Adherence of ***Lithocarpus spp*** (Manjakani) and Chlorpheramine in Tablet Dosage Form on Mammalian Oesophagus

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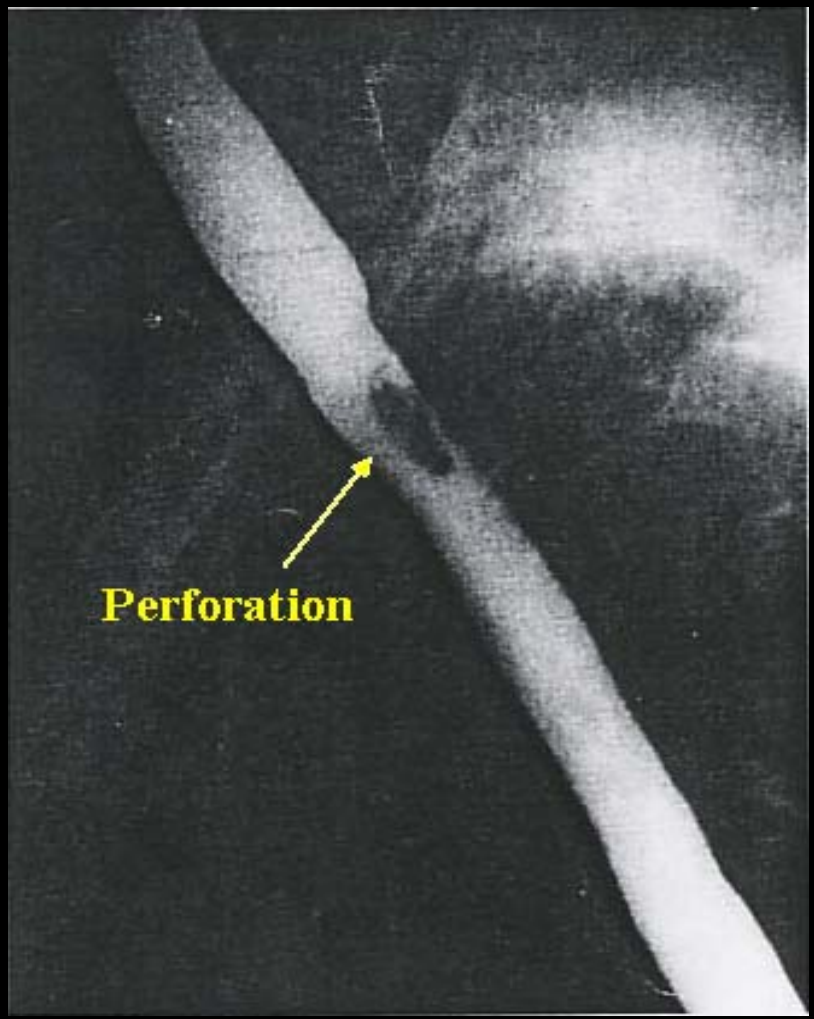
Background

- In recent years, many case reports concerning esophageal injuries caused by drugs have been published

  - A 44 year old male was treated for prostatitis with oral tetracycline. On the fourth day of his treatment, he was awaken with retrosternal chest pain. The endoscopy showed a 2 mm ulcer 25 cm from the incisors and 10 mm ulcer at 35 cm.

- The primary cause has apparently been the adherence of the drug product to the esophagus

Oesophageal Injury



- ***Lithocarpus spp*** (manjakani) has been a supplement drug for people around South East Asia country
- No specific study on ***Lithocarpus spp*** adherent tendency
- The adverse affect of ***Lithocarpus spp*** is unknown

Objective

To measure and compare adherence force of herb which is ***Lithocarpus spp*** (manjakani) and commercial drug (chlorpheniramine) in tablet form to the mammalian oesophagus tissue for different moistness

Scopes of Work

- To compare the adherence force for herb and commercial drug that well establish with the same size and shape in tablet form
- To identify the adherence force in different moistness of oesophagus for herb and commercial drug with the same size and shape in tablet form.
- To compare the adherence force in vary moistness of oesophagus between herb and commercial drug with the same size and shape in tablet form

Adherence

- An adherence phenomenon is an undesirable situation which may contribute to oesophagus damage
- Factors affecting adherence force are:

  size, shape, density, and surface characteristics of the dosage unit and by physiologic factors such as posture and the volume of water taken with the units.

