation methods available in the EU [INFOODS method, British method, yield factor method, retention factor method, summing method, the method of Bognár and Piekarski and method used in EPIC study]. Recipe calculations take into account changes in weight and the nutrient content of ingredients during preparation and cooking. Recipe calculation procedures use edible portion, weight and nutrient changes also known as yield and retention factors (Reinivuo & Laitinen, 2006). For further information please refer to Reinivuo et al., 2006.

This report focuses on the progress of recipe calculation by six of the partners [AFSSA, BGU, CESNID, INRAN, RIVM & UL] for; the selection of ethnic foods and the calculation of nutrients in selected foods using the EuroFIR method, an adapted British method or the partners' own calculation software.

The EuroFIR recipe calculation procedure has been taken from the "*Proposal for harmonisation of recipe calculation procedures*". It was derived from the most commonly used recipe calculation procedure, which applies ***the yield factor at recipe level and the retention factor at ingredient level.*** This method was used at AFFSA and UL.

An adapted British method was used to calculate nutrients in a small study of ethnic foods in the UK, at the University of Leeds (UL). This method was used to calculate the already analysed foods as well as some new foods. The British method does not apply retention factors to minor ingredients such as herbs and spices and the fat uptake is not taken into account (Reinivuo et al., 2006). There is a need for including the quantities of fat uptake in particular foods. This is because those foods that use fat as the cooking medium for shallow and deep frying can absorb large amounts of fat which would otherwise not be included.

Some partners [AFSSA, BGU & RIVM] currently use their own calculation software and this is documented in the methods section of this report.

This report is divided into the following sections:

1. **Introduction**
2. **List of ethnic foods**
3. **Criteria for the selection of recipes**
4. **Recipe recording**
5. **Calculation of nutrients**
6. **Results of the nutritional composition from recipe calculation of selected foods**

2. List of ethnic foods

It was agreed at the recipe calculation workshop in Leeds, July, 2007 that five foods or (dishes) would be selected from a list of commonly consumed foods, previously

identified in each participating country. These were dishes representing different food groups. **Table 1** contains a provisional list of ethnic foods for those partners who are participating in this task.

Table 1. Provisional list of ethnic foods selected for recipe calculation

Partner (country)	Ethnic group/ cuisine	Food name	Description
AFFSA (France)	North African	1.*Brik*, egg filled 2. *Brik*, beef filled 3. *Brik*, potatoes filled 4. *Molokhia* 5. *Chorba Frik*	1. North African egg filled pastry sheet 2. North African beef filled pastry sheet 3. North African potato filled pastry sheet 4. Beef-based dish 5. North African soup with meat, vegetables and *frik*
BGU (Israel)	Israeli/ Ethiopian	1. *Khubiz saj* 2. *Khubaizeh* (Dwarf mellow) 3. *Melokhiyeh* with chicken 4. *Semneh* 5. Potatoes and turkey breast in tomato sauce	1. Pita bread, prepared on a *saj* 2. Wild, dark green leafy plant, cooked in a sauce 3. Cooked *Melokhiyeh* (green leaves) with sauce and chicken 4. Clarified butter with spices 5. Arabik/Beduion dish
CESNID (Spain)	Latin American/ Asian	1. *Burrito* 2. Oriental noodles with shrimp 3. *Seco de cerdo* 4. *Sancocho* 5. *Alfajores*	1. Flour tortilla wrapped around a filling 2. Egg noodles stir fried with shrimp and vegetables and seasoned with soy sauce 3. Pork or goat stew in beer with potatoes, tomatoes and cilantro 4. Ingredients usually include chicken, fish, plantains, yucca, cilantro, yams, corn, and potatoes 5. Typical Argentian dessert with *dulce de leche* as main ingredient
INRAN (Italy)	Asian/ Eastern European	1. Steamed ravioli 2. Chicken with almonds	1. A pastry stuffed with minced pork, cabbage, leek, onion and spices 2. Chicken cooked in a sauce with ginger, onions, almonds and bamboo shoots

Partner (country)	Ethnic group/ cuisine	Food name	Description
		3.*Taboule/Tabuleh/ Tabbouleh* 4. *Tajine/Tagine* with lamb 5. Hummus/ Hoummous	3. Bulgur wheat salad with tomatoes, onions, mint, lemon and herbs 4. Lamb stew with prunes, almonds, onions, and spices cooked in a *tagine* (clay pot with dome shaped lid) 5. A puree of chickpeas, tahini, garlic, lemon juice and spices
RIVM (Netherlands)	Surinamese	1. Brown beans with rice 2. *Roti* with potato filling 3. *Dhal* 4. *Pom* 5. *Moksi-alesi*	1. A dish of brown beans, meat and rice 2. Flatbread with potato filling (potato *paratha*) 3. Thick sauce made from yellow split peas 4. Oven dish made with *pomtajer* (yautia) and chicken 5. A dish made with rice, legumes, vegetables, fish and salted meat
UL (UK)	South Asian	1. Chicken vindaloo 2. Fish *biryani* 3. *Paratha gobhi* 4. Vegetable *pakora* 5. *Channa bateta* *Additional foods for calculation* 6. *Puri* (white flour) 7. *Puri* (brown flour) 8. *aloo palak* 9. Bengali chicken and potato curry 10. Bengali prawn *bhuna* 11. Pakistani *zarda* 12. *Rasmalai*	1. Hot and spicy chicken curry 2. White fish cooked with rice, herbs and spices 3. Shallow fried unleavened bread (*chapatti*) stuffed with cauliflower 4. A popular vegetable fritter also known as *bhaji* 5. A Gujarati snack made of chick peas, coconut, potato, tomato and spices 6. Mini *chapatii* bread (white chapatti flour), deep fried 7. Mini *chapatii* bread (brown *chapatti* flour), deep fried 8. *Aloo* (potato) and *palak* (spinach) cooked with onions and spices 9. A spicy chicken curry with onions, garlic, ginger and potato 10. A spicy prawn curry with onions, tomatoes and spices 11. A sweet pudding made from rice, sugar, cardamom, nuts and dried fruits 12. Milky dessert made with specialised milk powder, milk cream & cardamom

Partner (country)	Ethnic group/ cuisine	Food name	Description
		13. Chicken *bhuna* 14. *Aloo* Bombay 15. Lamb kebab	13. Medium spiced chicken curry with tomato, onion, garlic and fresh coriander 14. Chunks of potato in a spicy, tomato & onion sauce 15. Patties made with spiced minced lamb & coriander

3. Criteria for the selection of recipes

The criteria used to select recipes were agreed at the recipe calculation workshop in July, 2007 which included:

i) identify commonly consumed ethnic foods and the recipes,

ii) select representative/standard recipes, and

iii) gather recipe information from volunteers, food composition tables, food surveys, the highest selling ethnic cookery books or internet archives.

Recipes were sought from cookery books in preference to internet archives. Only where no suitable recipes were found, the internet was searched for recipes. For authentic recipes, volunteers from the community representing ethnic group were asked to provide recipes. A number of recipes were assessed to establish main ingredients by comparing information from various sources including, literature, volunteers and investigators' personal knowledge of specific ethnic foods to identify a standard recipe.

1 **Table 2. Sources of recipe information for all partners**

Partner (country)	Ethnic group/cuisine	Recipe	Type of documentation	Sources for selection	Selected source
AFFSA (France)	North African	*Brik*, egg filled	Internet archives and cookery books	http://www.magic-recettes.com/cuisine/bricks-a-l-oeuf/758/10562.asp; http://www.khaoula.com/briktunisien.htm; http://www.marmiton.org/recettes/recette.cfm?num_recette=30414 Bouayed F.-Z., 1991. La cuisine algérienne. 46. Brik. Enag Editions, Algeria, 64; Boutaleb, A., 2003. Cuisine d'Algérie et du Maghreb. Brik à l'oeuf. Paris-Méditerrannée Edition, 11	Bouayed F.-Z. (1991). La cuisine algérienne. 46. Brik. Enag Editions, Algeria, 64
		Brik, beef filled	Internet archives and cookery books	http://www.marmiton.org/recettes/recette.cfm?num_recette=53794; http://www.marmiton.org/recettes/recette.cfm?num_recette=46941; http://www.khaoula.com/briktunisien.htm; http://faimdumonde.kyuran.be/2006/05/21/bricks-a-la-viande-de-boeuf-hachee/; http://www.cuisineaz.com/Recettes/Brick-a-la-viande-hachee-8997.aspx; http://www.cuisineaz.com/Recettes/Bourak-algerien-17076.aspx; http://www.guide-maroc.net/cuisine-1-briouats-a-la-viande-hachee.html Bouayed F.-Z., 1991. La cuisine algérienne. 48. Moummou fi hder'mmou. Petits bouraks farcis. Enag Editions, Algeria, 65 ; Boutaleb, A., 2003. Cuisine d'Algérie et du Maghreb. Bourek bel selk. Paris-Méditerrannée Edition, 10	Bouayed F.-Z., 1991. La cuisine algérienne. 48. Moummou fi hder'mmou. Petits bouraks farcis. Enag Editions, Algeria, 65
		Brik, potatoes filled	Internet archives and cookery books	http://www.la-cuisine-marocaine.com/recettes/entrees-chaudes-33.html; http://www.cuisine-orientale.com/121-brick-pommes-terre; http://www.cap-tunisie.com/cuisine/brik_po_de_terre.htm;	Bouayed F.-Z., 1991. La cuisine algérienne. 42. Bourakb'l-batata.

