##### Sheet # : 21refer to slides : there is no slide for this lecture written and corrected by : basheer al-hasanat  [Ghaida'a Al-Qallab](https://www.facebook.com/drghaida.algallab)

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 **-nitrates:**
High nitrate levels in water can cause methemoglobinemia or blue baby syndrome, a condition found especially in infants under six months. The stomach acid of an infant is not as strong as in older children and adults. This causes an increase in bacteria that can readily convert nitrate to nitrite (NO2). Do not let infants drink water that exceeds 10 mg/l NO3-N. This includes formula preparation.

Nitrite is absorbed in the blood, and hemoglobin (the oxygen-carrying component of blood) is converted to methemoglobin. Methemoglobin does not carry oxygen efficiently. This results in a reduced oxygen supply to vital tissues such as the brain. Methemoglobin in infant blood cannot change back to hemoglobin, which normally occurs in adults. Severe methemoglobinemia can result in brain damage and death.

Nitrate used to be make much more problem in the past when people used to consume large amount of nitrate from other sources including food items like meat …. Otherwise nowadays the concentration of nitrate in the water as high as (70mg/l instead of 10mg/l that used to be before).

**\*the second group :**

 ( chemicals that interfere with the acceptability of water for drinking purposes)

Here we will not concern about health issues …. What we are concern about is that : " you wouldn’t drink that water ". because of certain changing in color, taste or smell …. May be it is not at concentration that it will be harmful but "as normal people we don’t drink this".

Example:

-that what happen when we have high level of salt relatively in water .
In Libya …. The north part of it has just salty water (near to Mediterranean) … so they solve that by conduct fresh water in huge pipe from the south part .
 In Jordan ( Eddesah program) …. We do almost the same of what was done in Libya.

-rust …. ( iron oxide ).
if we collect or store water in iron container like barrel ….. then we might have by time little bit of rust and this will be dissolved in water …. As we know rust is not toxic however it can give bad taste and bad color to water (brownish color)

-detergents.
make foam and this is unlikely for people to drink water

-petroleum product.
which appear as rainbow color on the surface of water

-sulfur.
give water very bad smell and taste

(Algae)
at 1997-1998 Jordan government decide to take their right of water from Tabariya lake … Israel gave us from the bottom of the lake which is full of algae …. Then the government conduct this water to ( Zay and Daabog) .... people in this location didn’t like water because of it is bad taste …. Then the government add chlorine to solve the problem without know they made a real problem in the taste …….. that was real bad situation.

**\*third group:**
(chemical we need it in water but below a certain limit)
chlorine…. Fluorine…. Iodine

-chlorine : we need it to treat water and to disinfect it ….. chlorine is not a big problem because the range in concentration form the beneficial concentration and the toxic concentration is very big …. So it is almost below the toxic concentration.

-fluorine : which is more dangerous
it is consider as knife with two edges ….. it is good for teeth because it act as anti carries agent …. But if it exceeds it will be worse even for teeth because it cause fluorosis (which effect the tooth as breaking the edges any discoloration it so the teeth become yellowish brown as they are smoker while not )….. that seen in some part of Jordan and in north part of Syria.
the range in concentration between the good and bad fluorine it is not big as chlorine range.

NOTE : bromine is halogen but we wouldn’t want to have it in water in any concentration… it is not good anyway.

-iodine : as we mentioned before is knife with two edges ….. if it is low this lead to hypothyroidism which mean less active thyroid gland and vice versa.
we assume that usually almost have efficient and enough amount of iodine because there is a lot of sources to take it ( from the salt and milk!!).

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**\*The physical contamination of water:**

**1-tempreture :**
as consumers we have to adjust the temperature of water as we like …. Government are not responsible for that.
however when we talk about outdoor water,,, wild water,,, hot water is bad ,,,,, because hot water is contaminated water ,,,, and the cause is when the water become hot suddenly that may kill the living organisms in it ( fish ,,, octopus ,,, etc ).
however one of reason that make water hot suddenly is using the water for cooling purposes and this is major use in USA and Europe for cooling nuclear reactors.
and then they cooling water by pumping it with duct to a certain height and let it drop as rain at that location in a small droplets state cooled by air.
however they can use hot water in heating building ,,, in melting the ice on the roads ,,, or other uses.

**2-soil** : the dr mentioned it but it is biological contaminant

**3-radiation :**
a lot of sources can do it may be by nature or by manmade
for example the fossil water it collected underground by thousand and thousand year and this big chance for it to be polluted and contaminated with radiation from the layer of the earth ( natural source ).
we judge on water if it is contaminated with radiation by standard ranges that the government and scientists put it and work according these ranges.

If the radiation contaminate the water what we can do ?
first , the standard ranges are flexible for acceptable limit….. this must be decided by studies and measurements not randomly .
second , we can mix this contaminated water with fresh water to become finally with water that totally had contaminated less than before (high + low=medium ).

**Air pollution**

How can we judge if the air is polluted or not ?
by taking sample of air by certain machine which can take sample as one shoot or continuous taking ,,,, then take this sample for laboratory to find it composition then we decide according to standard
NOTE : there is no place on earth have what we called it standard air,, because of movement of air ,,,,simply what leave place arrive to another place.
and this prove what happened in 1990 when we have for the first time 5-6 snow storm which explained by huge fire that was happened in US in California ,,,, also when Iraqis burn oil in Kuwait , China had been rained with black rain take in consideration the distance between china and Kuwait.

Then air pollution may be mean contaminated with new material or change in the ordinary composition ,,, increase or decrease …. And also It can mean the causes which prevent us to enjoy in the environment and wild.

The sources of air pollution :
-manmade sources
-natural ,,,,, by mean of natural fire , volcano , winds and swaps
and forest can be source of pollution by pollens and pheromone which may be cause some kind of allergy for people.

 sorry for any mistake
if you find any thing unclear please come and ask ☺