  (Perkins et al., 1999)

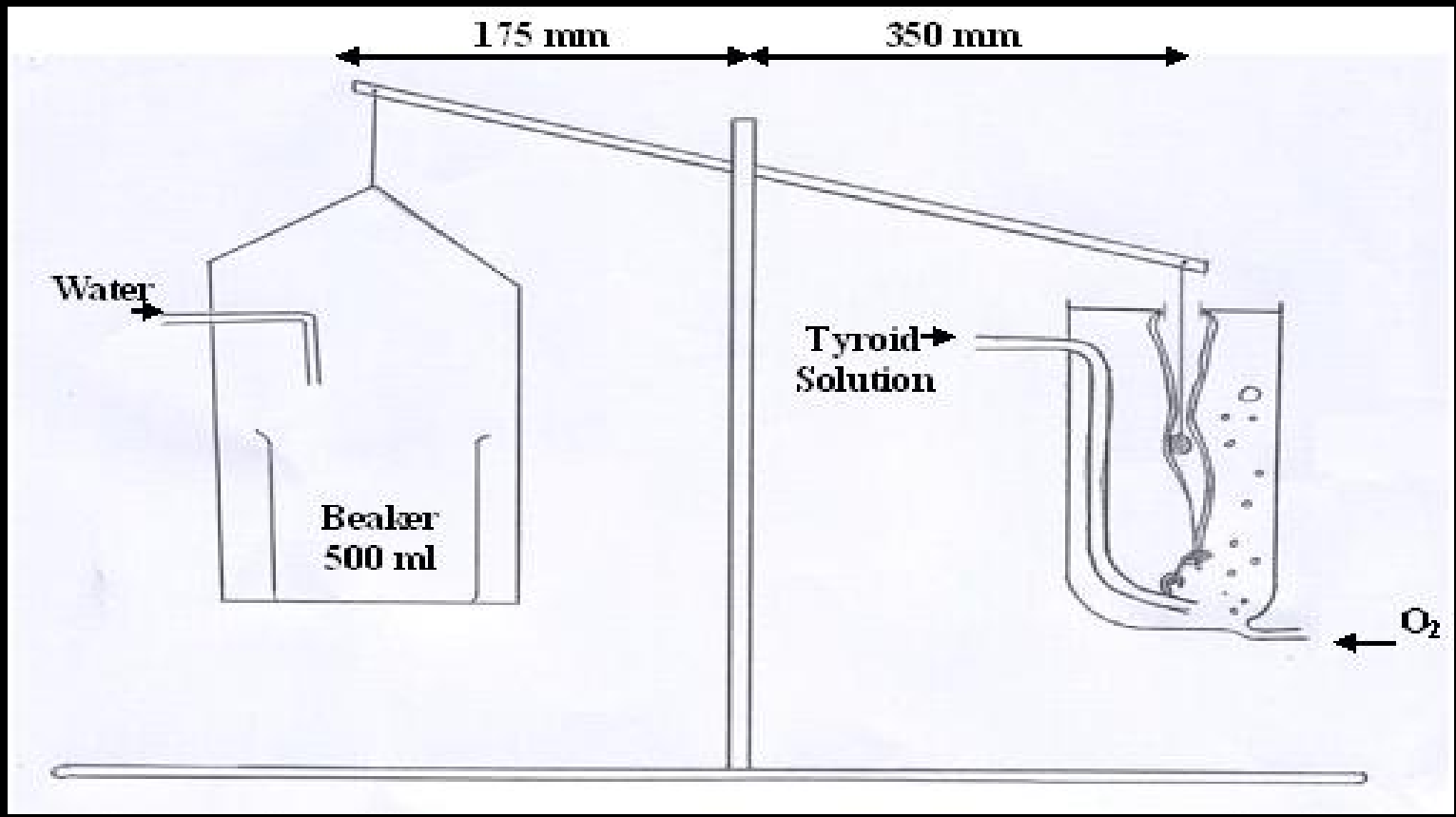
Lithocarpus spp (manjakani)