Partner (country)	Ethnic group/cuisine	Recipe	Type of documentation	Sources for selection	Selected source
				http://www.orientalement.com/c16-brick-aux-pommes-de-terre.html Bouayed F.-Z., 1991. La cuisine algérienne. 42. Bourakb'l-batata ; Bouraks à la pomme de terre. Enag Editions, Algeria, 60	Bouraks à la pomme de terre. Enag Editions, Algeria, 60
		Molokhia	Internet archives and cookery book	http://lemondegarance.blogspot.com/2007/03/la-meloukhia.html; http://anoussi.canalblog.com/archives/2007/04/24/4728769.html; http://www.khaoula.com/mloukhia.htm; http://www.cap-tunisia.com/cuisine/viandes/Boeuf_corete.htm; http://www.asslema.com/forums/salon-de/2654-mloukhiyya-cherchons-recette.html Boutaleb, A., 2003. Cuisine d'Algérie et du Maghreb. M'loukhia. Paris-Méditerrannée Edition, 72	http://anoussi.canalblog.com/archives/2007/04/24/4728769.html
		Chorba Frik	Internet archives and cookery book	http://sokitch.canalblog.com/archives/2007/01/22/2914588.html; http://www.orientale.fr/article_10457_new.htm; http://www.la-cuisine-marocaine.com/recettes/soupes-54.html; http://www.cuisine-dz.com/?r=recette&recette=3; http://1001saveurs.canalblog.com/archives/2007/09/16/6227291.html; http://www.ramadandetunisie.com/recettes_de_cuisine_pour_ramadan/recettes_tunisiennes/chorba_frik_20051010122/; http://www.webarabic.com/portail/news/4/55/d,Cuisine.htm Bouayed F.-Z.,1991. La cuisine algérienne. 8. Djâdri hmar – Chorba frik. Soupe au blé vert concassé. Enag Editions, Algeria, 20	Bouayed F.-Z.,1991. La cuisine algérienne. 8. Djâdri hmar – Chorba frik. Soupe au blé vert concassé. Enag Editions, Algeria, 20
BGU (Israel)	Israeli/Ethiopian	*Khubiz saj*	Recipes from volunteers	Collected from a survey of Bedouin women in the Negev area. Data was collected by another female from the same family	Recipe from volunteers

Partner (country)	Ethnic group/cuisine	Recipe	Type of documentation	Sources for selection	Selected source
		Khubaizeh (Dwarf mellow)	Recipes from volunteers	Collected from a survey of Bedouin women in the Negev area. Data was collected by another female from the same family	Recipe from volunteers
		Melokhiyeh with chicken	Recipes from volunteers	Collected from a survey of Bedouin women in the Negev area. Data was collected by another female from the same family	Recipe from volunteers
		Semneh	Recipes from volunteers	Collected from a survey of Bedouin women in the Negev area. Data was collected by another female from the same family	Recipe from volunteers
		Potatoes and turkey breast in tomato sauce	Recipes from volunteers	Collected from a survey of Bedouin women in the Negev area. Data was collected by another female from the same family	Recipe from volunteers
CESNID (Spain)	Latin American/Asian	*Burrito*	Information not provided		
		Oriental noodles with shrimp	Information not provided		
		Seco de cerdo	Information not provided		
		Sancocho	Information not provided		
		Alfajores	Information not provided		
INRAN (Italy)	Asian/Eastern European	Steamed ravioli	Cookery book and internet archives	http://www.italiacina.org/cultura/cucina/ricette.html http://fooddownunder.com/cgi-bin/recipe.cgi?r=201115 http://www.asianworld.it/forum/index.php?showtopic=874 http://www.ilgastronomade.com/index.php?option=com_content&task=view&id=276&Itemid=16 http://www.cucinamoree.it/dbricette/ricetta.php?id=2686&sid=795d3ac19588a6a1336151dee296f12d http://www.cookaround.com/cucina/cina/confro-	http://www.italiacina.org/cultura/cucina/ricette.html

Partner (country)	Ethnic group/cuisine	Recipe	Type of documentation	Sources for selection	Selected source
				1.php?ID=1172 http://www.edulab.it/roma/prodotti/classeC/cinese.htm http://www.mollyweb.it/molli/moduli/gastronomia/gastronomia_cucinacinese.asp?ID=43 http://www.romaethnica.com/ricercaricettavis.php Libro: Cucina Cinese. Agostina Carnevale Maffè. La Spiga. 1985, pp 143-8	
		Chicken with almonds	Cookery book and internet archives	http://cookingsecrets.org/chinese/almond-chicken.html http://www.cookaround.com/cucina/cina/confro-1.php?ID=1228 http://www.giallozafferano.it/ricetta/Pollo-alle-mandorle http://www.cinacom.com/ricette.html http://www.cucinaericette.it/ricetta-pollo-alle-mandorle.asp http://www.mollyweb.it/molli/moduli/gastronomia/gastronomia_cucinacinese.asp?ID=43 Libro: Cucina Cinese. Agostina Carnevale Maffè. La Spiga .1985 pp 68-9 Libro: L'enciclopedia della cucina internazionale N21: Giappone, Cina, Corea, Cambogia e Vietnam. Istituto Geografico De Agostani. 2006, pp 166	Libro: Cucina Cinese. Agostina Carnevale Maffè. La Spiga .1985, pp 68
		Taboule/Tabuleh/ Tabbouleh/Tabuli	Cookery book and internet archives	Libro: Ricettario del Mondo. Giunti Demetra. Giunti Editore 2007, pp 315-6 http://www.cucinamoree.it/dbricette/ricetta.php?id=1975&sid=795d3ac19588a6a1336151dee296f12d http://www.oliopepesale.com/risorse/ricetta.asp?dish_ID=61 http://www.cookaround.com/cucina/araba/confro-1.php?ID=13 http://cookingwithbj.com/bjcooking/recipe/rcpdetail.php?bj=1&mealname=Eid+Trolley&rcpID=622 http://www.contactpakistan.com/arabfood/taboule.htm	Libro: Ricettario del Mondo. Giunti Demetra. Giunti Editore. 2007, pp 315-6

Partner (country)	Ethnic group/cuisine	Recipe	Type of documentation	Sources for selection	Selected source
				http://www.cucinaconme.it/tabuli.htm http://www.buonissimo.org/ricette/1249_tabuli.asp http://fooddownunder.com/cgi-bin/recipe.cgi?r=255272 Libro: La grande cucina. Nord Africa e Medio Oriente. N 29.RCS Quotidiani 2006, pp 102 Libro: L'enciclopedia della cucina internazionale N23: Africa e Medioriente. Istituto Geografico De Agostani. 2006, pp 277	
		Tajine/Tagine with lamb	Internet archives	http://www.arab.it/ricette/prugne.htm http://www.cucinamoree.it/dbricette/ricetta.php?id=1982&sid=795d3ac19588a6a1336151dee296f12d http://fooddownunder.com/cgi-bin/recipe.cgi?r=145776 http://www.romaethnica.com/ricercaricettavis.php http://www.mangiarebene.com/ricette/carne/carne-ovina/tajine-di-agnello-con-prugne-_IDa_532.htm http://www.cookaround.com/cucina/araba/confro-1.php?ID=25 http://www.ricetteonline.com/tipi_cucina/cucina-etnica/cucina-africana/visualizza_ricetta.php/ricetta/2079 Libro: Ricettario del Mondo. Giunti Demetra. Giunti Editore. 2007, pp 253-4 Libro: L'enciclopedia della cucina internazionale N23: Africa e Medioriente. Istituto Geografico De Agostani. 2006, pp 106	http://www.arab.it/ricette/prugne.htm
		Hummus/ Hoummous/ Homous	Cookery book and internet archives	http://www.arab.it/ricette/hummus.htm http://www.romaethnica.com/ricercaricettavis.php http://www.contactpakistan.com/arabfood/homous.htm http://www.cucinaconme.it/hummus_pure_ceci_libano.htm http://www.buonissimo.org/ricette/1248_hummusbetahini.asp http://www.nbts.it/cucina/libano.htm http://www.oliopepesale.com/etnico/mondoarabo/scheda_rice	http://www.arab.it/ricette/hummus.htm

Partner (country)	Ethnic group/cuisine	Recipe	Type of documentation	Sources for selection	Selected source
				tta.asp?dish_ID=62 http://www.ricetteonline.com/tipi_cucina/cucina-etnica/cucina-araba/visualizza_ricetta.php/ricetta/1882 http://fooddownunder.com/cgi-bin/recipe.cgi?r=134919 Libro: L'enciclopedia della cucina internazionale N23: Africa e Medioriente. Istituto Geografico De Agostani. 2006, pp 266 Libro: La grande cucina. Nord Africa e Medio Oriente. N 29.RCS Quotidiani. 2006, pp 38	
RIVM (Netherlands)	Surinamese	Brown beans with rice	Recipes from volunteers	Recipes from two female volunteers of Surinam community	Average of the two recipes from volunteers
		Roti with potato filling (or potato paratha)	Recipes from volunteers and internet archives	Recipes from three female volunteers from Surinam community in the Netherlands http://www.tantethea.net/recepten/hoofdger/hg_sur_roti_pannekoek.htm http://surinaamsekeuken.web-log.nl/surinaamsekeuken/2004/05/roti_met_aardap.html http://www.eigenwijskoken.nl/roti.htm http://www.hollandsepot.dordt.nl/surinaams/surinaams.htm	http://www.tantethea.net/recepten/hoofdger/hg_sur_roti_pannekoek.htm
		Dhal	Recipes from volunteers	Recipes from two female volunteers of Surinam community	Average of the two recipes from volunteers
		Pom	Internet archives	http://www.gratisrecept.nl http://www.keukentips.nl/recept.php?id=1558 http://www.hollandsepot.dordt.nl/surinaams/surinaams.htm http://www.mijnreceptenboek.nl/recept/hoofdgerechten/gevogelte/pom-tajer-1444.html http://www.tantethea.net/recepten/hoofdger/hg_pom.htm http://www.hermans.org/culinair/FAC/pom.html	http://www.gratisrecept.nl/recept/surinaamse-pom.php
		Moksi-alesi	Internet archives	http://www.gratisrecept.nl http://www.sranangkukru.net/skphp/start.php?menu=recepten	http://www.gratisrecept.nl/recept/moksi-

Partner (country)	Ethnic group/cuisine	Recipe	Type of documentation	Sources for selection	Selected source
				&id=65&categorie=hoofd&naam_recept=Moksi%20alesi%20djarpesi http://www.eigenwijskoken.nl/MOKSIAL.HTM http://www.hollandsepot.dordt.nl/surinaams/surinaams.htm http://www.omawapsie.nl/recepten/moski_alesi.html http://www.ah.nl/allerhande/kookschrift/recept.jsp?id=8941	alesi-met-zoutvlees-en-garnalen.php
UL (UK)	South Asian	Chicken vindaloo	Internet archives	http://www.cookitsimply.com/recipe-0010-013q441.html http://www.greenchronicle.com/recipes/chicken_vindaloo_recipe.htm http://www.videojug.com/film/how-to-make-chicken-vindaloo http://www.recipe-ideas.co.uk/recipes-6/Chicken%20Vindaloo.htm http://www.cookingindex.com/recipes/37784/chicken-vindaloo.htm http://forkd.com/recipe/chicken-vindaloo-328 http://www.currydirectory.co.uk/recipe/ChickenVindaloo.htm http://curryfocus.co.uk/recipe.php?recipe=21	http://www.greenchronicle.com/recipes/chicken_vindaloo_recipe.htm
		Fish *biryani*	Internet archives and recipes from volunteers	http://uktv.co.uk/food/recipe/aid/515615 http://www.cookitsimply.com/recipe-0010-044o61.html	
		Paratha gobhi	Cookery book, internet archive and recipes from volunteers	http://www.cookitsimply.com/recipe-0010-0108p03.html Hansa, D. (2000). Hansa's Indian vegetarian cookbook. Hansa's publications	
		Vegetable *pakora*	Cookery book, internet archives and recipes from volunteers	Holland, Welch and Buss (1992). Second supplement to McCance and Widdowson's The Composition of Foods, 5th edition; vegetable dishes. Royal Society of Chemistry, Cambridge. P188 http://www.celtnet.org.uk/recipes/miscellaneous/fetch-recipe.php?rid=misc-vegetable-pakoras http://www.mamtaskitchen.com/recipe_display.php?id=1280	

