

Methodology & Design of the first Total diet study in Riyadh, Saudi Arabia

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Objectives of the S-TDS

The S-TDS aims to obtain the most accurate data on dietary exposure to contaminants and nutrients for the Saudi population and contribute data to WHO databases.

How?



Purchasing the most consumed foods from different retail outlets



Preparing food "as consumed"



Pooling & homogenizing foods into composites



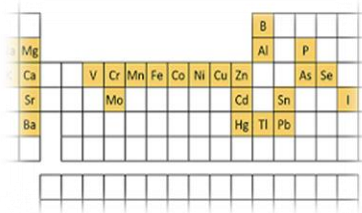
Chemical Analysis



Methodology



Food selection



Analytes selection



Sampling



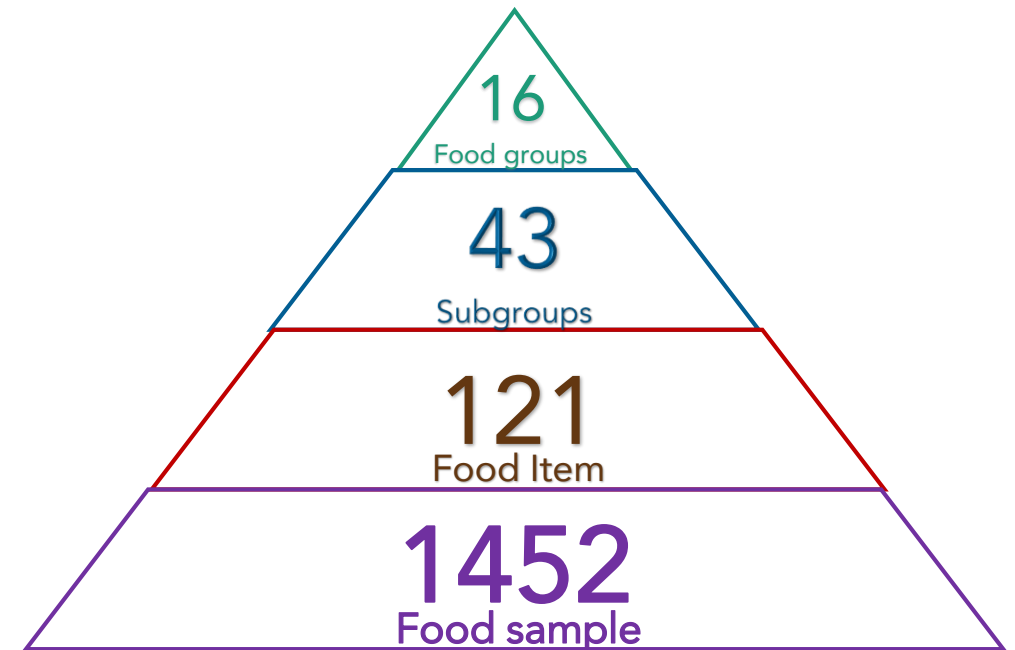
Preparation

Food Items Selection criteria

- ✓ 90% of population's diet - representing most consumed food items
- ✓ Significant contributors to targeted analytes
- ✓ Validated analytical method at Saudi FDA labs

Selection of Brands and sample origin

- ✓ Euromonitor market share data
- ✓ Saudi authority of statistics data on import & produce



Analytes Selection criteria:

- SFDA risk profiles
- Contaminant/nutrient must be present in a significant part of the diet.
- The availability of a validated analytical method.
- To fill gaps in knowledge regarding the content and composition of Saudi foods for these substances.

Arsenic	Lead	Cadmium	Mercury
Aluminum	Potassium	Sodium	Iron

Sampling:

- Sampling of the foods was conducted over 4 months (during March, April, May, and June, 2022).
- All the sampling of the foods was undertaken by SFDA staff.
- Sampling of foods took place in a single location (Riyadh) and in a single period.
- 4 major retail markets were chosen for sampling.



