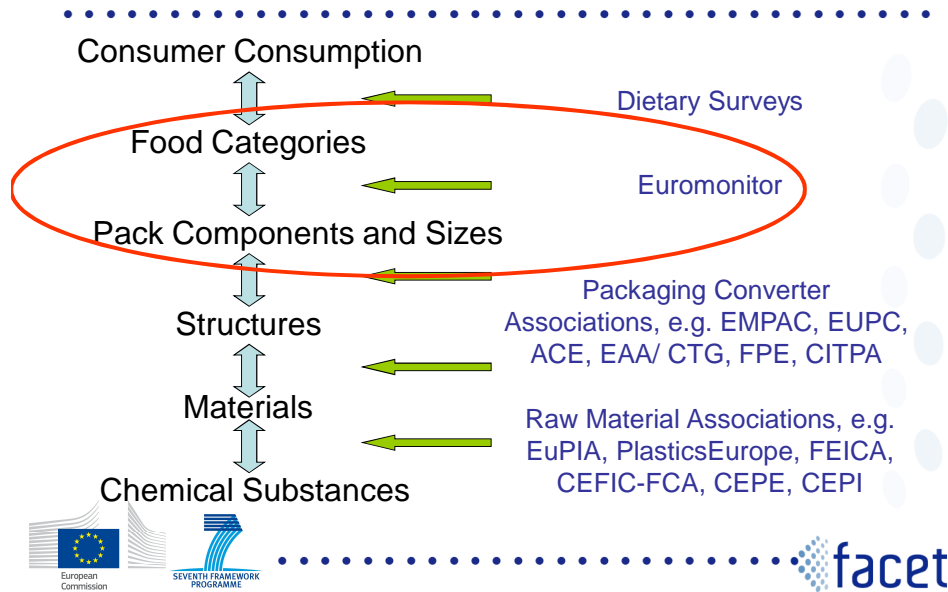


Packaging Composition and Usage

John Dixon – Consultant to the FACET Industry Group



Information Sources



Data Requirements

- **Consumption event gives the country of consumption and type of food consumed**
- **Need to link these with**
 - The type of packaging used for direct food contact
 - The trade association responsible for each type of packaging
 - Who could provide a layer by layer description of the material structures used
 - The pack surface area to food weight ratio. This is dependent on
 - Pack size
 - Pack shape
 - Bulk density of the food
- **Decision not to include secondary and tertiary packaging as potential source of migrants**



Euromonitor Data

- **Commercially available database**
- **Using 2005 data but updated to correct known errors**
- **Covers 19 EU countries + Switzerland**
- **Fields in pack type databases**
 - Country
 - Food type (by Euromonitor food code)
 - Pack type (by Euromonitor pack type code)
 - Retail pack size (in grams)
 - “Primary” or “Secondary” (in food contact or not)
 - Volume of sales in million units
 - Volume of sales in tonnes or million litres
- **Further separate databases for closure types**
- **The Euromonitor data was converted into spreadsheets and subsequently handled in one large spreadsheet – the “Link” table**



Handling of Euromonitor Data

- **Conversion of Euromonitor food and pack type codes into FACET codes**
 - Many had a one to one relationship, others a many to one relationship.
 - Expert judgement needed in the few cases of a many to one relationship
- **Combining pack type and closure type databases**
- **Interpreting the “primary” and “secondary” values to give a full description of each pack. Four types of component used:**
 - Main pack, e.g. bottle, jar, can body, carton tray, pot, flexible bag or sachet
 - Closure, e.g. bottle and jar caps, can lids and including sealing lidding and membranes for trays and pots
 - Outer pack, e.g. cartons and flexible overwraps for open trays – where there is a possibility of contact with the food
 - Insert, e.g. drip pads and separation sheets