Partner (country)	Ethnic group/cuisine	Recipe	Type of documentation	Sources for selection	Selected source
				3 http://uktv.co.uk/food/recipe/aid/512412	
		Channa bateta	Cookery book and internet archives	Dabhi, H. (2000). Hansa's Indian vegetarian cookbook: popular recipes from Hansa's Gujarati restaurant. UK: Kishor Dabhi http://www.cookingindex.com/recipes/61497/channa-bhatura.htm http://www.cookinggoddess.com/category/Recipes/Chana-Bhatura/	Dabhi, H. (2000). Hansa's Indian vegetarian cookbook: popular recipes from Hansa's Gujarati restaurant. UK: Kishor Dabhi
		Puri (white)	Cookery book	Dabhi, H. (2000). Hansa's Indian vegetarian cookbook: popular recipes from Hansa's Gujarati restaurant. UK: Kishor Dabhi	Dabhi, H. (2000). Hansa's Indian vegetarian cookbook: popular recipes from Hansa's Gujarati restaurant. UK: Kishor Dabhi
		Puri (brown)	Cookery book	Dabhi, H. (2000). Hansa's Indian vegetarian cookbook: popular recipes from Hansa's Gujarati restaurant. UK: Kishor Dabhi	Dabhi, H. (2000). Hansa's Indian vegetarian cookbook: popular recipes from Hansa's Gujarati restaurant. UK: Kishor Dabhi
		Aloo palak	Internet archive	Indian recipes. *Aloo palak recipe*. http://cookingsecrets.org/curry/aloo-palak-2.html	Indian recipes. *Aloo palak recipe*. http://cookingsecret

Partner (country)	Ethnic group/cuisine	Recipe	Type of documentation	Sources for selection	Selected source
					s.org/curry/aloo-palak-2.html
		Bengali chicken and potato curry	Book	Judd, P. A., Kassam-Khamis, T., & Thomas, J. E. (2000). *The Composition and nutrient content of food commonly consumed by South Asians in the UK.* Aga Khan Health Board for the United Kingdom.	Judd, P. A., Kassam-Khamis, T., & Thomas, J. E. (2000). *The Composition and nutrient content of food commonly consumed by South Asians in the UK.* Aga Khan Health Board for the United Kingdom.
		Bengali prawn *bhuna*	Book	Judd, P. A., Kassam-Khamis, T., & Thomas, J. E. (2000). *The Composition and nutrient content of food commonly consumed by South Asians in the UK.* Aga Khan Health Board for the United Kingdom.	Judd, P. A., Kassam-Khamis, T., & Thomas, J. E. (2000). *The Composition and nutrient content of food commonly consumed by South Asians in the UK.* Aga Khan Health Board for the United Kingdom.

Partner (country)	Ethnic group/cuisine	Recipe	Type of documentation	Sources for selection	Selected source
		Pakistani *zarda*	Book	Judd, P. A., Kassam-Khamis, T., & Thomas, J. E. (2000). *The Composition and nutrient content of food commonly consumed by South Asians in the UK.* Aga Khan Health Board for the United Kingdom.	Judd, P. A., Kassam-Khamis, T., & Thomas, J. E. (2000). *The Composition and nutrient content of food commonly consumed by South Asians in the UK.* Aga Khan Health Board for the United Kingdom.
		Rasmalai	Internet archive	UKTV food, 2007 http://uktv.co.uk/food/peoplescookbook/recipe/aid/581419	UKTV food, 2007 http://uktv.co.uk/food/peoplescookbook/recipe/aid/581419
		Chicken *bhuna*	Book	Judd, P. A., Kassam-Khamis, T., & Thomas, J. E. (2000). *The Composition and nutrient content of food commonly consumed by South Asians in the UK.* Aga Khan Health Board for the United Kingdom.	Judd, P. A., Kassam-Khamis, T., & Thomas, J. E. (2000). *The Composition and nutrient content of food commonly consumed by South Asians in the UK.* Aga Khan Health Board for the United Kingdom.

Partner (country)	Ethnic group/cuisine	Recipe	Type of documentation	Sources for selection	Selected source
		Aloo Bombay	Internet archive	Sainsburys, 2007 [http://www.sainsburys.co.uk/food/recipe/detail.htm?recipeid=11195&prevUrl=%2fsearch.htm%3fquery%3dBombay%2bpotatoes%26x%3d0%26y%3d0]	Sainsburys, 2007
		Lamb kebab	Recipes from volunteers	Volunteer recipes x 4	Average of the recipes from volunteers & from Indian community

4. Recipe recording

4.1 Ingredients

Most of the ingredients (**Table 3**) such as spices, *chapatti* flours, oil, vegetables and meat were purchased from the ethnic food stores and a few from the supermarkets. This was to ensure the ingredients were authentic and represented the cuisine selected for this task on recipe calculation.

1

2 **Table 3. List of ingredients used in selected dishes**

Partner (country)	**Ethnic cuisine**	**Dish**	**Ingredients grams & (%) [a]**	**Total raw weight (g) (edible portion)**
AFFSA (France)	North African	*Brik,* egg filled *Brik,* beef filled *Brik*, potatoes filled *Molokhia* *Chorba Frik*	Recipe information is to be completed	
BGU (Israel)	Israeli/Ethiopian	*Khubiz saj*	Whole grain wheat flour 2500g (53.6%), table salt 23.94g (0.51%), water 2133g (45.8%)	4656.94
		Khubaizeh	Water 1185g (69%), salt 18g (1.04%), green chilli peppers 22.5g (1.31%), white wheat flour 39.06g (2.2%), onions 70g (4.0%), olive oil 81g (17.4%), *khubaizeh* (dwarf mellow) 300g (17.4%)	1715.56
		Melokhiyeh with chicken	*Jute* leaves 260g (18.6%), chicken stock 1080g (77.2%), soybean oil 27.2g (1.9%), garlic 18g (1.28%), salt 0.75g (0.05%), green chilli peppers 11.25g (0.8%)	1397.20
		Semneh	Unsalted butter 400g (97.2%), ground turmeric 2.2g (0.53%), table salt 9.0g (2.1%)	411.20

Partner (country)	**Ethnic cuisine**	**Dish**	**Ingredients grams & (%) [a]**	**Total raw weight (g) (edible portion)**
		Potatoes and turkey breast in tomato sauce	Potatoes 229.5g (15.08%), onions 35g (2.3%), turkey 500g (32.8%), soyabean oil 13.6g (0.89%), green chilli peppers 22.5g (1.47%), sweet green peppers 29.75g (1.95%), water 592.5g (38.9%), tinned tomatoes 93.75g (6.1%), chicken broth 2.0g (0.13%), salt 3.0g (0.19%)	1521.60
CESNID (Spain)	Latin American/Asian	*Burrito* Oriental noodles with shrimp *Seco de cerdo* *Sancocho* *Alfajores*	Information to be completed	
INRAN (Italy)	Asian/Eastern European	Steamed ravioli	**Pastry:** wheat flour 200g (19.9%), water 150g (15%), sesame oil 7g (0.7%), **stuffing:** minced swine 200g (19.9%), leek 200g (19.9%), Chinese cabbage 200g (19.9%), soy sauce15 g (1.5%), wheat flour 20g (2%), glutamate 6g (0.6%), pepper 0.4g (0.04%), soy oil 7g (0.7%), salt 4.5g (0.4%)	1004
		Chicken with almonds	Chicken breasts 300g (36.7%), peeled almonds 200g (24.5%), bamboo shoots 200g (24.5%), wheat flour 22g (2.7%), soy oil 30g (3.7%), green onions 10g (1.2%), fresh ginger 6g (0.7%); **sauce:** sherry 10g (1.2%), broth 20g (2.4%), *maizena* flour 10g (1.2%), salt 9 g (1.1%), pepper 0.8g (0.1%)	818

Partner (country)	Ethnic cuisine	Dish	Ingredients grams & (%) [a]	Total raw weight (g) (edible portion)
		Taboule/Tabuleh	Bulgur wheat , 300g (22%), water (absorbed on soaking) 500g (36%), chopped parsley 4 g (0.3%), tomato 350g (25%), onions120g (8.7%), fresh mint 2g (0.1%), cumin seed 0.3g (0.02%), lemon juice 70g (5.1%), extra virgin olive oil 28 g (2%), salt 4.5g (0.3%)	1379
		Tajine with lamb	Shoulder of lamb 750g (58.8%), plums 250g (19.6%), onion 120g (9.4%), almonds 50g (3.9%), garlic 10g (0.8%), cinnamon stick 15g (1.2%), cinnamon powder 2g(0.2%), sesame seeds 10g (0.8%), ginger 2g(0.2%), saffron 0.3g (0.02%), sugar 39g (3.1%), olive oil 22g (1.7%), salt 4.5g (0.4%)	1275
		Hummus	Cooked, drained chickpeas 250g (64%), tahini sauce 40g (10.2%), garlic 10g (2.5%), lemon juice 70g (17.8%), chopped parsley 4g (1%), chilli pepper 0.3g (0.08%), olive oil 14g (3.6%), salt 4.5g (1.1%)	393

Partner (country)	Ethnic cuisine	Dish	Ingredients grams & (%) [a]	Total raw weight (g) (edible portion)
RIVM (Netherlands)	Surinamese	Brown beans, meat and rice	Salted meat 125 g (7.3%), chicken leg with skin 200 g (11.7%), chicken breasts 125 g (7.3%), olive oil 40 g (2.3%), garlic 3 g (0.2%), stock made from stock cube 75 g (4.4%), celery 1.5 g (0.1%), granulated sugar 5 g (0.3%), brown beans canned 720 g(42.2%), white rice 220 g (12.9%), tomatoes 100 g (5.8%), tomato puree 17.5 g (1.0%), onions 76 g (4.4%)	1707.8
		Roti with potato filling or potato *paratha*	Self-raising wheat flour 1000 g (47.6%), water 600 g (28.6%), potatoes 400 g (19.1%), sunflower oil 90 g (100 ml) (4.3%), garlic 4 g (0.2%), cumin seeds 5 g (0.2%)	2099
		Dhal	Yellow split peas 200 g (34.7%), garlic 4 g (0.7%), onions 43 g (7.5%), olive oil 20 g (3.5%), salt 1 g (0.2%), pepper 1 g (0.2%), curry powder 7.5 g (1.3%), water 300 g (52%)	576.5
		Pom	*Pomtajer* 1000 g (37.4%), salted meat 200 g (7.5%), chicken drumstick 640 g (24.0%), butter 60 g (2.2%), stock made from stock cube 200 g (7.5%), celery 5 g (0.2%), parsley 5 g (0.2%), tomatoes 285 g (10.7%), onions 114 g (4.3%), orange juice	