Food preparation & recipes

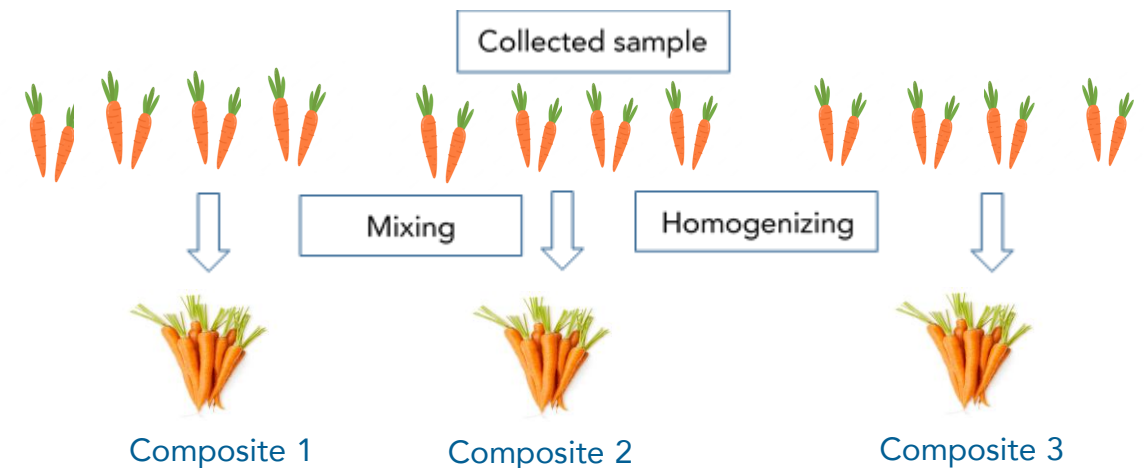
Standardized recipes were developed at the Saudi FDA as follows:

1. Three recipes from different sources were used to develop a standardized recipe.
2. Household measures (e.g. cups, spoons, liters) of each ingredient were converted to the corresponding gram weight.
3. Recipes were documented and reviewed by professional Saudi chiefs
4. Suggested adjustments were applied if appropriate.

Dish name	Chichen kabsa		كبسة دجاج		اسم الطبق	
Alternative name 1	N/A		N/A		الاسم المرادف في منطقة أخرى	
Alternative name 2	N/A		N/A		الاسم المرادف في بلد آخر	
Serving Size	6-8 persons		من 6-8 أشخاص		عدد الأشخاص	
Eat with	N/A		N/A		تؤكل مع	
Ingredients	Row weight (Inc. inedible portion)	Cooked weight (Edible portions only)	Unit	المكونات	Preparation method	Notes
Chicken	1800		g	دجاج وسط (عدد2)		
Rice	820		g	أرز (4كاسات)	رز كبسة يتم طبخه مع الماء	
Onions	300		g	بصل (عدد2)		
Tomatoes	390		g	طماطم (عدد 3)		
Tomato paste	17		g	صلصة طماطم (ملعقة كبيرة)		
Butter	40		g	اربع ملاعق طعام زيت		
Spices	26		g	بهارات مشكلة		
Salt	22		g	ملح اربع ملاعق شاي		
Black pepper	4		g	فلفل أسود ملعقة صغيرة		
Water	1440		g	ماء لطبخ 6 أكواب		
Hot pepper	32		g	فلفل حار عدد (2)		
Total weight				المجموع		
CODER			a			

