

Project presentation

The effect of aging on the potency of antacid medicine

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Does antacid
medicine age

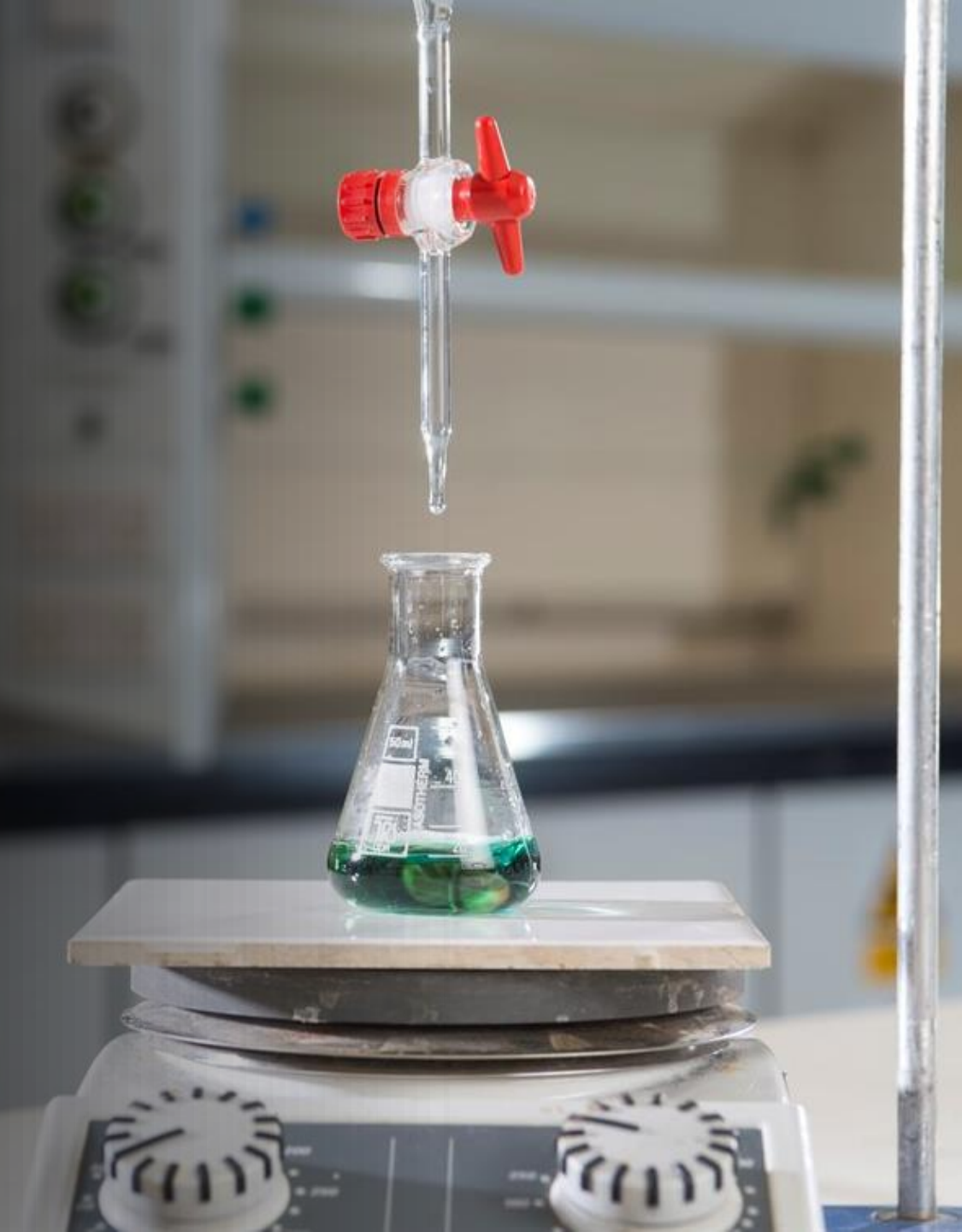


Medicine ages and degrades

- It seems that almost every medicinal chemical is, to some extent, susceptible to degradation as it ages
- In the case of antacids the degradation may occur as a result of micro-organisms, or chemical reactions such as with moisture.
- In my project I investigated the question of "*How does the age (indicated by the expiration date) of an antacid tablet affect the moles of hydrochloric acid per gram it is able to neutralize?*"



Methods and apparatus



Sourcing medicine

- To obtain statistical significance, the project required several individual pieces of antacid medicine with a range of expiration dates.
- This was accomplished by finding older medicine packets in personal storage and in the storage of friends
- As multiple trials were able to be conducted with gradual change in age, a stronger case for the degradation of antacid can be made.

