Alqalam Journal of Medical and Applied Sciences. 2026;9(11):3687-3692
https://doi.org/10.54361/ajmas.261119

Original article

Determination of the Acid-Neutralizing Capacity of Different Antacid Tablet Samples Available on the Libyan Market in Ajdabiya Using Complementary Analytical Techniques

Rebh Othman[1]*, Saud Omar[2]

[1]*Department of Chemistry, Faculty of Sciences, University of Ajdabia, Libya*
[2]*Department of Chemistry, Faculty of Science, Omar Al-Mukhtar University, El-Bieda, Libya*
Email. *rebh.alfakhri@uoa.edu.ly*

Abstract
Antacid preparations are widely used to manage the symptoms of gastric hyperacidity by chemically neutralising hydrochloric acid (HCl). The acid-neutralising capacity (ANC) of an antacid is an important analytical parameter because it quantitatively measures the amount of acid a defined quantity of the formulation can neutralise. However, ANC alone does not provide complete information about the physicochemical characteristics or chemical composition of a commercial pharmaceutical product. The present study therefore employed a complementary analytical approach involving acid–base back titration, pH measurement, and attenuated total reflectance Fourier-transform infrared (ATR-FTIR) spectroscopy to evaluate four commercial antacid formulations available in pharmacies in Ajdabia, Libya. The investigated products were Eno, Gaviscon, Gastavit, and Rennie. Samples were collected between November 2023 and February 2024. For ANC determination, 1.3 g of each powdered formulation was reacted with 30 mL of 1 N HCl, and the residual acid was back-titrated using 0.5 N NaOH. The measured ANC values were 8.0, 10.846, 10.769, and 19.3 mEq/g for Eno, Gaviscon, Gastavit, and Rennie, respectively. The measured final pH values were 9.26, 8.16, 8.67, and 11.25, respectively. ATR-FTIR analysis revealed absorption bands attributable to hydroxyl, C–O, C–H, and carbonyl-containing functional groups, with additional bands observed for C–N and $C–H_2$/$C–H_3$ groups in selected formulations. The results demonstrate substantial differences in acid-neutralising capacity among the examined products despite their common therapeutic purpose. The findings also demonstrate the value of combining titrimetric analysis with pH and spectroscopic characterisation when evaluating commercial antacid formulations.
Keywords. Antacid; Acid-Neutralising Capacity; Back Titration; pH; ATR-FTIR; Hydrochloric Acid; Ajdabia; Libya.

Introduction

Gastric secretion is a continuous physiological process that produces a complex fluid containing water, electrolytes, hydrochloric acid, digestive enzymes, and intrinsic factor. In healthy adults, the daily volume of gastric juice may range from approximately 1.5 to 2.5 L [1]. Excessive gastric acidity can produce symptoms requiring clinical or pharmacological management. Antacids are among the commonly used over-the-counter (OTC) medications for the management of gastric acidity [2]. Their therapeutic action is principally based on acid–base reactions between alkaline active ingredients and hydrochloric acid (HCl).

Commercial antacid formulations may contain compounds such as calcium carbonate, magnesium carbonate, magnesium hydroxide, aluminium hydroxide, sodium bicarbonate, and sodium carbonate that neutralise excess HCl via an acid base reaction [3]. The chemical reactions between these compounds and HCl result in the consumption of hydrogen ions and formation of salts and, for carbonate and bicarbonate compounds, carbon dioxide. The acid-neutralising capacity (ANC) is therefore an important parameter in evaluating antacid formulations. It represents the quantity of acid neutralised by a specified amount of an antacid under defined experimental conditions. The United States regulatory framework specifies a minimum ANC of 5milliequivalents per dose for OTC antacid products [4]. The United States Pharmacopoeia (USP) procedure is based on a potentiometric back-titration approach in which a known excess of hydrochloric acid is added to the sample, followed by titration of residual acid with sodium hydroxide to a fixed endpoint of pH 3.5 using a calibrated pH meter. While analytically robust, there are restrictions in its routine application in laboratories within low-resource settings [5]. The principal chemical reactions involved in the neutralisation process can be represented as follows:

Aluminium hydroxide

$Al(OH)_3(s) + 3HCl(aq) \rightarrow AlCl_3(aq) + 3H_2O(l)$

Calcium carbonate

$CaCO_3(s) + 2HCl(aq) \rightarrow CaCl_2(aq) + H_2O(l) + CO_2(g)$

Magnesium carbonate

$MgCO_3(s) + 2HCl(aq) \rightarrow MgCl_2(aq) + H_2O(l) + CO_2(g)$

Magnesium hydroxide

$Mg(OH)_2(s) + 2HCl(aq) \rightarrow MgCl_2(aq) + 2H_2O(l)$

Copyright *Author (s) 2026. Distributed under Creative Commons CC BY 4.0*
Received*: 02-09-2026 -* ***Accepted****: 01-11-2026 -* ***Published****: 10-11-2026*

Sodium carbonate

$Na_2CO_3(aq) + 2HCl(aq) \rightarrow 2NaCl(aq) + H_2O(l) + CO_2(g)$

Sodium bicarbonate

$NaHCO_3(aq) + HCl(aq) \rightarrow NaCl(aq) + H_2O(l) + CO_2(g)$

The stoichiometry of these reactions demonstrates why the identity and concentration of active ingredients can strongly influence ANC. Formulations containing different combinations of alkaline compounds may consequently display markedly different neutralisation capacities. Therefore, this study aimed to evaluate the ANC in different antacid tablet samples available in the city of Ajdabia, Libyan market.

Related Work

Larger-scale surveys on antacids were conducted in Morocco on twelve commercial brands (Yafout et al., 2022 and across several antacid brand ranges in Nigeria [4-6]. On nine liquid suspensions in Ghana [1], in the first study from the Gaza Strip in Palestine [7], and in Bangladesh [8], all the aforementioned studies have consistently shown that combined aluminum/magnesium hydroxide formulations tend to exhibit higher acid-neutralising capacity than single-ingredient products, with notable performance differences between dosage forms (tablets versus liquid suspensions). In parallel, other studies have explored alternative or complementary sources, such as calcium carbonate isolated from eggshells [9], which met Indonesian pharmacopeial specifications, or pharmaceutically formulated polyherbal chewable tablets in India [2], which outperformed some commercial products. Conversely, a study conducted in Iraq by [10] demonstrated that raw herbal infusions, such as ginger and chamomile, failed to meet the minimum requisite acid-neutralising capacity. These findings suggest that herbal efficacy is heavily contingent upon standardised concentration and pharmaceutical processing, rather than direct consumption in raw form. Similarly, a comparative analysis in India [11] between commercial antacids and traditional home remedies found the former to be significantly superior in neutralising performance. The therapeutic effectiveness of the aforementioned formulation is largely determined by its acid-neutralising capacity (ANC), a parameter the US Food and Drug Administration (FDA) requires to be at least 5 milliequivalents (mEq) per dose for a product to be considered effective [12]. These substances intervene by chemically neutralising excess hydrochloric acid within the stomach (Ali N. Wannas et al., 2026). There are several studies worldwide on the estimation of acid neutralisation capacity of antacid formulations.

For illustration, in 2022, Garg and co- authors assessed several commercial antacid tablets using analytical methods such as back titration and PH measurement; it was found that there were considerable differences in their acid-neutralising capacities, indicating that the neutralising performance varies among formulations [12]. Back titration remains the predominant technique for quantifying acid-neutralising capacity (ANC) across the literature, primarily due to its procedural simplicity, cost-effectiveness, and minimal reliance on specialised instrumentation. A comprehensive methodological review by Yulian et al. (2023) corroborated this utility, detailing its applications in quality control, research and development and dosage determination; However, the authors explicitly noted that the method is constrained by low accuracy and poor selectivity. The reviewed literature in the present study indicates that formulations containing combinations of aluminium and magnesium compounds can exhibit substantial neutralising capacity, while differences have also been observed between solid and liquid preparations. Other investigations have examined alternative antacid materials, including calcium carbonate obtained from eggshells and pharmaceutical polyherbal formulations. These aforementioned studies demonstrate the broader interest in identifying and evaluating substances capable of neutralising gastric acid.