- Round-shaped abnormal growth found only on a few species of trees in the world
- Use as:
  - astringent
  - antibacterial
  - antifungal
  - anti-inflammatory

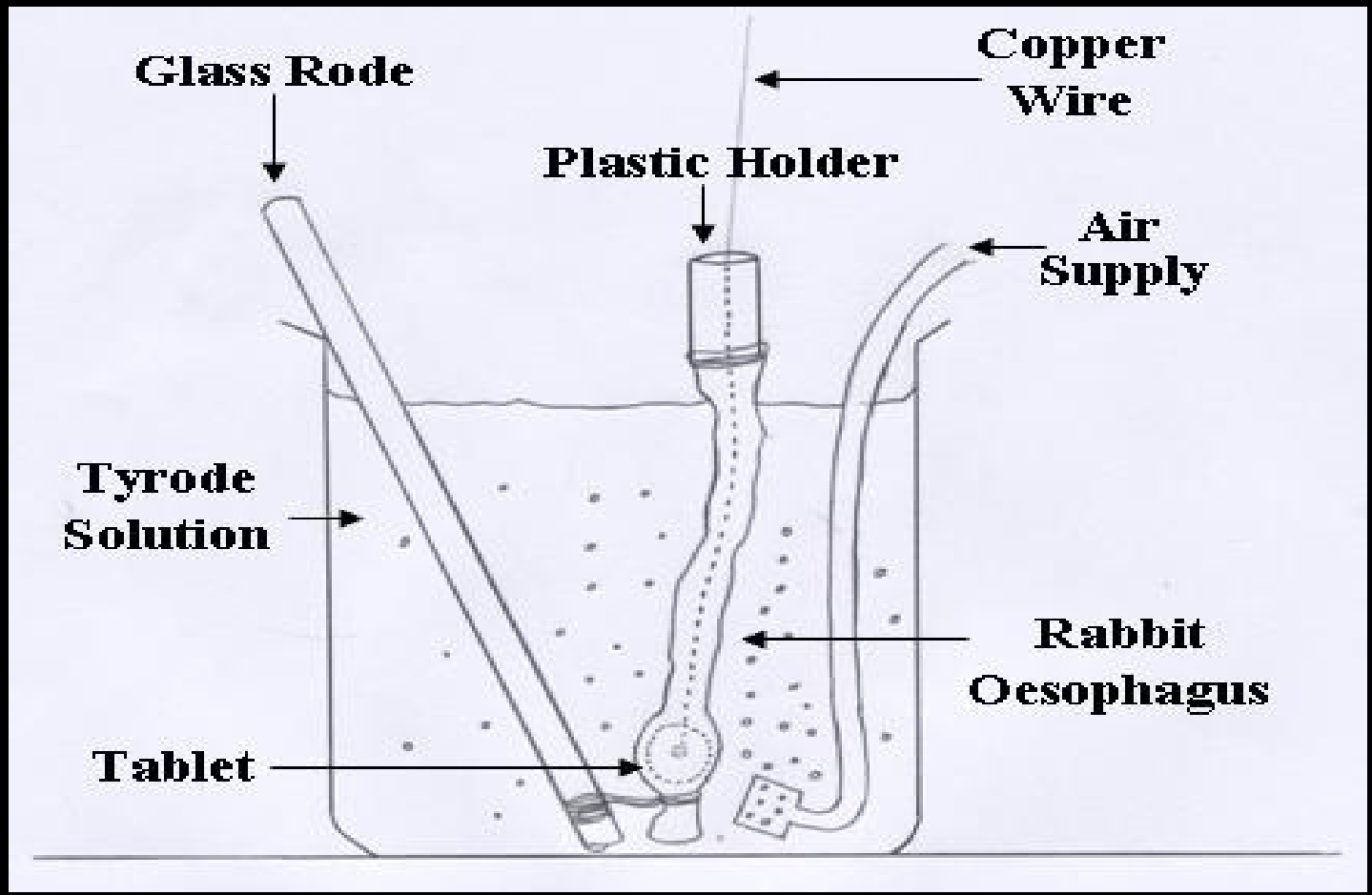
Chlorpheniramine

- First-generation antihistamine used in the prevention of the symptoms of allergic conditions such as rhinitis and urticaria
