Investigation into the efficiency of various indigestion tablets essay

Indigestion is a general term used to describe discomfort or pain in the upper abdomen or chest, which is sometimes experienced while our bodies digest the food we eat. A better and more scientific term for indigestion is dyspepsia. Indigestion is caused by too much acid in the stomach. Indigestion tablets contain bases, which neutralise the excessive hydrochloric acid.

The three indigestion tablets that I used all contained calcium carbonate as the active ingredient. Setlers is however the only indigestion tablet with just that active ingredient. Both Rennie and Bisodol also contained magnesium carbonate and, additionally, Bisodol also contained sodium bicarbonate. When the indigestion tablets come in contact with the HCl, the following chemical reactions will occur:- Setlers: CaCO3 + 2HCl –> CaCl2 + CO2 + H2O- Rennie: CaCO3 + 2HCl –> CaCl2 + CO2 + H2OMgCO3 + 2HCl –> MgCl2 + CO2 + H2O- Bisodol: CaCO3 + 2HCl –> CaCl2 + CO2 + H2OMgCO3 + 2HCl –> MgCl2 + CO2 + H2ONaHCO3 + HCl –> NaCl + CO2 + H2OAimMy aim is to determine which of the three indigestion tablets is the most effective.

I will try to determine this by means of titration, in order to calculate the masses of the active ingredients present in the tablets. Variables to control and varyIn order to make this a fair experiment, I must keep most things constant. Firstly, the concentration of HCl which the indigestion tablet must neutralise has to remain the same. In this case, this has to be 0. 1M, which is the same as in the stomach because I am trying to simulate the hydrochloric acid in the stomach. Secondly, the volume of deionised water in which I dissolve the tablet must remain the same, so that all solutions are of the same concentration.

I cannot simply dissolve one tablet, as the masses of the different tablets vary. Instead, I will use a pestle and mortar to grind the tablet and weigh the set amount of powder for each of the tablets. The indicator that I use will also have to stay constant, as well as the amount of indicator added to the solution. There is only one variable that I have to vary. That is of course the factor that I want to investigate, which is the powders with different concentrations of active ingredients.

I will only vary the powder that I use, all the other factors will have to remain constant. Initial planFirstly, I will crush up one indigestion tablet using a pestle and mortar. I will weigh out 1g of that, on a sensitive pair of scales. I will have to do this carefully, as the amount I dissolve into the water will affect the amount of HCl needed to neutralise it.

I will dissolve that 1g. of powder into 25 cm3 of deionised water. Tap water will have impurities and will contain other chemicals which will affect the reactions that are to take place. I will add three drops of phenolphthalein, which will cause a colour change when the solution becomes pH neutral.

I will fill a burette with 0. 1M HCl. I will put the indigestion tablet solution in the conical flask, as that is the solution which I want to know something about. I will keep adding HCl to the solution until the solution turns from bright pink to light pink, as that would mean that the solution is neutral. Problems MistakesWhen trying out this method, I experienced quite a few problems.

Firstly, it seemed like the phenolphthalein didn’t suit my experiment. There was a weak base to strong acid reaction taking place and therefore

phenolphthalein did not work. Methyl orange covers the neutralisation point and is therefore more useful. Methyl orange is yellow if pH is above 4 and red at pH below 4. Phenolphthalein would be more useful if we had a strong base and a weak acid, as it is colourless below pH 8 and red above pH 9.

6. In my final method, I will therefore use methyl orange instead of phenolphthalein. Secondly, I noticed that 1g. of powder was simply too much. Even after adding a full burette (50 cm3) of HCl, the solution would not change colour.

I decided that if I reduced the amount of powder added to the water, I would dilute the solution, thus making it take less HCl to neutralise it. If I'd reduce the amount of powder added to the water with all samples and all tablets, the results would remain the same. Also, after weighing the powder and putting it into the water, some powder would remain in the plastic cup. Even though this is only a very small amount, the experiment would be more precise if I could get this into the water. To do this, I will measure another 10 cm3 – using an accurate pipette – which I will use to rinse the plastic cup. The water will " pick up" all bits of powder left in the plastic cup.

I must add 10 cm3 on top of the 25 cm3 in every sample, to make this a fair experiment.