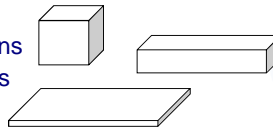
Example of Pack Description

Country	Food	Pack	Size (g)	Closure	Outer Pack	Insert	Volume (m packs)
Greece	P.14.1.2 Packaged Water	Plastic Bottle	3000	Plastic screw thread	-	-	51.7
Germany	P.08.1.1 Fresh meat	Plastic Tray/ Pot/ Tub/ Cup	400	Sealed Lidding/ membrane	-	Drip pad	135.9
Italy	P.07.3.1 Sweet biscuits	Flexible Wrapper/ Bag/ Pouch	250	-	-	-	81.2
Italy	P.07.3.1 Sweet biscuits	Plastic Tray/ Pot/ Tub/ Cup	250	Sealed Lidding/ membrane	-	-	6.4
Italy	P.07.3.1 Sweet biscuits	Plastic Tray/ Pot/ Tub/ Cup	250	-	Flexible Wrapper/ Bag/ Pouch	-	15.3



Pack Surface Area to Weight Ratio

- **Euromonitor gives weight or volume of retail sales unit**
- **For some foods, food contact pack size is smaller, e.g. bouillon cubes, individual wrapped candy**
 - Assign these “portion pack” weights by expert judgement backed by limited research
- **For each food/ size/ pack combination, assigned one of three “shapes”**
 - Cube/ cylinder, e.g. bottles, cans, most cartons
 - Bar, e.g. liquid cartons, most bags, most trays
 - Flat, e.g. sachets, shallow tray, pizza carton
- **Formula for each shape used to calculate surface area from pack weight (assuming food bulk density = 1)**
- **For some packs, closures allocated a percentage of surface area. For others, e.g. bottles, closures given a standard size/ area**



Density Adjustment Factor

- **However**
 - The bulk density of many foods does not equal 1
 - Assumptions on headspace may be wrong
 - Assumptions on shape may be wrong
- **Actual pack surface area to weight ratios for a wide range of food/ pack type combinations were gathered from**
 - Data collected for the Food Standards Agency project “Packaged Food Intake in Students and Older Adults” which was carried out by Newcastle University
 - “Kitchen” measurements made by FIG members
- **Calculated and actual ratios were compared and a “Density Adjustment Factor” introduced to get the best fit**
 - Only used where there was a plausible reason, e.g. known low food bulk density



Other Sources of Data

- **Euromonitor does not cover some retail foods, e.g. fresh fruit, vegetables and meat and staples such as flour and sugar**
 - Data was taken from the earlier Matrix project – which was also based on Euromonitor data but for 4 countries
 - Code conversion were again needed
 - Matrix volumes adjusted by a factor to put them on the same basis
- **Euromonitor does not include take-away food**
 - Data on pack types taken from survey carried out by WP6
 - These pack types will be used where the food consumption has a take-away “flag”



Final Steps

- **For each pack component, a trade association was allocated the responsibility of describing the layer by layer structure used for that pack component/ food combination**
 - In some cases, responsibility needed to be split between two associations
 - Data gaps, where an association did not have the structural data for a particular pack component/ food combination, were identified and responsibilities re-assigned
- **In 10 cases, the volumes and surface area to weight ratios were calculated by hand from the original Euromonitor or Matrix data and compared with those given by the Link table**
- **The fields needed for the operation of the FACET model were extracted and delivered to Crème as the PASTA table (Pack Size, Type and Association)**