- Had been choose as comparison to ***Lithocarpus spp*** in comparing the adherence force because it has the same size and shape like ***Lithocarpus spp*** tablet

Methodology



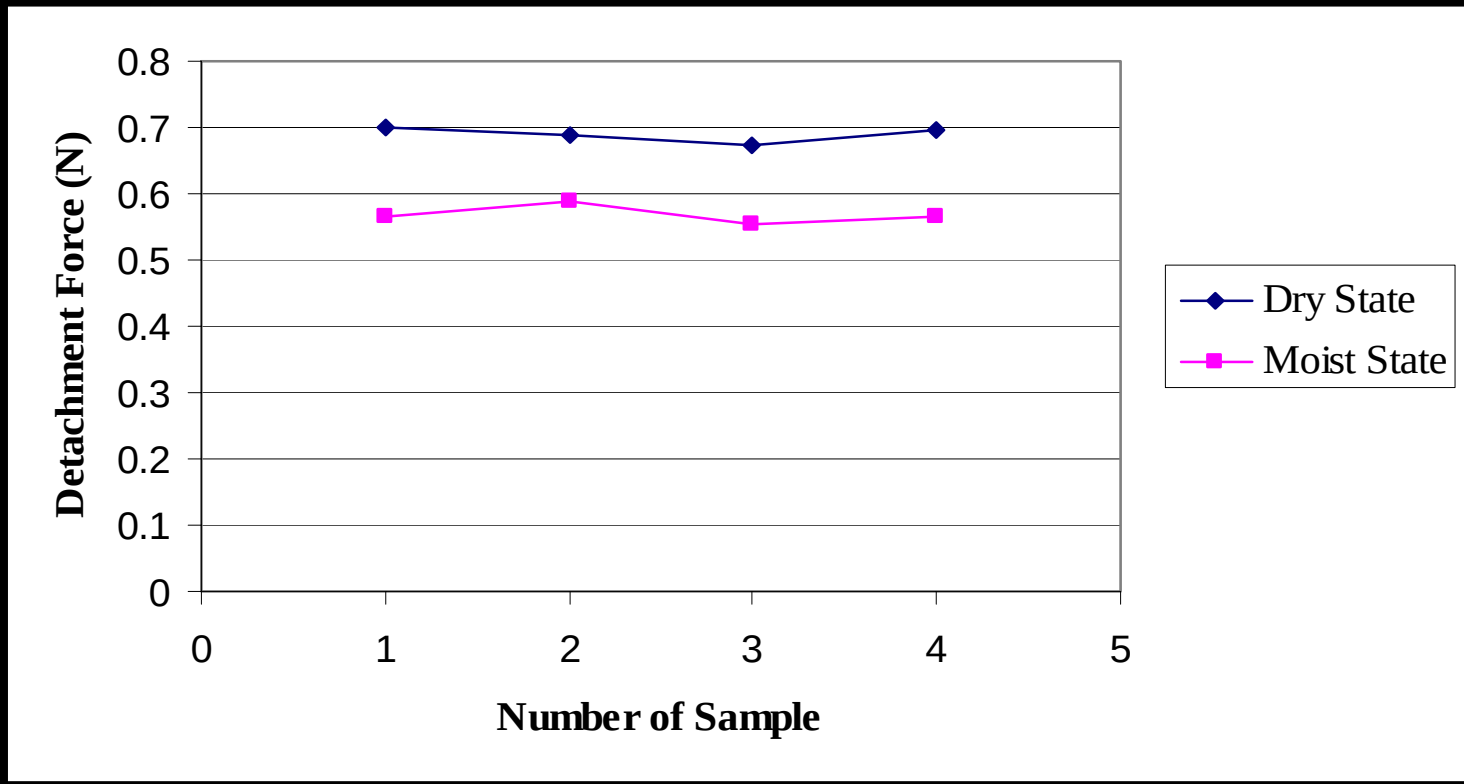
Measurement system for force needed to detach product from the oesophagus (Marvola, 1981)