Partner (country)	Ethnic cuisine	Dish	Ingredients grams & (%) [a]	Total raw weight (g) (edible portion)
			120 g (4.5%), lemon juice 30 g (1.1%), granulated sugar 10 g 0.4%), salt 1 g (0.0%), pepper 1 g (0.0%), nutmeg 1 g (0.0%)	2672.0
		Moksi-alesi	Salted meat 250 g (17.5%), white rice 200 g (14.0%), sunflower oil 20 g (1.4%), garlic 4 g (0.3%), chilli pepper 8 g (0.6%), fish stock 500 g (35.0%), ginger root 12 g (0.8%), tomato puree 70 g (4.9%), onions 120 g (8.0%), tiger prawns 250 g (17.5%), kidney beans, canned 125 g (8.8%), curry powder 5 g (0.4%), pak-choi 425 g (29.8%)	1428.0
UL (UK)	South Asian	Chicken vindaloo	Chicken breasts 297.5g (36.1%), vegetable oil 5.5g (0.7%), onion 201g (24.4%), garlic 9.7g (1.18%), red chilli 1.45g (0.18%), clove 9.9g (1.2%), ground cumin 2.92g (0.35%), ground coriander 2.47g (0.3%), chopped tomatoes 201.8g (24.5%), wine vinegar 66.6g (8%), mango chutney 23.95g (2.9%)	822.7
		Channa Bateta	Chickpeas 112.8g (17.7%), gram flour 6.9g (1.1%), green chillies 1.2g (0.18%), creamed coconut 98.8g (15.5%), lemon juice 9.7g (1.5%), tomato puree 6.7g (1%), potatoes 101.5g (15.9%), oil 12.5g (1.9%), salt 2.3g (0.4%), water 284g (44.6%)	636.3

Partner (country)	Ethnic cuisine	Dish	Ingredients grams & (%) [a]	Total raw weight (g) (edible portion)
		Puri (white)	East End *chapatti* flour, white 225g (51.9 %), vegetable oil 61g (14.1 %), salt 7g (1.6 %), water 140g (32.3 %)	433.3
		Puri (brown)	East End *chapatti* flour, brown 225g (51.6%), vegetable oil 64g (14.6%), salt 7g (1.6%), water 140g (32.1%)	436
		Aloo palak	Potato 189g (20.3%), spinach 384g (41.2%), garlic 7g (0.8%), ginger 14g (1.5%), onion 251g (27%), green chilli 15g (1.6%), butter 59g(6.3%), salt 12g (1.3%)	931
		Bengali chicken and potato curry	Water 200g (17.9%), chicken 546g (48.9%), onions 118g (10.6%), potatoes 160g (14.3%), vegetable oil 68g (6.1%), ginger 5g (0.4%), garlic 3g (0.3%), red chillies 4g (0.4%), salt 4g (0.4%), turmeric 1g (0.1%), coriander powder 4g (0.4%), cumin 4g (0.4%)	1117
		Bengali prawn *bhuna*	Prawns, cooked 320g (52.2%), tomatoes, canned 134g (21.9%), onions 102g (16.6%), vegetable oil 40g (6.5%), curry powder 6g (1.0%), chilli powder 6g (1.0%), ground turmeric 1g (0.2%), salt 4g (0.7%)	613

Partner (country)	Ethnic cuisine	Dish	Ingredients grams & (%) [a]	Total raw weight (g) (edible portion)
		Pakistani *zarda*	Basmati rice 260g (22.2%), sugar 190g (16.2%), almonds 50g (4.3%), vegetable oil 48g (4.1%), sultanas 40g (3.4%), dry coconut 34g (2.9%), cardamom 1g (0.1%), water 550g (46.9%)	1173
		Rasmalai	Milk powder 76g (9.1%), eggs 52g (6.2%), vegetable oil 47g (5.6%), full fat milk 585g (70%), cardamom 1g (0.1%), caster sugar 75g (8.9%)	834.7
		Chicken *bhuna*	Chicken 227g (72.7%), onion 45g (14.3%), sunflower oil 22g (7%), garlic 2g (0.6%), ginger 2g (0.6%), salt 2g (0.6%), cumin powder 1g (0.3%), bay leaf 1g (0.3%), coriander 5g (1.6%), chilli powder 3g (1.0%), turmeric powder 1g (0.3%), coriander powder 1g (0.3%), curry powder 1g (0.3%), fenugreek seeds 1g (0.3%)	311.7
		Aloo Bombay	Potatoes 375g (46.5%), oil 4g (0.5%), onion 148g (18.3%), *garam masala* 2g (0.3%), chopped tomatoes 199g (24.7%), vegetable stock cube 3g (0.4%), water 75g (9.2%), chilli powder 1g (0.1%)	807.3
		Lamb kebab	Minced lamb 209g (53.7%), onion 53.8g (13.8%), salt 0.4g (0.1%), red chilli 0.2g (0.1%), green chilli 0.3g (0.1%), red chilli	388.7

Partner (country)	Ethnic cuisine	Dish	Ingredients grams & (%) [a]	Total raw weight (g) (edible portion)
			powder 0.3g (0.1%), coriander powder 0.6g (0.2%), coriander leaves 2.5g (0.64%), *garam masala* 0.7g (0.2%), egg 25.8g (6.6%), gram flour 15g (3.9%), fenugreek leaves 0.1g (0.1%), vegetable oil 80g (20.6%)	

[a] The numbers after each ingredient in brackets represents the weight of each ingredient as a percentage of total weight of ingredients.

4.2 Cooking methods

Dishes were prepared and cooked in the laboratory at the University/ Institute of the participating partner. Some partners were helped by individuals experienced in the particular cuisine. The dishes were prepared according to the cooking method for the particular recipe. Three to four identical preparations of each dish were cooked and weighed. Preparation and cooking methods for some of the recipes are described in the following section;

AFSSA (France)

Recipes are yet to be translated and included at a later date.

Brik, egg filled



Djamel Eddine Mekhancha, 2007. Picture collection, food composition database network on Algerian foods project, ALNUTS Laboratory, Mentouri Constantine University."

BGU (Israel)

Khubiz saj



The dough was made with the flour, salt and water, by gradually adding the water in stages. The dough was kneaded well before letting it rest for 15 minutes. The dough was then separated into handful size pieces and patted into a circle, starting at the outside edges. It was flipped over gradually to make it larger (22-25cm) diameter. (Preparation is similar to chapattis but much bigger in size). Then it was stretched from one hand to the other reaching about 46-50cm. The bread was draped over the heated *saj* (iron griddle or flat pan), once dried out flipped over to the other side. Continuing to flip 3-4 times until evenly baked. It was removed from the *saj* and the same method was repeated with the other dough pieces.

***Khubaizeh* (Dwarf mellow)**

The *khubaizeh* leaves were boiled in water, hot pepper and salt. If dirt remained, then it was blanched in hot water, drained, and then boiled for 5 minutes. The flour and ¼ cup of water was mixed in a small bowl, making the flour into small pea-sized dumplings. The dumplings were added to the pot. When the *khubaizeh* was tender, a *maghzel* or hand mixer was used to break up the leaves and flour dumplings into very small pieces. The

onion was sauté in olive oil until browned. The *khubaizeh* was added and mixed well with a *maghzel* or hand mixer before removing from the heat.

***Melokhiyeh* with chicken**

The lamb was cut into small pieces and heated in a pan until brown. The garlic and sweet red peppers were fried until lightly brown. The chicken pieces were added and cooked until golden. The water was added and cooked until tender (20-30 minutes). The *molokhiyeh* was put in a bowl with ½ cup of chicken broth and stirred to remove all the lumps. Another ½ cup of broth was added and stirred. The *molokhiyeh* mixture was added to the cooked meat and remaining broth. This continued to cook for 5-7 minutes, removed from the heat and uncovered to prevent the *molokhiyeh* turning yellow.

Semneh

This dish was prepared as follows:

Traditional method

The butter was melted in a heavy bottom pot and the turmeric and salt were added. Once the butter began to boil, it was stirred constantly. Once the foam boiled off, the fresh fennel and cardamom was added. The heat was lowered and cooked until the milk solids sank to the bottom of the pot. This was cooled and poured into containers. It was stored in a cool and dry place in the laboratory.

Modern method

The butter was melted in a heavy bottom pot and the turmeric and salt were added. It was stirred constantly over a medium heat until the foam disappeared, the butter turned clear and solids sank to the bottom of the pot. This was removed from the heat and allowed to cool. The clarified butter was poured into containers, leaving the solids in the bottom of the pan. The quantity made was 275 grams.

Potatoes and turkey breast in tomato sauce

The turkey was cut into bite-size chunks. The potatoes were peeled and cut crosswise into slices. These were fried in oil until cooked and golden. In another pan, the onions and sweet and hot pepper were fried in oil until brown. The diced turkey breast was added and fried until half done. The water, tomato paste, chicken broth and stir were added and stirred together. Once the water reached boiling point, the potatoes were added and cooked for another 5 minutes without stirring.

CESNID (Spain)

Information to be completed

INRAN (Italy)

Steamed ravioli



The paste for the ravioli was prepared by mixing the flour and salt, adding the water little by little to make a homogeneous paste. The ball was rolled and kept in a bowl covered with cling film. The stuffing was prepared by mixing leeks, Chinese cabbage, minced swine and salt in a bowl. Once the mixture was homogeneous the other ingredients were incorporated. The ravioli paste was rolled into circles (5 -6 cm diameter). A spoonful of stuffing was placed in the centre of each circle. The outside of each circle was brushed

with water and folded up to the centre. The ravioli was placed in bamboo baskets and covered with soy seeds. The baskets were arranged one above the other on a wok filled with boiling water and then steamed for twenty minutes.

Chicken with almonds



The silvered almonds were deep fried in vegetable oil for 2 -3 minutes until crisp and then drained on a paper towel. These were left to stand for 5 minutes before using. To marinate the ingredients (wheat flour, soy oil) were combined and added to the diced chicken. This was left to marinade for 30 minutes before heating the oil in a wok and stir frying the chicken until golden brown. The chicken was removed from the wok and left to drain whilst the ginger, onion, pepper and bamboo shoots were fried for about 1 minute until crisp. The ingredients for the sauce were combined in a small bowl, mixed well and added to the wok. Once this was boiling, the chicken was added, coated with sauce and almonds added.

Taboule/Tabuleh



Crushed wheat (bulgar wheat) was soaked in water for 15- 20 minutes until soft and all of the water was absorbed. This was placed in a large bowl with the lemon juice. Finely chopped washed parsley. Was added to the bulgur wheat. The tomatoes and onions were finely chopped and added to the crushed wheat parsley mixture. Olive oil and seasoning were added and tossed gently.