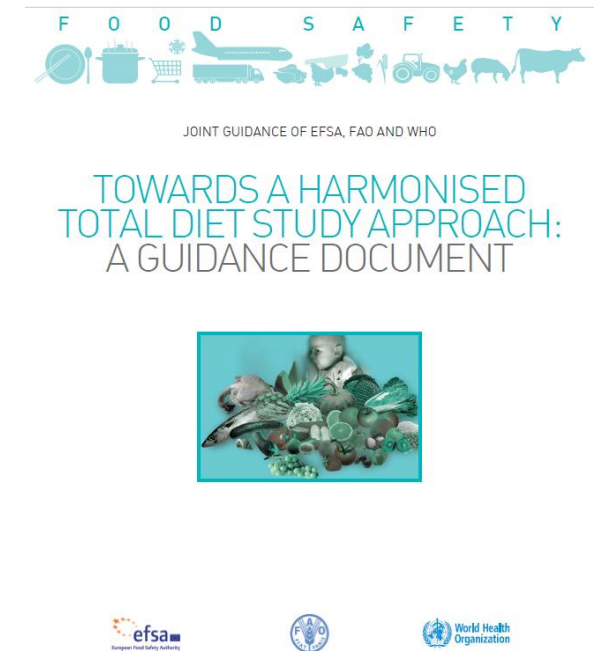
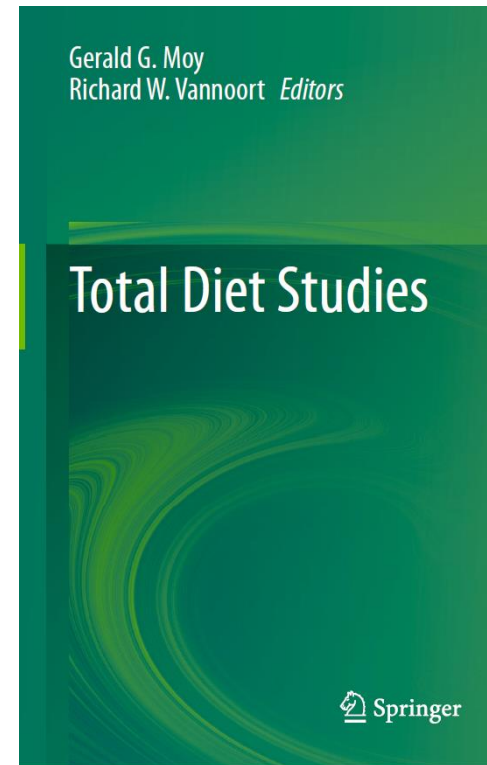
Sample preparation:

- 12 samples of each food item were purchased and prepared at the kitchen
- Samples were grouped to form 3 composites
- Mixing & homogenizing was done at SFDA labs



Standard Operation procedures SOPs

- 1 Food Collection:
 - i. Shopping list
 - ii. Instructions for purchasers/inspectors
 - iii. Collection report
 - iv. Codification and labelling
- 3 Standardized Operation procedures (SOPs) for Kitchen:
 - I. Checking for compliance
 - II. Registering
- 4 Kitchen Laboratory instructions and SOPs of sample preparation:
- 5 Analytical laboratory



General SOPs for staff involved in TDS:

1. Instructions for food collection
2. Food logging in the Collection Report
3. Instructions for hygiene and food preparation in the Kitchen
4. Cooking Procedure definition of terms
5. Labelling and storage
6. Chemical analysis