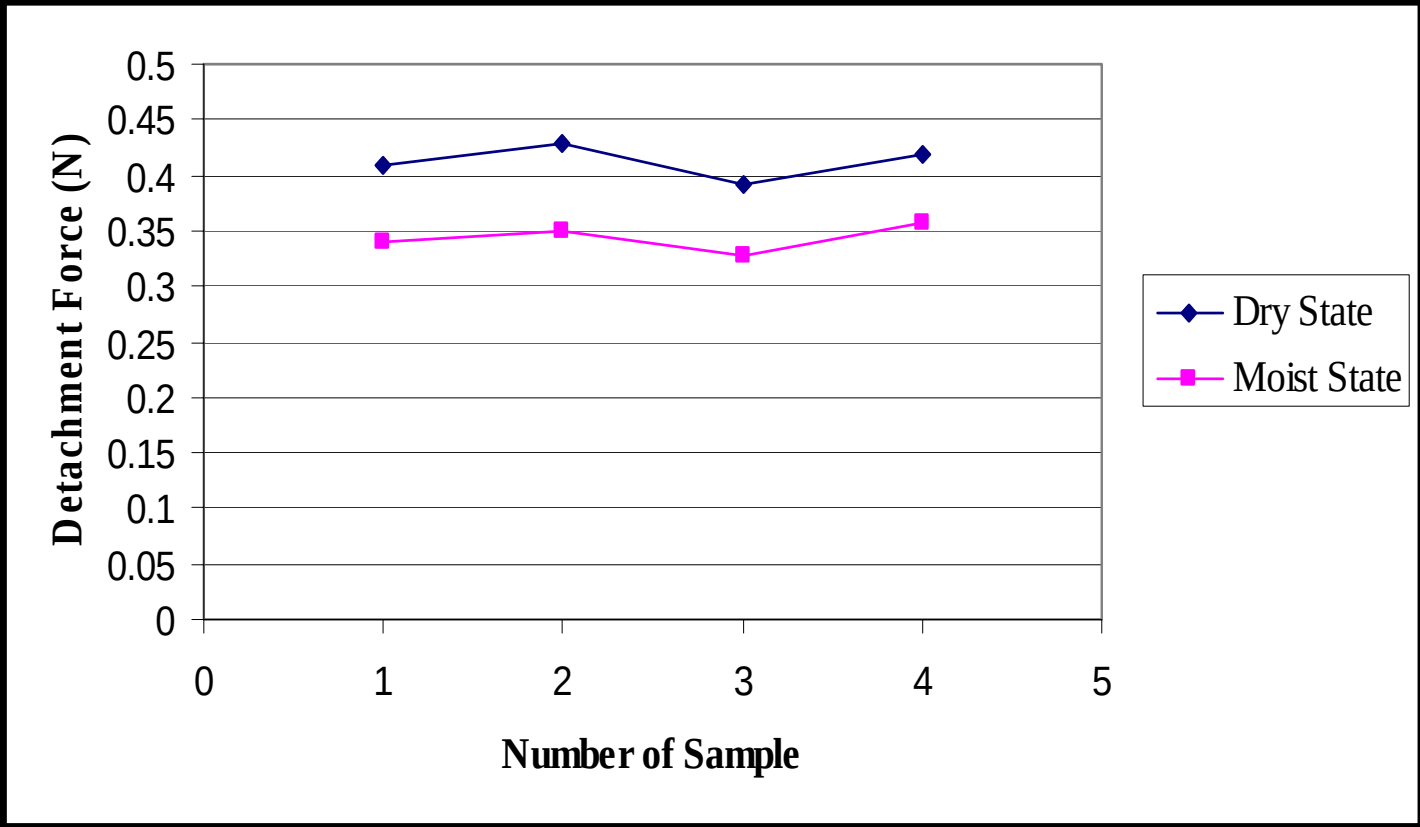
Modification of Marvola (1981) Method

Result and Discussion

Difference detachment force of ***Lithocarpus spp*** tablets in different moistness of oesophagus



Difference detachment force of chlorpheniramine tablets in different moistness of oesophagus



- ***Lithocarpus spp*** Tablet

  - Mean value of adherence force in dry oesophagus is 0.690 N.

  - Mean value of adherence force in moist oesophagus is 0.569 N (17.5% lower than in dry oesophagus condition)