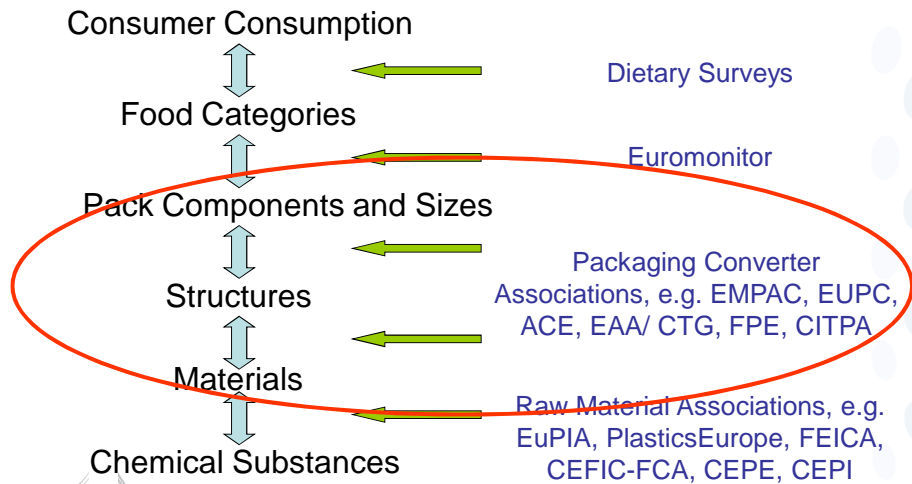


PASTA Table Headings

Pack ID	Country	FACET Food Code Tier 3		FACET Main Pack Type Tier 2	Main Pack Material	Retail/Portion Pack
Closure Type	Outer Type	Insert Type	pack size (g)	Unit sales in mn units	Product Volume (tonnes or million litres)	
Main Contact ratio (surface/weight) cm ² /g		Closure Contact ratio (surface/weight) cm ² /g		Outer Contact ratio (surface/weight) cm ² /g		Insert Contact ratio (surface/weight) cm ² /g
Main Primary Source for Structure		Closure Primary Source for Structure		Outer Primary Source for Structure		Insert Primary Source for Structure



Information Sources

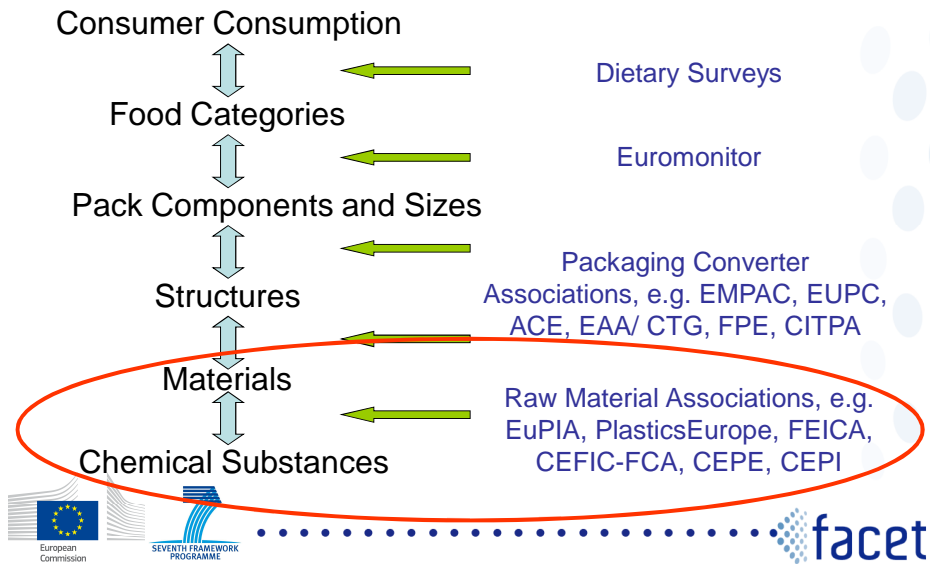


Packaging Converter Data

- This information was provided by the associations representing companies converting raw materials into packaging components
- Methodology differed in detail from association to association
- For each pack component/ food combination, they detailed:
 - Layer by layer description of the structures used
 - Materials in each layer, using standard FACET codes
 - Thickness of each layer
 - Time/ temperature conditions for
 - Pack filling and processing conditions, if other than ambient (e.g. hot fill, retorting)
 - Storage conditions (including warehouse, shop and kitchen)
 - Consumer end use conditions, if other than ambient (e.g. microwaving, boil-in-bag)
 - Market share of each structure



Information Sources



Substances in Materials

- This information was provided by the associations representing companies making the raw materials
- Again, the precise methodology differed from association to association
- For each material, they detailed:
 - The **Occurrence** of a substance, i.e. the probability that it would be present in the material
 - The **Concentration** of a substance, i.e. when the substance is present, the distribution of the concentrations at which it is found