الدليل الإرشادي للعاملين في مطابخ دراسة النظام الغذائي الشامل

الإدارة التنفيذية للرصد وتقييم المخاطر

إدارة تقييم المخاطر

قسم المخاطر الكيميائية



Food Groups

Main Group Code (1)	Food Group	Sub Groups Code (2)	Subgroups
01	Cereals & grains products	0101	Grains & whole grains, flours, wheat, rice, maize, barley, corn, sorghum
		0102	Cereal products (breads, pasta, noodles, tortillas, etc.)
		0103	Biscuits, cakes, doughs, pastries
		0104	Breakfast cereals
		0105	Starch
		0106	Pulses, Legumes, beans & it's products
02	Vegetables & vegetable products	0201	Fresh Vegetables (cucumbers, tomato, etc.)
		0202	Processed Vegetable (frozen /dried / processed / canned) like: Tomato paste
		0203	Vegetable juices
		0204	Mushrooms, fungi
		0205	Leafy Vegetables, leafy herbs, grape leaves, edible flowers
		0206	Roots, tubers & it's products (for e.g Potato, Sweet Potato, Yams, Cassavas, Taros & Sunroot)
03	Fruits & fruit products	0301	Fresh Fruits (berries, citrus fruit, etc.)
		0302	Processed fruits (frozen / dried / processed / canned)
		0303	Jams, jellies & marmalades
		0304	Juices (fresh, nectar & fruit drinks)
04	Nuts & seeds	0401	Nuts (Hazelnut, almond, pistachio, cashew, walnut, etc..) & it's products (almond drink, etc...)
		0402	Seeds & it's products
05	Oils & fats	0501	Plant fats & oils (oilseeds, Seed oils, margarines)
		0502	Animal fats & oils (ghee, butter, marine oils)
06	Fish & seafood products	0601	Fish
		0602	Molluscs
		0603	Crustacea
		0605	Processed marine animals (dried, salted, smoked, canned)
		0606	Seaweed & algae
		0701	All red meat species

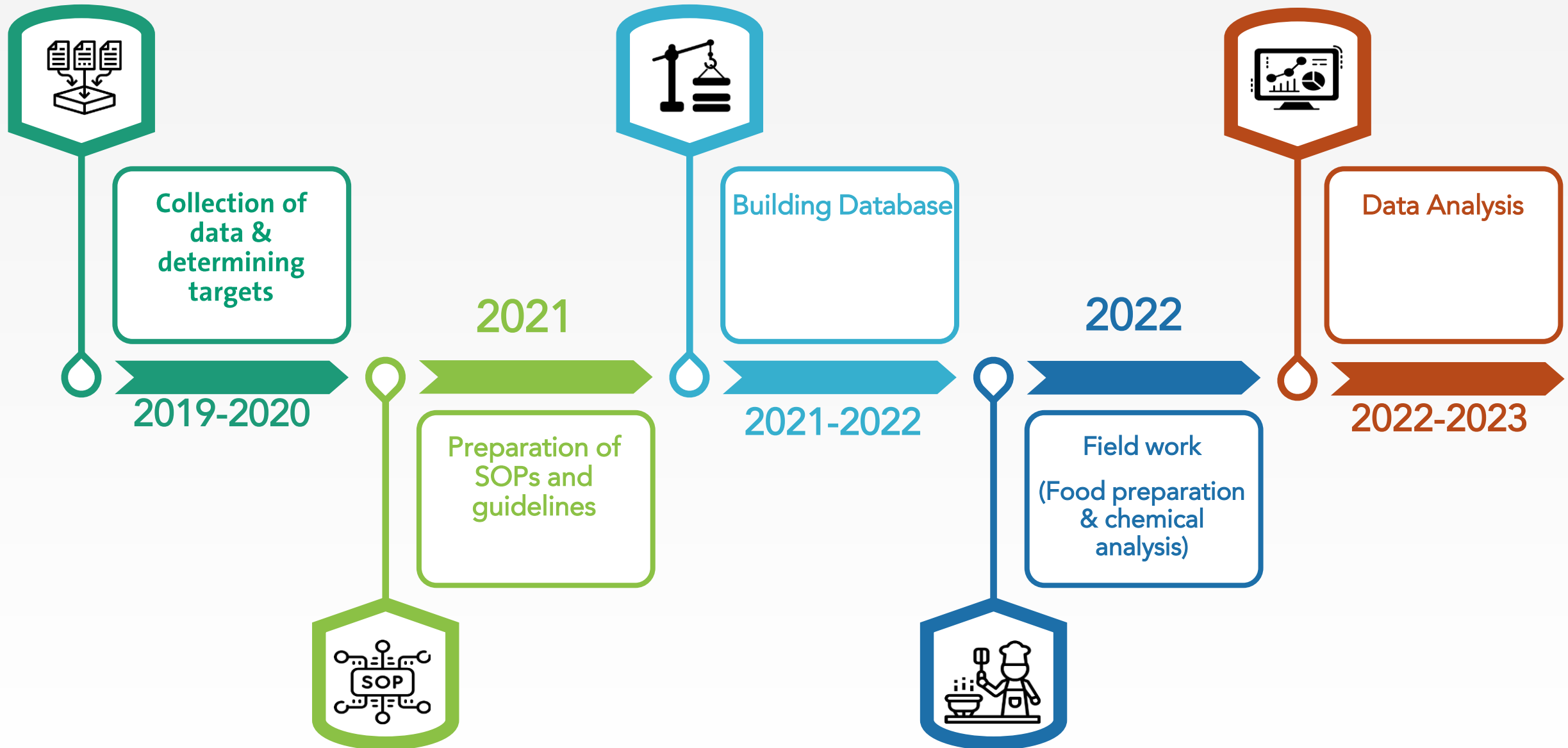
	Collector name/ID:			Date of purchase				12/4/2022		
Food item	Sample code	Brand name	Description of sample/ Packaging type	Minimum weight (g)	Store name/Location	Country of Origin	Cost (SR)	Expiration date	Sample condition at time of purchase.	Notes/ alternative purchasing date
Pasta	0049	Goody		500g	Danube					None
Pasta	0050	Perfetto		500g	Danube					
Pasta	0051	buitoni		500g	Danube					
Pasta	0052	Freshly	whole grain	500g	Altamimi					
Pasta	0053	al Alali		500g	Danube					
Chocolate cake	0130	homemade	المطاحن الأولى / الصوامع	500g	الدانوب					
Chocolate cake	0131	homemade	Voom	500g	الدانوب					
Chocolate cake	0132	homemade	بيتي كروكر	500g	الدانوب					
eggplant / Boiled	0337	supermarket/Ce ntral V&F market	باذنجان مكدوس بالكيلو	500g	الدانوب	لبنان	5.51			
eggplant / Boiled	0338	supermarket/Ce ntral V&F market	باذنجان بالكيلو	500g	الدانوب	سعودي	11.95			