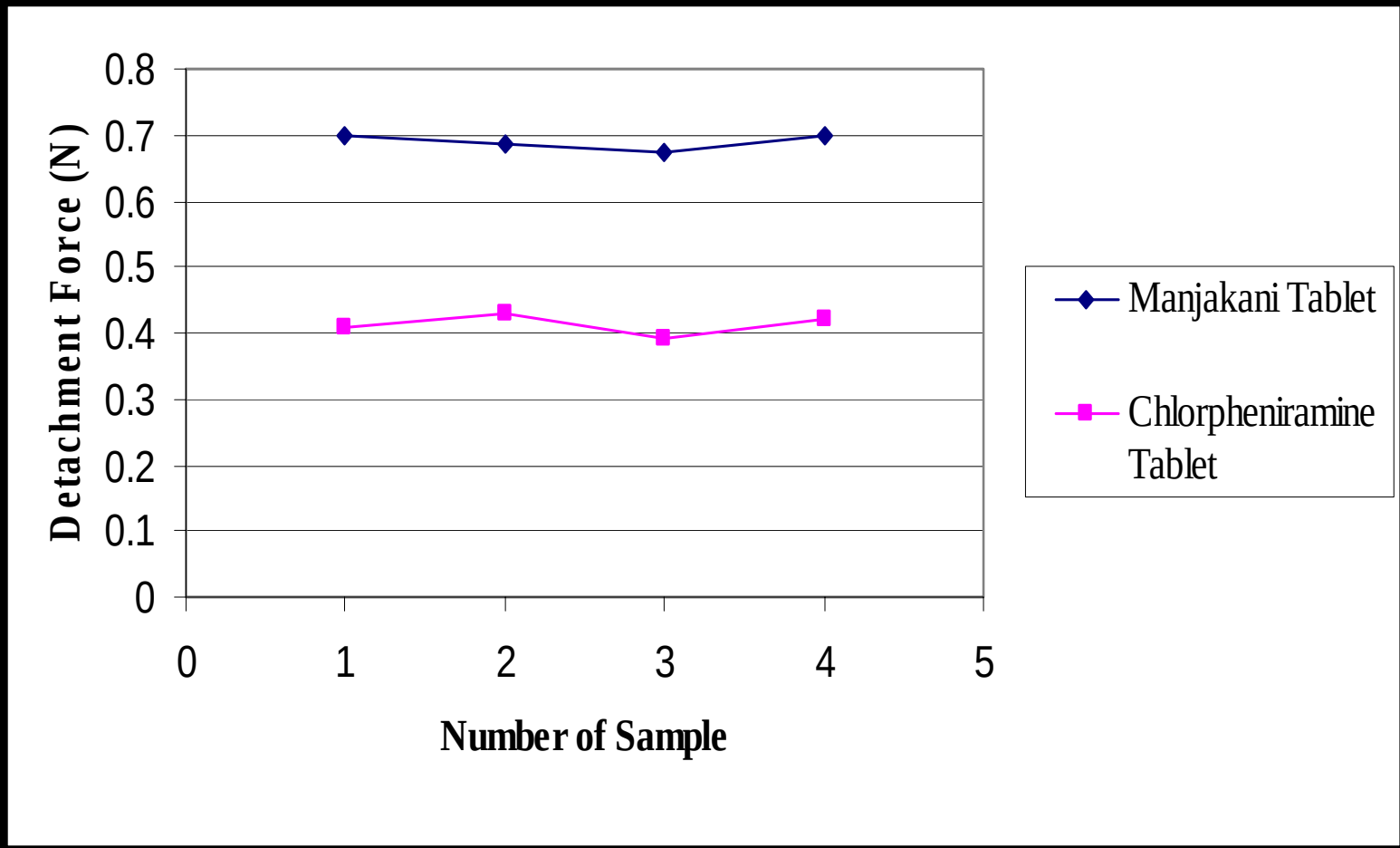
- Chlorpheramnine Tablet

  - Mean value of adherence force in dry oesophagus is 0.412 N.