***Tajine* with lamb**



The lamb was cut into pieces and put in a pressure cooker with the salt, oil, spices, half an onion and crushed garlic. This was mixed thoroughly, the lid was closed and it was cooked for 20 minutes over a medium heat. For the sauce two ladles of the broth were removed and put into a saucepan and cooked with the plums. When it was almost cooked,

1 tablespoon of sugar and half a teaspoon of cinnamon were added and cooked over a low heat. The pressure cooked lamb, the other onion half and remaining sugar was cooked for another 15 minutes. Meanwhile the almonds were peeled and fried with the sesame seeds in a frying pan (without oil). The meat mixture and plums were placed in a dish, seasoned with sauce and decorated with almonds and sesame seeds.

Hummus



The cooked chickpeas, *tahini*, lemon juice, garlic, water and salt were blended on a low speed for approximately 30 seconds to obtain a homogenous paste. It is served in a bowl with chopped parsley, a pinch of red pepper/paprika and a thread of olive oil.

RIVM (Netherlands)

Brown beans, meat and rice

The salted meat was cooked for 20 minutes and cut into pieces. The chicken was cut into pieces. The oil was heated in a pan and the meat was fried. The herbs and vegetables were finely sliced before putting the onions and garlic with the meat. The tomatoes, tomato puree, sugar, stock and herbs were added and stewed. The brown beans were added and mixed well. Rice was boiled and served with the mixture.

***Roti* with potato filling (potato *paratha*)**

The self raising flour was mixed slowly with the water. It was then left to rest before making into balls. For the potato filling; the potatoes were boiled and mashed. The salt and garlic were then mixed in. The balls of dough were flattened before adding the filling and folding the dough over the filling. These were flattened again before shallow frying in hot oil. This recipe is very similar to potato *paratha* (an Indian food, popular in the UK).

Dhal

The yellow split peas were cooked until soft and then mashed. The onion and garlic were peeled, finely sliced and stir fried in hot oil until golden brown. The herbs and pea puree were added to the pan and fried for a short while. Pepper and salt were added to taste.

Pom

The *pom tajer* was defrosted. The chicken drumsticks were seasoned with salt, pepper and nutmeg and the salted meat was cut into pieces. The drumsticks were fried in butter with the salted meat. The onions were finely sliced and the tomatoes cut into pieces. The onions, tomatoes, herbs were fried with the meat mixture before adding the stock. The orange juice, lemon juice and sugar were mixed into the *tajer*. The gravy was added to the chicken and half the *tajer* mixture was put into an oven proof dish with the meat and vegetable mixture on top and the remaining *tajer* on top. A few lumps of butter were added on top and it was cooked in a preheated oven (220°c) for 1.5 hours.

Moksi-alesi

The salted meat was rinsed in water and then cooked for 20 minutes. Finely sliced onions were fried in oil. The salted meat, garlic, red pepper, ginger and curry powder were added

and mixed. The tomato puree, rice and stock were added, brought to the boil and stewed for 10 minutes. The kidney beans, shrimp, sliced pak-choi were added and heated until the shrimps were cooked.

UL (UK)

Chicken vindaloo

Sliced onions and garlic were fried until softened and golden brown. The chillies and cloves were crushed together and the cumin and coriander were added. The chicken breasts were cut into chunks and cooked with a small amount of oil. The onion, garlic and chicken mixture was cooked over a medium heat for about 5 minutes, stirring continuously until golden brown. The chillies and spice mixture were added to the chicken before adding the tomatoes, vinegar and chutney. Cooking was carried out by simmering uncovered for 30 minutes or until the chicken was cooked.

Channa Bateta

The tinned chickpeas were weighed and rinsed under cold water. Gram flour was roasted in a pan containing a small amount of heated oil. The tomato puree, green chillies, salt and water were added and brought to the boil. The chickpeas and potatoes were added and mixed well. The creamed coconut and lemon juice were now added, stirred and cooked for 20 minutes until the potatoes were tender.

Puris



Two types of *puris* were made with brown and white *chapatti* flour (wheat). The dough was prepared using a little oil to knead into a soft dough before dividing into small balls. Each ball was rolled into a 3 ½ inch round before deep frying in a deep frying pan for 15 seconds at approximately 190°c.

Aloo palak



The spinach, garlic, ginger, onions and chilli were combined in a saucepan and cooked for 5-10 minutes. The mixture was then pureed with a hand blender whilst the other ingredients [potatoes, turmeric and salt] were boiled in a pan until cooked. The spinach puree was tossed in butter and the potato mixture, *garam masala* and cumin powder were now added to the spinach puree.

Bengali chicken and potato curry



To prepare the Bengali chicken and potato curry, the onions, garlic, and ginger were stir fried until golden brown. The chicken and salt were added and cooked further. In another saucepan the potatoes were boiled with spices (coriander powder, cumin, turmeric and red chillies). Once cooked, the potatoes, meat and vegetables were combined and garnished with coriander.

Bengali prawn *bhuna*



The Bengali prawn *bhuna* was cooked by frying the onions, spices (curry powder, chilli powder, turmeric) and tomatoes in vegetable oil over a medium heat. The prawns were added and cooked together for a further 10 minutes.

Pakistani *zarda*

The rice was boiled until half cooked, drained and set aside. In a pan, the vegetable oil and cardamom were fried until brown. Sugar and water were added and the mixture

brought to the boil. Rice, nuts and dried fruits were added to the mixture which was then simmered for about 5 minutes or until cooked.

Rasmalai

Rasmalai was prepared by firstly boiling the milk, sugar and cardamom in a large pan. Whilst this was simmering the dough was prepared by mixing the milk powder, eggs and vegetable oil in a bowl. The dough was shaped into around 15 balls and flattened. There dough balls were placed one at a time in the hot milk and cooked for 15 minutes over a medium heat.

Chicken *bhuna*



Chicken *bhuna* was prepared by stir frying the garlic, ginger, bay leaf and fenugreek in sunflower oil. Onions, chicken and salt were added to the mixture and was cooked for 5 minutes. The remaining spices (cumin, chilli, turmeric, coriander and curry powder) and fresh coriander were then added and cooked for a further 12 minutes.

***Aloo* Bombay**



To prepare *aloo* Bombay, onions were fried over a medium heat until softened. Then *garam masala* was added and the fried for a further 1-2 minutes. The stock cube was dissolved in boiling water and added to the pan with chopped tomatoes. Whilst this was coming up to the boil the potatoes were peeled, cut into cubes and added to the pan with the chilli powder. The pan was covered and the mixture was left to simmer for 20-25 minutes or until the potatoes were tender.

Lamb kebab



To prepare lamb kebab, minced lamb, onions, red and green chillies, fenugreek leaves, salt, coriander, egg, gram flour and spices (*garam masala*, chilli and coriander powder)

were blended in a food processor. The mixture was shaped into round balls, flattened and fried for 4 minutes on both sides.

Recording of raw and cooked weight, water loss and fat uptake

All ingredients were weighed and recorded in grams, before and after inedible parts were removed such as vegetable skin. The edible parts were recorded for the total raw weight and total cooked weights [Table 4]. For example, the total raw weight of the raw *puri* dough was recorded and the total cooked weight (after frying).

5. Calculation of nutrients [EuroFIR, adapted British method and others]

5.1 EuroFIR recipe calculation procedure

The EuroFIR recipe calculation procedure was used for calculating five foods from the UK [Chicken vindaloo, fish *biryani, paratha gobhi,* vegetable *pakora* and *channa bateta/bhatura*] and one food from France [*Chorba frik*] as described below;

1. **Collect recipes**
2. **Determine ingredient weights**
   Convert household units to gram weights
3. **Sum weights of raw ingredients**
4. **Correct the weights for the effect of cooking**
5. **Apply yield factor to adjust for weight changes;**

- *Total cooked weight (g) = total raw weight (g) * yield factor*

6. **Calculate the nutrient values**
   Find nutrient values per 100 g of raw ingredients (edible part) from the database

   Calculate the nutrient content per 100 g of cooked dish as:

- *Nutrient content of the ingredient * raw weight of the ingredient (g) / total cooked weight (g)*

7. **Correct the nutrient values for the effect of cooking**
   Apply retention factor to adjust for nutrient content changes and apply retention factor to the nutrient values of each ingredient;
   *Nutrient content per 100 g of cooked weight * retention factor*

Adjust the water content per 100 g of cooked dish as;

- *Weight loss (g per 100g) of the cooked dish = (raw weight – cooked weight) / cooked weight * 100 g*
- *Water content (per 100g) of the cooked dish = total water of cooked dish (g) - weight loss (g)*

8. Documentation

5.2 Adapted British method

The adapted British method was used to calculate ten selected foods from the UK [*Puri* (white), *puri* (brown) *aloo palak*, Bengali chicken and potato curry, Bengali prawn *bhuna*, Pakistani *zarda*, *rasmalai*, chicken *bhuna*, *aloo* Bombay and lamb kebab].

a) Total water loss (%) was calculated by:

$$\frac{\textit{The weight change due to cooking}}{\textit{Total raw weight}} \quad x\ 100$$

b) The nutrient weight per 100g or the nutrient content of each ingredient per 100g dish was calculated as follows:

i) $$\frac{\textit{Weight of nutrient in recipe x \% of ingredient in recipe}}{100}$$

ii) *x 100/ 100 - % water loss on cooking*

iii) $$\frac{\textit{x 100 - \% of nutrient loss on cooking}}{100}$$

c) The nutrient content was calculated by summing the individual nutrient weights per 100g (from the previous calculations of each ingredient).

d) The nutrient content was then corrected by taking into account nutrient losses for vitamins and the change in water content.

Corrected % = percentage of nutrient content in a recipe

e) The water loss in cooking was corrected by:

(corrected % - % water losses on cooking)

x (100 / 100 - % water losses on cooking)

Fat uptake

The total raw weight of the raw *puri* dough was recorded as was the total cooked weight after frying. To calculate fat uptake for the *puris* (white and brown) the amount of oil was measured and recorded in the deep frying pan before and after frying; the amount of oil taken up by the kitchen paper was also noted (after frying, *puris* are normally kept on kitchen paper to remove excess oil). Any fragments of food left in the pan after frying were removed and recorded separately. Therefore, the oil used for frying (in the pan) and what was retained in the final product was calculated. Fat uptake should not include the amount of oil, if and when it is used as an ingredient this uptake should only refer to retention during frying (deep frying).

i) Fat gained from cooking oil was calculated by:

weight change from raw oil in pan before cooking to after – weight change of the kitchen paper after retaining oil from puris.

ii) Total fat content was calculated by:

fat gained from cooking oil + vegetable oil used in the dough

5.3 Other methods

BGU (Israel)

A recipe calculation method using software was used to calculate foods from Israel (BGU) [*Khubiz saj, khubaizeh* (Dwarf mellow), *melokhiyeh* with chicken, *semneh* and potatoes and turkey breast in tomato sauce]. This method is described below;

Recipes for the Jewish population were collected from 14 popular Israeli cookbooks which tended to recommend popular recipes or recipes typical of certain ethnic groups. For the Bedouin population no cook books or other sources of information were available. Therefore recipes were collected from Bedouin women and were cooked in the University kitchen. From this source, 130 basic recipes were chosen such as *falafel* (deep fried ground chick peas), doughnuts, meat or vegetarian '*hamin*' (*Sabbath* casserole), chicken soup, *gefilte* fish (ground fish patties) and so on. Additional recipes from 24hr recall interviews (Shai, Vardi, Shahar, Azrad and Fraser, 2003; Abusaad, Shahar, Bilenko, Vardy and Fraser, 2008) were added or existing recipes were modified. In this way, the new immigrants' recipes, e.g. Ethiopian and Russian, were recorded. From a number of descriptions of the same food in the reported 24-h recall questionnaire, an 'average' recipe was chosen and 'cooked' in the program. Modified recipes were saved in a separate modification file. Modification decisions were made at the supervisory level, similar to the procedure at the USDA. Recipes were constructed as follows:

1. **A base recipe was chosen**.