	A	B	C	D	E	G	XFD
	Food item	Brand name	Sample code	Composite code	Product number	LIMs code	Status
1	rice	AbuKas	0001	C001	1.0062E+11	FD_RYD-RO-150322-05086	OK
2	rice	almuhaideb Punjabi	0002				
3	rice	Alshaalan	0003				
4	rice	Alalamin	0004				
14	rice/short grain	sun white	0013	C004	1.0062E+11	FD_RYD-RO-150322-05199	OK
15	rice/short grain	white swan	0014				
16	rice/short grain	Green Farmers	0015				
17	rice/short grain	Abu Bint (أبو بنت)	0016				
26	Bread Toast	L'usine	0025	C007	1.9059E+11	FD_RYD-RO-150322-05089	OK
27	Bread Toast	Herf y	0026				
28	Bread Toast	Yaumi	0027				
29	Bread Toast	Fuschia	0028				
38	Bread Toast	L'usine	0037	C010	1.9059E+11	FD_RYD-RO-150322-05093	OK
39	Bread Toast	Herf y	0038				
40	Bread Toast	Yaumi	0039				
58	Pasta	Perfetto	0057	C015	1.9021E+11	FD_RYD-RO-220322-05692 FD_RYD-RO-220622-11942	Pending
59	Pasta	buitoni	0058				
60	Pasta	al Alali	0059				
61	Pasta	Wafra	0060				

Food Preparation



Timeline



Future directions

1. Extend the S-TDS timeline
2. Include more cities, analytes and food items from the results of recent diet survey
3. Establish a technical international advisory committee for the S-TDS project

Thank you



Bundesinstitut für Risikobewertung



World Health
Organization

بالأهم نهتم