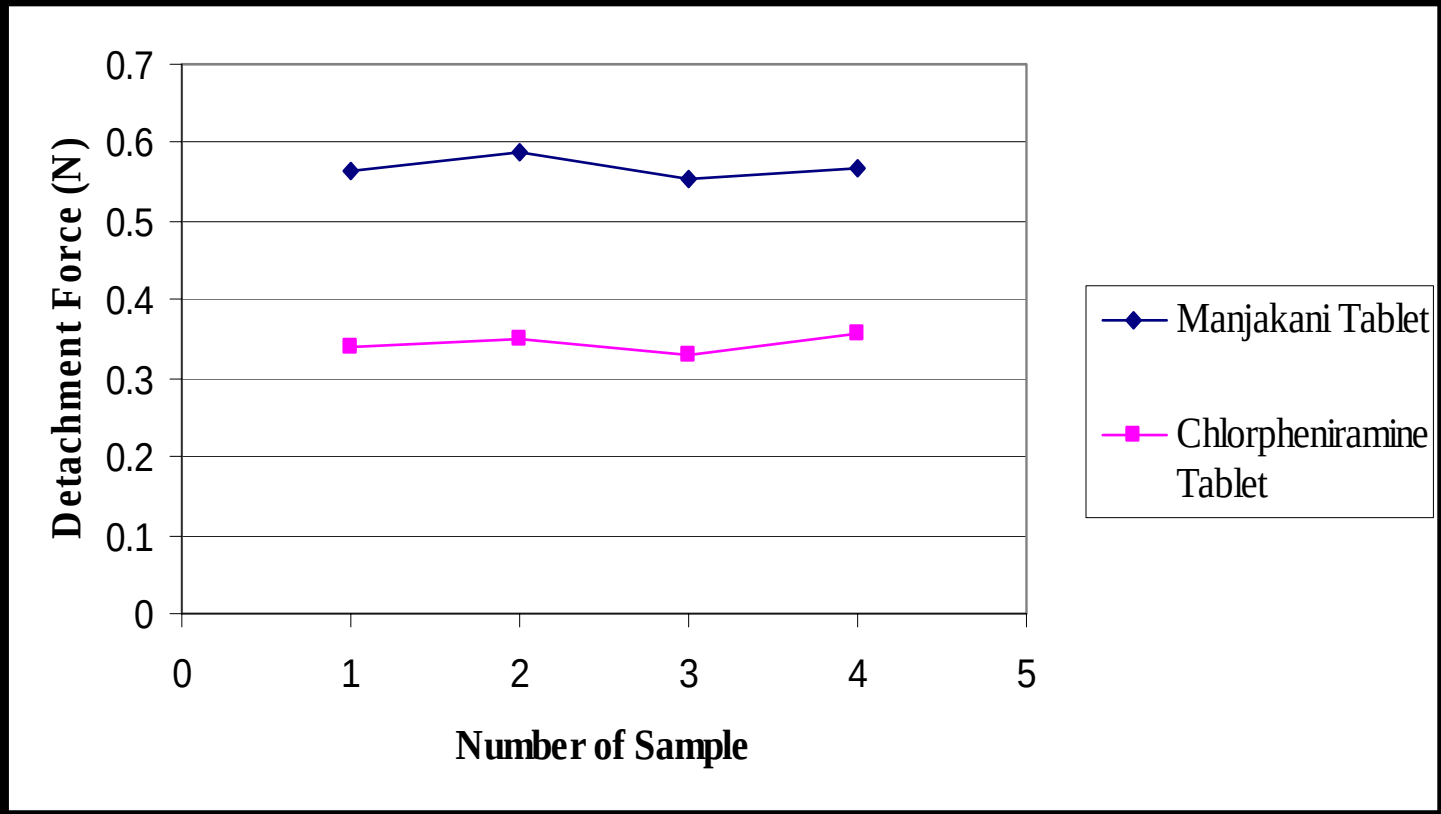
  - Mean adherence force in dry oesophagus is 0.344 N (6.8% lower than in dry oesophagus condition)

