The periodic table of food, elements, ions and compounds

KITCHEN ELEMENTS

Chapter 1: Science of Cooking

Can you spell your name in P.T. symbols?

36	53	16	22	10
Kr	I	S	Ti	Ne
Krypton	Iodine	Sulfur	Titanium	Neon

102	3	7
No	Li	N
Nobelium	Lithium	Nitrogen

There are a lot of elements here…are they ALL in food?

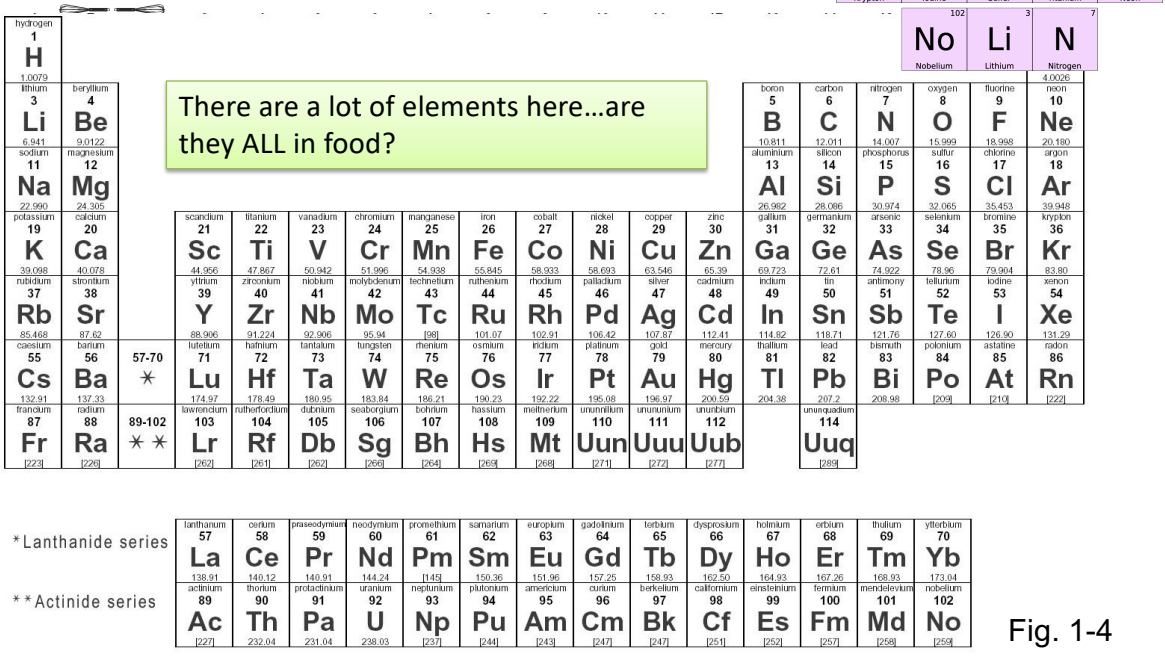


Fig. 1-4

https://www.chemspeller.com/

Food = chemistry

- Elements
  - The periodic table…of food
- Compounds and molecules
  - Covalent molecules
    - Bonding
    - Electrons
  - Ionic compounds
    - Cations
    - Anions
- Elemental exceptions

Examples of food molecules from the major classes: fat, carbohydrate and protein.

What elements do we find the major classes of food macronutrients most often?

Type	Specific example	Molecular formula
Fat	Linolenic acid[1]	$C_{18}H_{30}O_2$
Fat	Oleic Acid[2]	$C_{18}H_{34}O_2$
Carbohydrate	Glucose (i.e. dextrose)	$C_6H_{12}O_6$
Carbohydrate	maltose	$C_{12}H_{22}O_{11}$
Protein	Alanine	$C_3H_7NO_2$
Protein	Glutamate[3]	$C_5H_9NO_4$