The aim was to choose a base recipe that included the main ingredients in the Israeli recipe and use a similar cooking method, thus ensuring accurate calculations of percentage of moisture loss and fat absorption. For example, in order to add a recipe for

vegetarian '*hamin*' based on beans, a long-cooking Mexican casserole recipe containing beans was chosen as the food base. If, after a thorough search, no suitable base recipe was found, the percentage of moisture loss and fat absorption was chosen from the most similar cooking method

1. **Coding:**

The recipes were coded using a 6-digit code number. In cases where a number of Israeli recipes were developed based on one base recipe, the last digit of the code was changed according to sequence numbers

2. Naming Recipes:

Each recipe was given a title that included its description and source

3. Choosing the Recipe's Ingredients:

The base recipe was modified to produce an Israeli recipe. The ingredients were carefully chosen from the 3,000 raw foods that were described in the SR12. The guiding principles were choosing un-enriched foods, as they exist in Israel, and raw foods

4. Determining the ingredient weights:

The guiding principle was to choose foods in their original volume, before processing; for example, two cups of uncooked dry white rice, according to the description of quantities in the recipe. The program was used to convert volume to weight in grams

5. Calculating the retention factor:

For each ingredient in the recipe, the quantity of vitamins and minerals lost during cooking was calculated according to the cooking method described (e.g. boiling,

steaming, baking, heating at a certain temperature, etc.)

6. Calculating the percentage of moisture loss and fat absorption:

Percentages were determined by the program, based on the described cooking method

7. Determining the portion size:

The total weight of a recipe (after allowing for moisture loss and fat absorption) was divided by the number of portions described (e.g. 40 cookies per recipe). The calculated standard portion was verified by weighing samples of the food and comparison with the standard portion size

8. Determining weight/volume ratio:

At this last stage, specific gravity was determined for each recipe with the aim of converting volume models from the quantity guide used in the 24h recall interview to units of weight. The specific gravity was chosen using a recipe of similar texture or direct volume and weight measurements. At the end of the process, the nutritional value of the chosen recipes was calculated, taking into account all factors described

RIVM (Netherlands)

A recipe calculation method using NEVO software was used to calculate foods from the Netherlands (RIVM) [Brown beans with rice, *Roti* with potato filling, *Dhal*, *Pom & Moksi-alesi*]. This method is described below:

1. Collect recipes

2. Determine ingredient weights

Convert household units to gram weight

Correct the ingredient weights for waste (like bones, skin) (Wageningen University and TNO Nutrition, 2003)

Apply waste factor to adjust for weight changes

- *Total raw edible weight g = total raw weight g * waste deduction factor*

3. **Correct the edible ingredient weights for effect of cooking (yield factor)**

(Wageningen University and TNO Nutrition, 2003)

4. **Apply yield factor to adjust for weight changes**

- *Total cooked edible weight g = total raw edible weight g * yield factor*

5. **Calculate the nutrient values of the recipe**
6. **Correct the nutrient values of the recipe for effect of cooking**

Apply retention factors to the nutrient values of the recipe

<u>AFSSA (France)</u>

Four food products; *Brik* (egg filled), *brik* (beef filled), *brik* (potatoes filled) and *molokhia* have been selected. The following is the calculation method:

1. **Select nutritional composition of cooked ingredients from the recipes without applying retention or yield factors.**

Where necessary, the amounts of the cooked ingredients were calculated based on water gain or loss between cooked and raw ingredients. Minor ingredients such as herbs and spices were used uncooked.

2. **Adjust for fat uptake:**

The amount of fat in the recipe was estimated considering analytical values of fat in similar dishes, and this fat was added in the recipe as an ingredient.

INRAN (Italy)

Two food products: *Tabule,* Hummus were selected for the recipe calculation. This method is described below:

1. **Select nutritional composition of cooked ingredients from the recipes without applying retention or yield factors.**

6. Results

6.1 Nutrient losses (adapted British method)

The percentage of nutrient losses on cooking for each of the vitamins [B_1, B_2, niacin, B_6, B_{12}, C, E, folate, panthothenate and biotin] were recorded in the spreadsheet. These were taken from *McCance and Widdowson's The Composition of Foods* (Food Standards Agency, 2002). For example in *puri*, the *chapatti* flour was the only ingredient therefore a retention factor of 40 for all the vitamins, except folate (which was 50) were applied. Nutrient losses in ingredients for each of the ten dishes are presented in **Table 4**.

Table 4. "Vitamin losses" used for different food groups (Food Standards Agency, 2002)

Dish	Ingredient	Cooking method	B_1 (% loss)	B_2 (% loss)	Niacin (% loss)	B_6 (% loss)	B_{12} (% loss)	Folate (% loss)	Pantothenate (% loss)	Biotin (% loss)	C (% loss)	E (% loss)
Puri (white)	*Chapatti* flour, white	Boiled	40	40	40	40	ND	50	40	40	ND	ND
Puri (brown)	*Chapatti* flour, brown	Boiled	40	40	40	40	ND	50	40	40	ND	ND
Aloo palak	Vegetables [potato, spinach, onion, chilli]	Fried	20	0	0	25	ND	55	ND	ND	30	0
Bengali chicken and potato curry	Meat [chicken]	Grilled or fried	20	20	20	20	20	ND	20	10	ND	20
	Vegetables [potato, onion, chilli]	Fried	20	0	0	25	ND	55	ND	ND	30	0
Bengali prawn *bhuna*	Fish [prawns]	Fried	20	20	20	20	0	0	20	10	ND	0
	Vegetables [tomatoes & onion]	Fried	20	0	0	25	ND	55	ND	ND	30	0
Pakistani *zarda*	Cereal [rice]	Boiled	40	40	40	40	ND	50	40	40	ND	ND
	Fruit [sultanas & coconut]	Stewed	25	25	25	20	ND	80	25	25	25	ND

Dish	Ingredient	Cooking method	B_1 (% loss)	B_2 (% loss)	Niacin (% loss)	B_6 (% loss)	B_{12} (% loss)	Folate (% loss)	Pantothenate (% loss)	Biotin (% loss)	C (% loss)	E (% loss)
Rasmalai	Milk	Boiled	10	10	0	10	5	20	10	ND	50	20
	Eggs	Baked	15	15	5	25	ND	50	25	ND	ND	ND
Chicken	Meat [chicken]	Grilled or fried	20	20	20	20	20	ND	20	10	ND	20
bhuna	Vegetables [onion, garlic, ginger, coriander]	Fried	20	0	0	25	ND	55	ND	ND	30	0
Aloo Bombay	Vegetables [potatoes, onions, tomatoes]	Fried	20	0	0	25	ND	55	ND	ND	30	0
Lamb kebab	Meat [lamb]	Grilled or fried	20	20	20	20	20	ND	20	10	ND	20
	Vegetables [onion, chillies, coriander]	Fried	20	0	0	25	ND	55	ND	ND	30	0
	Eggs	Omelette	5	20	5	15	ND	30	15	ND	ND	ND

ND =Not determined

6.2 Nutritional composition from recipe calculation

The task of recipe calculations has been completed by BGU, INRAN and UL. Other partners are expected to complete this work by month 43. Weight changes from cooking (raw to cooked) and the total water loss (weight change due to cooking/total raw weight) x 100). In addition, fat uptake was taken into consideration for two foods in the UK [*puri* (white) and *puri* (brown)] (Tables 5, 6 & 7). The nutritional composition was calculated for between 22 and 27 nutrients (Tables 8, 9 & 10). Results of the macronutrient composition, vitamin and mineral composition are presented in figures 1, 2 and tables 11, 12 & 13. The remaining data on some foods are expected to be completed by month 43 and to be included in the final report (month 48).

Table 5. Weight change during cooking for ethnic foods from Israel (BGU)

Dish	Total raw (g)	Total cooked weight (g)	Weight change due to cooking	Total water loss (%)[a]
Khubiz saj	4656.9	3958.4	698.5	14.9
Khubaizeh (Dwarf mellow)	1715.6	1544.0	171.6	9.9
Melokhiyeh with chicken	1397.2	1257.5	139.7	10
Semneh	411.2	390.6	20.6	5.0
Potatoes and turkey breast tomato sauce	1521.6	390.6	1131.0	74.3

[a] calculated by (weight change due to cooking/total raw weight) x 100

Table 6. Weight change during cooking for ethnic foods from Italy (INRAN)

Dish	Total raw (g)	Total cooked weight (g)	Weight change due to cooking	Total water loss (%)[a]
Steamed ravioli	1004	1506	502	33.3 (gained)
Chicken with almonds	818	718	100	12.2
Taboulè	1379	1379	To be completed	
Tajine with lamb	1275	912	363	28.5
Hummus	393	393	To be completed	

[a] calculated by (weight change due to cooking/total raw weight) x 100

Table 7. Weight change during cooking for the UK ethnic foods (UL)

Dish	Total raw (g)	Total cooked weight (g)	Weight change due to cooking	Total water loss (%)[a]	Fat gained (g) [b]	Total added fat content (g) [c]
Chicken vindaloo	822.7	658.2	164.5	19.9		
Channa	636.3	604.4	31.9	5.01		
Bateta	433.3g	338.5g	94.8g	21.9	49.3	61.3
Puri (white)						
Puri (brown)	436g	364.4g	71.6g	16.4	52.0	63.9
Aloo palak	931g	733g	198g	21.3		
Bengali chicken and potato curry	1117g	908g	209g	18.7		
Bengali prawn *bhuna*	613g	506g	107g	17.5		
Pakistani *zarda*	1173g	1156g	17g	1.5		
Rasmalai	834.7g	675.3g	159.4g	19.1		
Chicken *bhuna*	311.7g	249.4g	62.3g	20.0		
Aloo Bombay	807.3	615.9g	191.4g	23.7		
Lamb kebab	388.7	294.0g	94.7g	24.4		

[a] calculated by weight change due to cooking/total raw weight x 100

[b] Fat gained from cooking oil

[c] Fat gained from cooking oil + vegetable oil used in the recipe

Table 8. List of calculated nutrients in ethnic foods consumed in Israel (BGU ,Israel)