Preparation

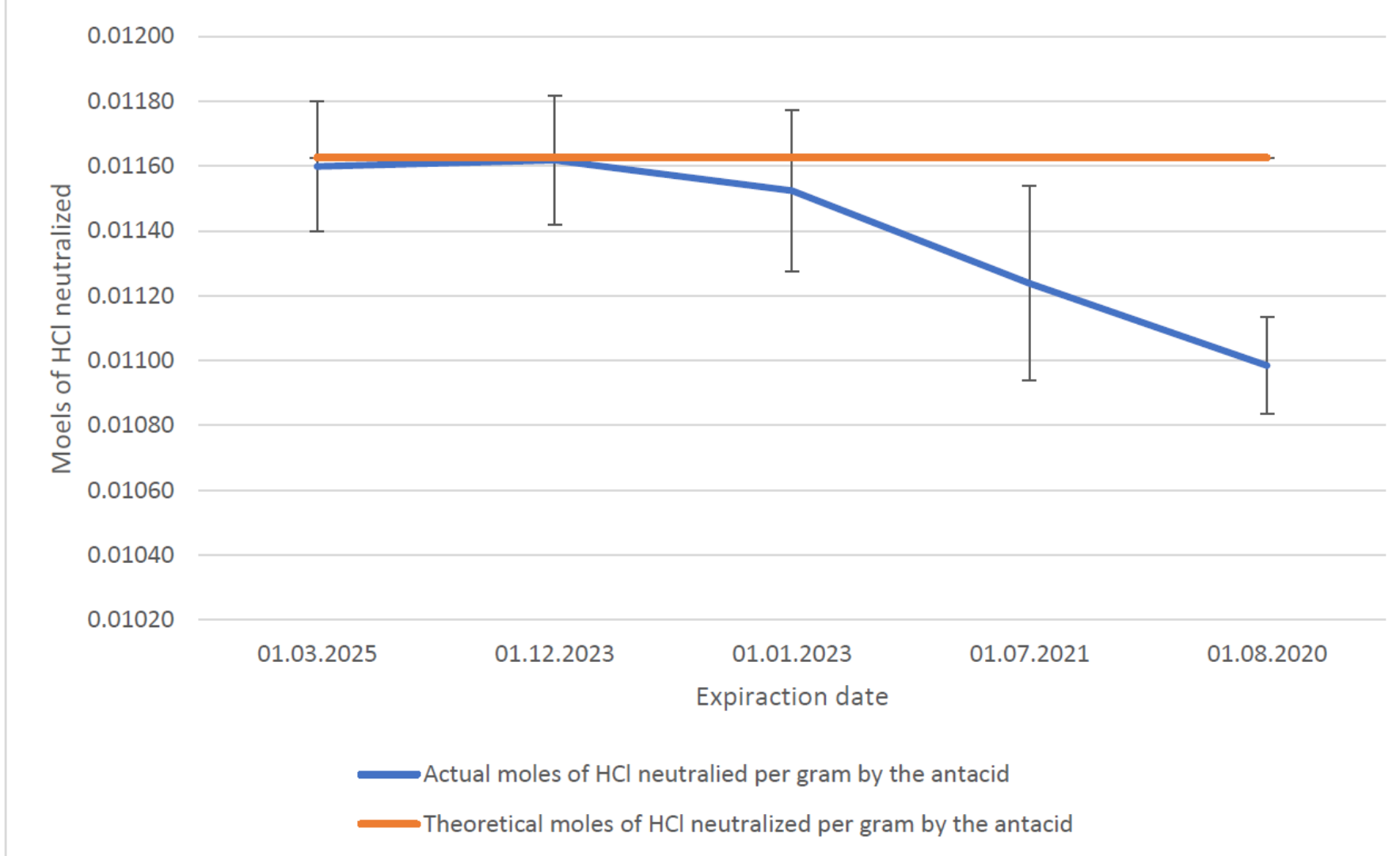
- Firstly, all trials were prepared by dissolving the antacid tablet in a known excess of hydrochloric acid
 - This was done since the tablets dissolve poorly in plain water and so that the carbon dioxide produced in the acid and tablet reaction could be excised
- Secondly, the dissolved antacid tablets were lightly heated so that the produced carbon dioxide could escape
- Lastly, the indicator bromothymol blue was added to indicate when the solution becomes neutral

Titration

- After being prepared the trials were titrated against using sodium hydroxide in a burette until the indicator showed that the solution became neutral
- The volume of sodium hydroxide used to neutralize the solution can be used to find the amount of base in the original tablets and thus their potency
- Further calculations were done to find uncertainties of the aforementioned values.

Results

Moles of HCl neutralized per gram by the antacid compared to theoretical value



- The results of the study were that as the antacid medication ages from brand-new to expired it loses around 5.5% of its potency
- Furthermore, the shape of the graph strongly suggests that the degradation process accelerates as the antacid ages, showing why expiration dates are useful on medicine such as antacids