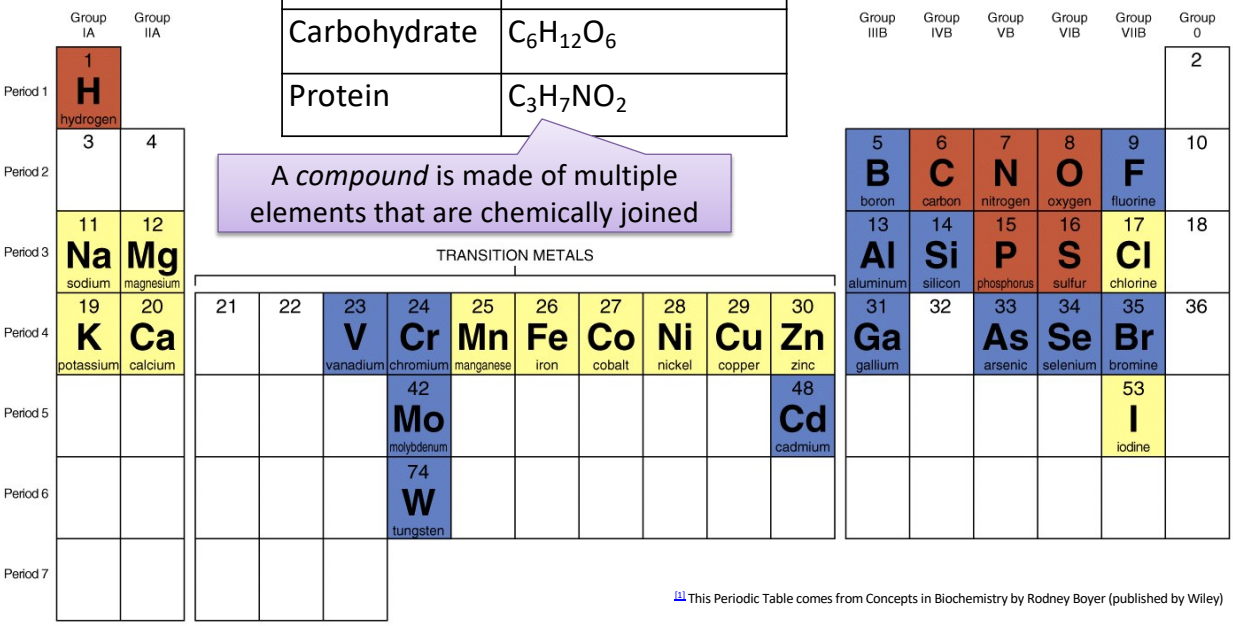
[1] An omega-3 fatty acid found in green leaves and some seed oils.
[2] The primary fatty acid found in olive oil
[3] Alanine and glutamate are components of protein

The Periodic Table…of Food

Type	Example
Fat	$C_{18}H_{34}O_2$
Carbohydrate	$C_6H_{12}O_6$
Protein	$C_3H_7NO_2$

Food is made up of many types of compounds

A *compound* is made of multiple elements that are chemically joined



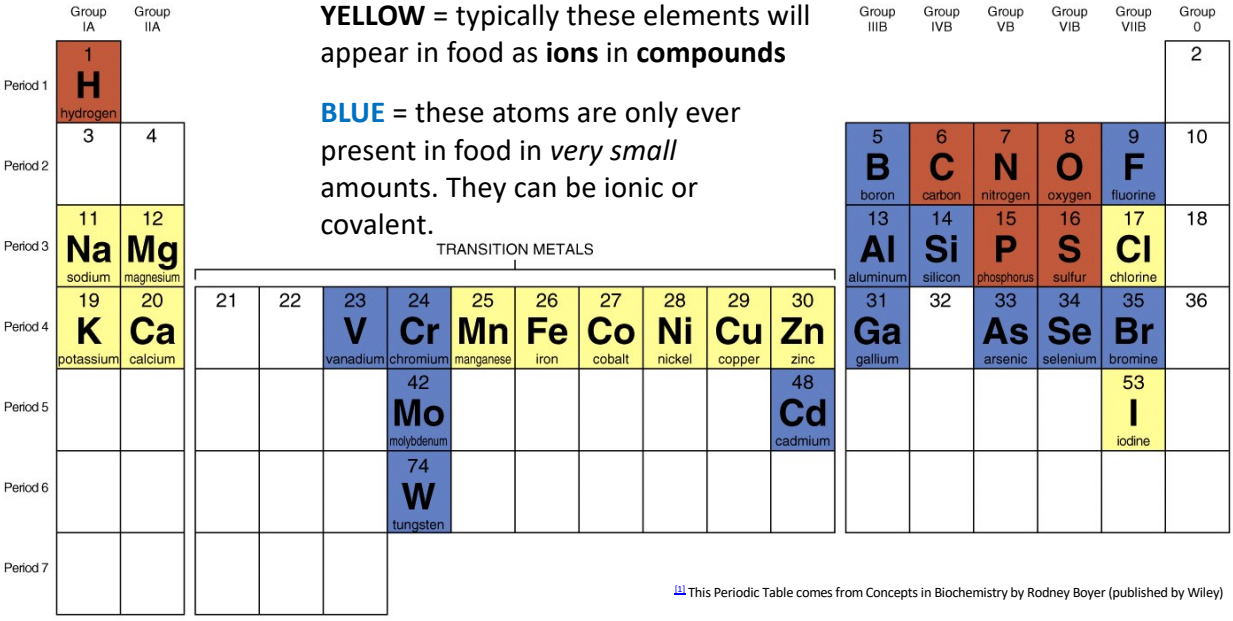
[1] This Periodic Table comes from Concepts in Biochemistry by Rodney Boyer (published by Wiley)

The Periodic Table…of Food

RED = typically these elements will form **covalent bonds** to make **molecules** with other red atoms. Sometimes a red atom can make an ion.

YELLOW = typically these elements will appear in food as **ions** in **compounds**

BLUE = these atoms are only ever present in food in *very small* amounts. They can be ionic or covalent.



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