- Excess amount of fluid on the mucosa allow drug to dissolve much faster and thus decreasing the adherence of drug to the oesophagus (Marvola, 1981)

Difference detachment force of ***Lithocarpus spp*** and chlorpheniramine tablet in dry oesophagus condition



Difference detachment force of ***Lithocarpus spp*** and chlorpheniramine tablet in moist oesophagus condition



- The adherence force of manjakani tablet is higher than adherence force of chlorpheramine tablet in both dry and moist condition of oesophagus

- Factors affecting the difference

  i) Tablet Coating

  - ***Lithocarpus spp*** (uncoated tablet)
  - Chlorpheramine (sugar coated tablet)
  - Previous study show that; ranking from the greatest to least adherence — hard gelatine capsules, film-coated tablets, uncoated tablets, sugar-coated tablets (Marvola, 1984)

ii) The characteristic of the excipient

- ***Lithocarpus spp*** (hydrophobic drug)
- Chlorpheramine (hydrophillic drug)
- hydrophilic substances would adsorb water more than hydrophobic substances, and as a result the hydrophilic tablet would be expected to dissolve much faster than hydrophobic tablet, thus decreasing the adherence to the oesophagus (Perkins et al., 1999)

Conclusion

- Both drugs (***Lithocarpus spp*** tablet and chlorpheramine tablet) have lower adherence force in moist condition of the oesophagus
- The adherence force of ***Lithocarpus spp*** tablet is higher than adherence force of chlorpheramine tablet in both dry and moist condition of oesophagus
- The hydrophilic drug has lower adherence force compare to hydrophobic drug
- Sugar coated tablet has lower adherence force compare to uncoated drug

Recommendation

- Recommendation in Decreasing the Adherence Force of Manjakani Tablet

  - Using sugar coating for manjakani tablet

  - Exchange the hydrophobic excipient to hydrophilic excipient

- Recommendation in Improving the Experiment in Measuring The Adherence Force of Drug

  - Using the latest apparatus in measuring the adherence force

    - Dartech Universal Testing Machine-Model M9500

  - Built the environment of experiment that close to human body

Thank You