Food	protein	CHO	fat	energy	SFA	MUFA	PUFA	cholesterol	alcohol	water	fibre	Ca	Fe	Mg	P	K	Other Nutrients
1. *Khubiz saj*	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	Na, Zn, Cu, vitamin C, B_1, B_2, niacin, B_6, folate, B_{12}
2. *Khubaizeh* (Dwarf mellow)	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	Na, Zn, Cu, vitamin C, B_1, B_2, niacin, B_6, folate, B_{12}
3. *Melokhiyeh* with chicken	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	Na, Zn, Cu, vitamin C, B_1, B_2, niacin, B_6, folate, B_{12}
4. *Semneh*	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	Na, Zn, Cu, vitamin C, B_1, B_2, niacin, B_6, folate, B_{12}

Food	protein	CHO	fat	energy	SFA	MUFA	PUFA	cholesterol	alcohol	water	fibre	Ca	Fe	Mg	P	K	Other Nutrients
5. Potatoes and turkey breast in tomato sauce	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	Na, Zn, Cu, Vitamin C, B_1, B_2, niacin, B_6, folate, B_{12}

Table 9. List of calculated nutrients in ethnic foods consumed in Italy (INRAN Italy)

Food	water	protein	CHO	fat	cholesterol	starch	sugar	vitamin	minerals
Steamed ravioli	√	√	√	√	√	√	√	B_1, B_2, niacin, retinol, vitamin C, vitamin E	sodium, potassium, iron, calcium, phosphorus, magnesium, zinc, copper, selenium
Chicken with almonds	√	√	√	√	√	√	√	B_1, B_2, niacin, retinol, vitamin C, vitamin E	sodium, potassium, iron, calcium, phosphorus, magnesium, zinc, copper, selenium
Taboulè	√	√	√	√	√	√	√	B_1, B_2, niacin, retinol, vitamin C, vitamin E	sodium, potassium, iron, calcium, phosphorus, magnesium, zinc, copper, selenium
Tajine with lamb	√	√	√	√	√	√	√	B_1, B_2, niacin, retinol, vitamin C, vitamin E	sodium, potassium, iron, calcium, phosphorus, magnesium, zinc, copper, selenium
Hummus	√	√	√	√	√	√	√	B_1, B_2, niacin, retinol, vitamin C, vitamin E	

Table 10. List of calculated nutrients in ethnic foods consumed in the UK (UL ,UK)

Food	**water**	**energy**	**protein**	**CHO**	**fat**	**SFA**	**MUFA**	**PUFA**	**B_1**	**B_6**	**folate**	**B_2**	**niacin**	**vit C**	**other nutrients**
Chicken vindaloo	√	√	√	√	√	√	√	√	√	√	√	√	x	√	sugars, Na, retinol, carotene, B_{12}, Fe, Ca, P, Zn, Se, fibre, vitamin E, D
Channa Bateta	√	√	√	√	√	√	√	√	√	√	√	√	x	√	sugars, Na, retinol, carotene, B_{12}, Fe, Ca, P, Zn, Se ,fibre, vitamin E, D
Puri (white)	√	√	√	√	√	√	√	√	√	√	√	√	√	×	Na, retinol, carotene, Fe, Ca, P, Zn, Se
Puri (brown)	√	√	√	√	√	√	√	√	√	√	√	√	√	×	Na, retinol, carotene, Fe, Ca, P, Zn, Se
Aloo palak	√	√	√	√	√	√	√	√	√	√	√	√	√	√	Na, retinol, carotene, Fe, Ca, P, Zn, Se. Vitamin E
Bengali chicken	√	√	√	√	√	√	√	√	√	√	√	√	√	√	Na, retinol, carotene,

Food	**water**	**energy**	**protein**	**CHO**	**fat**	**SFA**	**MUFA**	**PUFA**	**B_1**	**B_6**	**folate**	**B_2**	**niacin**	**vit C**	**other nutrients**
and potato curry															Fe, Ca, P, Zn, Se, vitamin E
Bengali prawn *bhuna*	√	√	√	√	√	√	√	√	√	√	√	√	√	×	Na, retinol, carotene, Fe, Ca, P, Zn, Se
.Pakistani *zarda*	√	√	√	√	√	√	√	√	√	√	√	√	√	×	Na, retinol, carotene, Fe, Ca, P, Zn, Se
Rasmalai	√	√	√	√	√	√	√	√	√	√	√	×	×	√	Na, retinol, carotene, Fe, Ca, P, Zn, Se
Chicken *bhuna*	√	√	√	√	√	√	√	√	√	√	√	×	×	√	Na, retinol, carotene, Fe, Ca, P, Zn, Se, vitamin D, fibre
Aloo Bombay	√	√	√	√	√	√	√	√	√	√	√	×	×	√	Na, retinol, carotene, Fe, Ca, P, Zn, Se, vitamin D, fibre
Lamb kebab	√	√	√	√	√	√	√	√	√	√	√	×	×	√	Na, retinol, carotene, Fe, Ca, P, Zn, Se vitamin D, fibre

BGU (Israel)

Figure 1. The macronutrient composition of selected ethnic foods from Israel

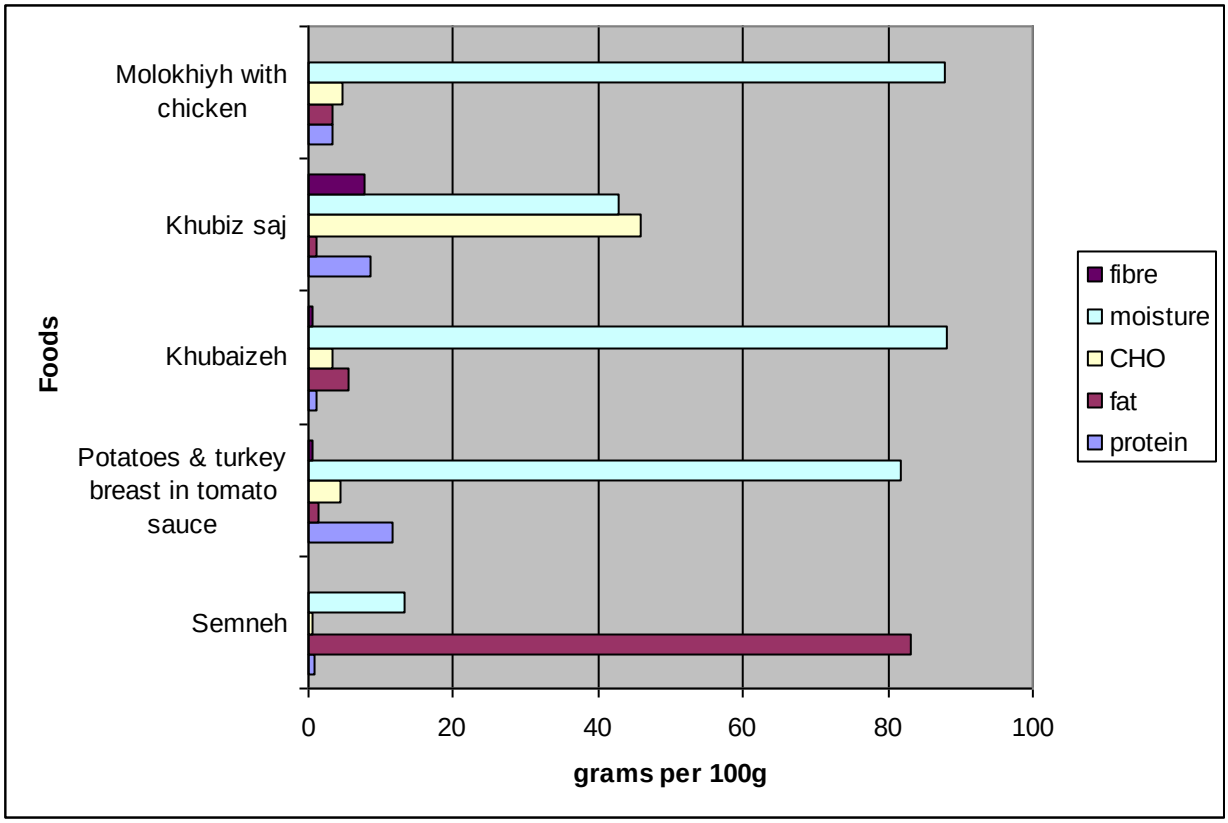


Table 11. The calculated macronutrient and micronutrient composition of ethnic foods in Israel (per 100g edible portion) reported by BGU, Israel

Nutrients	*Semneh*	Potatoes & turkey breast in tomato sauce	*Khubaizeh*	*Khubiz saj*	*Molokhiyh* with chicken
Fibre (g)	0.12	0.54	0.48	7.71	0.04
Moisture (g)	13.18	81.86	88.1	42.69	87.8
CHO (g)	0.43	4.49	3.33	45.83	4.79
Fat (g)	83.11	1.32	5.39	1.18	3.25
Protein (g)	0.91	11.48	1.2	8.65	3.23
Calcium (mg)	26	7.35	52.37	22.71	48.02
Iron (mg)	0.26	0.69	2.56	2.452	1.201
Magnesium (mg)	26.08	9.75	17.39	87.52	17.14
Phosphorus (mg)	26.08	62.16	18.12	218.52	42.95
Potassium (mg)	38.93	102.6	123.5	256.2	214.44
Sodium (mg)	904.27	128.5	469.6	238.65	147.56
Zinc (mg)	0.12	0.67	0.13	1.85	0.3
Copper (mg)	0.02	0.05	0.04	0.24	0.1
vit A (IU)	2558.88	57.89	1856.4	5.12	1103.47
vit C (mg)	0.15	5.71	8.03	0	7.73
thiamine (mg)	0.01	0.01	0.03	0.23	0.06
Riboflavin (mg)	0.04	0.05	0.04	0.12	0.18
Niacin (mg)	0.07	1.77	0.23	3.62	1.63
vit B_6 (mg)	0.01	0.12	0.06	0.19	0.19
Folate (ug)	3.29	2.78	40.19	19.45	23.55
vit B_{12} (ug)	0.17	0.07	0	0	0
cholesterol (mg)	220.15	30.32	0	0	2.58
SFA (g)	52.62	0.24	0.74	0.2	0.6
MUFA (g)	21.53	0.29	3.83	0.15	1.01
PUFA (g)	3.13	0.67	0.6	0.49	1.46

Table 12. The calculated macronutrient, mineral and vitamin composition of selected ethnic foods in Italy (per 100g edible portion) reported by INRAN, Italy

Nutrient	*Taboulè*	Hummus
water (g)	75.2	63.0
protein (g)	3.0	6.2
CHO (g)	14.0	9.4
fat (g)	2.4	11.0
cholesterol (mg)	0	0
starch (g)	12.4	7.5
sugar	1.6	1.1
fibre (g)	4.6	4.6
energy (Kcal)	100	160
B_1 (mg)	0.06	0.14
B_2 (mg)	0.03	0.04
niacin (mg)	1.37	0.72
retinol (ug)	159	13
vitamin C (mg)	9	9
vitamin E (mg)	0.81	28.41
sodium (mg)	115	582
potassium (mg)	187	117
iron (mg)	0.7	2.3
calcium (mg)	14	102
phosphorus (mg)	76	124
magnesium (mg)	39	56
zinc (mg)	0.47	1.26
copper (mg)	0.08	0.22
selenium (ug)	1.2	0.7

