Al-Nahrain University
College of pharmacy

Practical pharmacognosy
3rd stage 1st term

Saponin Glycosides

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Lab 6

Saponins



- Saponin comes from the *Latin* word ”sapo“ which means **soap.**
- Historically soap was made from **soap wart plant**.
- Usually, they have **bitter/acrid taste** and usually irritating to the mucus membrane.
- Due to their **high molecular weight**, saponins are very difficult to be extracted from their natural source.
- Saponins are glycosides with distinct characteristic :
- **Foaming - frothing property**
- When they are shaken with water or aqueous solution, they form a **stable** lather.
- Thus, **reduce the surface tension** of water.
- Due to its frothing property saponins are used in the manufacture of **shampoo , detergents ,soap and frothy beverages**.

Properties

- Saponins have **a hemolytic** property that can destroy red corpuscles (hemolysis).
- They are toxic to cold blooded animals (fish/insects)

➢Used as fish poison.

➢When injected in the blood stream they are highly toxic but when taken orally they are harmless since only a small part is absorbed.

Saponin by acid hydrolysis the yield aglycon and glycon

>Hydrophobic ***sapogenin*** (aglycon) and

>Hydrophilic sugar part

- The aglycon (sapogenin) part is of 2 types :

➢**steroidal (neutral)**

➢**Tri-terpenoids (acidic)**

- The steroidal type is less distributed in nature than the triterpenoids but the steroidal are more pharmaceutically more important due to its chemical structure which is like that of many body hormones (estrogen /cortisol) so some are used as starting material in the biosynthesis of those hormones.

➢(**Diosgenin** is the principle sapogenin used in the industry used in synthesis of combined oral contraceptives)





Experimental work

- Method of extraction:
Decoction

- Plant used:
Zingiber officinale
Camellia sinensis
Glycyrrhiza glabra
- Part used:
Dry root
Dry leaves
Dry root



(Plant)



(Roots)

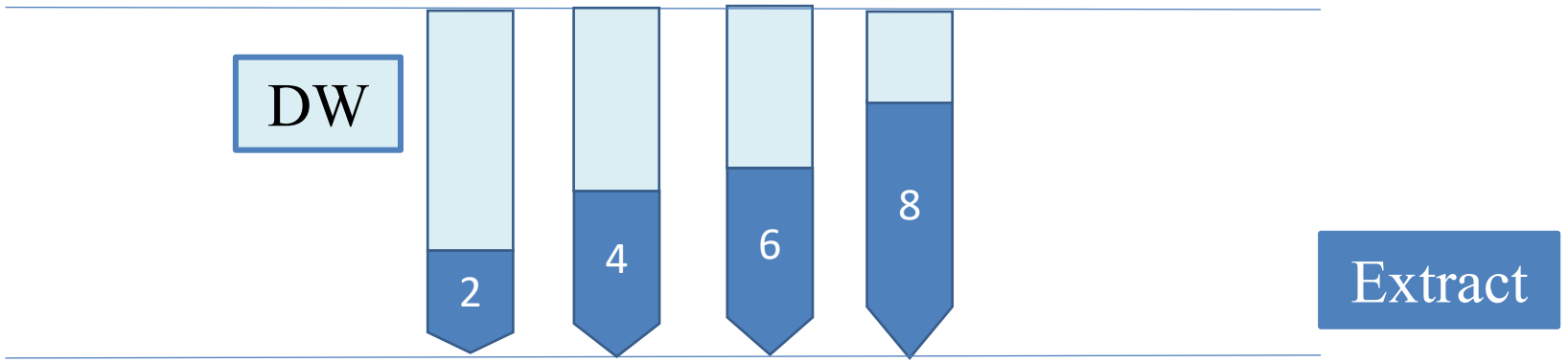
Specific Test
Foam index test

- It is the identity test specific for saponin glycosides.
- Aim of test : It will identify:
- The **Foaming ability** if the aqueous containing saponins
- The **stability** and persistence of the foam



Aim: Identify if the plant extract contains saponins (+ve/-ve)

- **Extraction :**From each powdered plant take **0.1% decoction.**
- **Decoction**: Bring to a boil then filter.
- Neutralize acidic saponins by adding 3 drops 1% **sodium carbonate solution**.
- Prepare serial dilutions: Add **2ml, 4ml , 6ml, 8ml** of your decoction into test tube.
- Then complete the volume to 10 ml with DW.



Experimental work

- Shake vigorously for **15 seconds** then stand for 10 min.
- Decide if your plant contains saponins or not from the tendency for foaming.
- Look for the test tube that gives you **the maximum height (1cm or more)** and **most persistent froth ring.**
- Find **how many grams of saponins present in that test tube**.
- Calculate the foaming index.
- For example: when the **highest and most persistent** foam occurs at test tube no. 8 which contains 8 ml of the decoction and 2 ml of water then 8ml of decoction contains 0.008 gm of the saponin:

0.1gm	100ml
X	8ml

X = 0.008 gm saponins in 8 ml decoction.

Calculate foam index

0.008gm 10ml (total volume in test tube)

1 cm X

X= 1250 foaming index

- This means the ideal **highest and most persistent** foam is formed by a solution diluted 1:1250
- Therefore, the foaming index is 1250
- Since it is more than 100 it is considered significant.
- The addition of sodium carbonate is to convert the acidic saponins that may be present in the decoction to salt wich are soluble in water.

Report
submit a single report for each group

Name of experiment:

Aim of experiment:

Procedure:

Results:

>+VE/-VE

>if present give the foaming index

Discussion: discuss the results .