UL (UK)

Figure 2. The macronutrient composition of selected ethnic foods in the UK

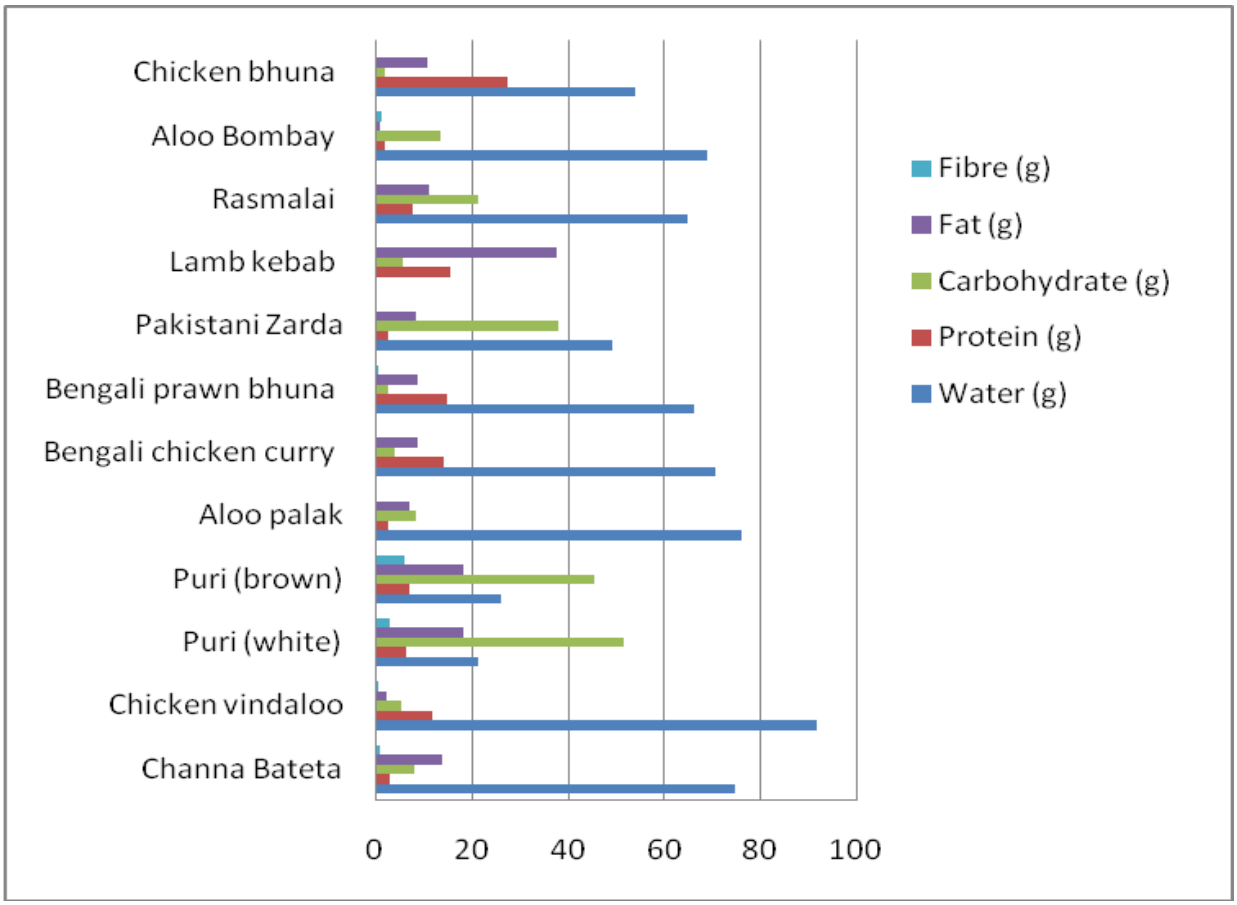


Table 13. The calculated macronutrient, vitamin and mineral contents of ethnic foods in the UK (per 100g edible portion) reported by UL, UK

Nutrient	Chicken vindaloo	*Channa Bateta*	*Puri* (white)	*Puri* (brown)	*Aloo palak*	Bengali chicken curry	Bengali prawn *bhuna*	Pakistani *zarda*	Lamb kebab	*Rasmalai*	*Aloo* Bombay	Chicken *bhuna*
fibre (g)	0.7	1.0	3.0	6.0	0	0.4	0.7	0.0	0.5	0.0	1.4	0.3
fat (g)	2.3	13.9	18.4	18.3	7.2	9.0	8.9	8.5	37.8	11.1	1.0	10.9
CHO (g)	5.4	8.1	51.6	45.5	8.4	4.2	2.7	38.1	5.6	21.6	13.6	2.0
protein (g)	11.9	2.9	6.5	7.1	2.6	14.1	15.1	2.8	15.5	7.9	1.0	27.6
water (g)	92	75	21.3	26.3	76.0	70.8	66.2	49.3	0.0	64.8	1.4	54.1
retinol (ug)	0.0	0.0	0.0	ND	ND	6.6	0.0	ND	20.2	79.9	0.0	0.0
carotene (ug)	130.7	23.4	0.0	ND	ND	19.8	348.1	ND	51.1	17.0	150.3	305.4
B_1 (mg)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
B_2 (mg)	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.0	ND	ND	ND	ND
niacin (mg)	ND	ND	0.8	1.4	1.1	4.0	0.6	0.2	ND	ND	ND	ND
vitamin B_6 (mg)	0.2	0.1	0.1	0.1	0.2	0.3	0.1	0.0	0.0	0.0	0.1	0.1
vitamin C (mg)	4.2	1.7	ND	ND	14.6	2.6	ND	ND	0.5	1.6	11.8	2.3
vitamin D (ug)	0.1	0.0	0.0	ND	ND	0.1	0.0	ND	0.7	0.4	0.0	0.2
vitamin E (mg)	0.5	0.6	ND	ND	1.2	0.1	ND	ND	ND	ND	ND	ND
folate (ug)	9.9	0.5	6.7	9.0	33.9	15.3	3.7	3.3	5.6	4.0	17.2	6.4
iron (mg)	1.0	0.9	1.7	ND	ND	0.6	ND	ND	1.6	0.2	0.6	1.3
calcium (mg)	25.8	13.0	56.0	ND	ND	8.2	ND	ND	31.6	251.6	16.3	25.7
phosphorus (mg)	108.4	44.2	93.1	ND	ND	107.4	ND	ND	167.9	204.9	38.3	271.0
sodium (mg)	77.5	186.4	826.1	ND	ND	221.3	ND	ND	122.1	110.3	108.0	662.0
zinc (mg)	0.5	0.3	0.9	ND	ND	0.8	ND	ND	2.7	0.9	0.3	0.9
selenium (ug)	5.9	2.7	2.0	ND	ND	8.1	ND	ND	2.7	2.9	0.8	13.8

ND = Not determined

7. Summary

Forty foods have been selected for recipe calculation and nineteen have been calculated for nutrient composition by using recipe information and preparing and cooking recipes so far. Recipes and list of foods were selected by agreed criteria [i) commonly consumed ethnic recipes, ii) representative/standard recipes, and iii) the highest selling ethnic cookery books or internet archives], recipe recording for ingredients and cooking methods and the calculation of nutrients. The calculation method used was either the EuroFIR method, British method or partners own calculation software. Different methods were used depending on what is available in each country such as nutrient calculation soft wares and existing databases for calculation. Where there was no on-line database or software available excel was used following the EuroFIR or British method. Recipe calculation work is ongoing and is expected to be completed by all six partners in M43. A comparison of calculated data with published data will take place once all the foods have been calculated. Some foods have already been evaluated and the data obtained has been published (Chen, Gilbert and Khokhar, 2008). They reported that the adapted British method was an important modification, taking into account vitamin loss, water loss and fat uptake. This modification was necessary because ethnic dishes have multiple stages in preparation and processing, therefore this calculation method has proved useful.
Other data will be assessed for the extent of variation, compatibility with the analysed data and the degree of estimation and accuracy of the harmonised recipe calculation procedure

8. References

Abusaad, K., Shahar, D. R., Bilenko, N., Vardy, H., & Fraser, D. A. (2008). Dietary Assessment Tool for Estimating Individual Intake from Common Plate Meals. [*Submitted to Journal of Nutrition]*.

Bognar, A., & Piekarski, J. (2000). Guidelines for recipe information and calculation of nutrient composition of prepared foods (dishes). *Journal of Food Composition and Analysis, 13,* 391-410.

Buzzard, M. I., Price, K. S., & Warren, R. A. (1991). Considerations for selecting nutrient-calculation software: evaluation of the nutrient database. *American Journal of Clinical Nutrition, 54,* 7- 9.

Chen, A., Gilbert, P., & Khokhar, S. (2008). Estimating the nutrient composition of South Asian foods using a recipe calculation method. *Food Chemistry* (Inclde the DOI as the reference).

Food Standards Agency. (2002). *McCance and Widdowson's The Composition of Foods*. Cambridge: Royal Society of Chemistry.

Reinivuo, H., & Laitinen. (2006). *Proposal for the harmonization of recipe calculation procedures, final draft.* EuroFIR: www.eurofir.net.

Schakel, S. F., Buzzard, M. I., & Gebhardt, S. E. (1997). Procedures for estimating nutrient values for food composition databases. *Journal of Food Composition and Analysis, 10,* 102-114.

Shai, I., Vardi, H., Shahar, D. R, Azrad, A., & Fraser D. (2003). Adaptation of international nutrition databases and data entry system tools to a specific population. Public Health Nutrition, *6* (4), 401-406.

Smith, Z., Knight, T., Sahota, P., Kernohan, E., & Baker, M. (1993). Dietary patterns in Asian and Caucasian men in Bradford: differences and implications for nutrition education. *Journal of Human Nutrition and Dietetics***,** *6,* 323 -333.

Vasilopoulou, E., Georga, K., Grilli, E., Linardou, A.,Vithoulka, M.,& Trichopoulou, A. (2003). Compatibility of computed and chemically determined macronutrients and energy content of traditional Greek recipes. *Journal of Food Composition and Analysis, 16,* 707-719.

Wharton, P.A., Eaton, P.M., & Wharton, B.A. (1984). Subethnic variation in the diets of Moslem, Sikh and Hindu pregnant women at Sorrento Maternity Hospital, Birmingham. *British Journal of Nutrition,* 52, 469-476.

Wageningen University and TNO Nutrition (2003). Maten, gewichten en codenummers (in Dutch) 2003. Wageningen.