Back titration remains particularly useful for antacid analysis because some alkaline components have limited water solubility and may react relatively slowly with hydrochloric acid. In the present experimental procedure, an excess of standardised HCl was added to the powdered antacid to react, and the remaining acid was subsequently titrated with standardised NaOH using phenolphthalein as an indicator. Although back titration provides a quantitative measure of acid consumption, it represents a static laboratory measurement and does not reproduce all physiological conditions of the gastrointestinal tract. Consequently, complementary measurements can provide additional information about the physicochemical behaviour and chemical composition of the formulation. The present study therefore combines ANC determination with pH measurement and ATR-FTIR spectroscopy. The study was conducted on four commercially available antacid products obtained from pharmacies in Ajdabia, Libya. The products were selected from different manufacturers and countries of manufacture and were analysed using complementary analytical techniques.

Methods

Study Design and Sample Collection

Four commercial antacid products—Eno, Gaviscon, Gastavit, and Rennie—were obtained from pharmacies in Ajdabia, Libya, between November 2023 and February 2024. The products were obtained in their original packages and were reported to be in suitable condition, without visible package damage or contamination. High-purity chemicals and deionised water were used during the laboratory procedures. The reported product compositions are summarised in

Copyright *Author (s) 2026. Distributed under Creative Commons CC BY 4.0*
Received*: 02-09-2026 -* ***Accepted****: 01-11-2026 -* ***Published****: 10-11-2026*

(Table 1).

Table 1. Commercial antacid products examined in the study

Product	Reported manufacturer / country	Reported composition
Rennie	France / Delpharm	Calcium carbonate 680 mg; magnesium carbonate 80 mg
Gastavit	Italy / SLLT S.R.L.	Sodium alginate 200 mg; sodium bicarbonate 200 mg; calcium carbonate 140 mg; alginic acid 50 mg
Eno	India / Haleon	Sodium bicarbonate 229 mg; anhydrous sodium carbonate 500 mg; citric acid 216 mg
Gaviscon	USA / Asin	Sodium alginate 500 mg; sodium hydrogen carbonate 267 mg; calcium carbonate 160 mg

Preparation of standard solutions

Hydrochloric acid was prepared at a nominal concentration of 1 N using the dilution relationship:

$$N_1V_1 = N_2V_2$$

The supplied experimental record calculated the concentrated HCl stock solution as approximately 12 N and used approximately 83 mL of the concentrated acid to prepare 1 L of 1 N HCl. Sodium hydroxide was prepared as a nominal 0.5 N solution.

Sample preparation and back titration

Each antacid tablet was crushed using a mortar and pestle. A 1.3-g portion of the powdered sample was transferred into a reaction vessel, followed by 30 mL of 1 N HCl. The mixture was thoroughly stirred and heated briefly to facilitate reaction between the antacid constituents and hydrochloric acid. The experimental procedure was designed as a back titration because some antacid components have limited water solubility and may react relatively slowly with HCl. After reaction, the excess HCl remaining in the mixture was titrated with 0.5 N NaOH using phenolphthalein as the indicator. The endpoint was identified by the change from a colourless solution to a pink solution. Three replicate titrations were performed for each product. The amount of HCl consumed by the antacid was calculated from the difference between the initial amount of HCl added and the amount of residual HCl determined by back titration:

$$n_{\text{HCl, reacted}} = n_{\text{HCl, initial}} - n_{\text{HCl, residual}}$$

where:

$$n_{\text{HCl,initial}} = N_{\text{HCl}}V_{\text{HCl}}$$

and

$$n_{\text{HCl,residual}} = N_{\text{NaOH}}V_{\text{NaOH}}$$

The resulting ANC was expressed as milliequivalents of HCl neutralised per gram of antacid.

ATR-FTIR analysis

Chemical characterisation was performed using attenuated total reflectance Fourier-transform infrared spectroscopy (ATR-FTIR). The measurements were performed using a Bruker VERTEX 80 spectrometer equipped with a Platinum Diamond ATR accessory. The instrument operated over the range 4000–400 cm^{-1} at a resolution of 4 cm^{-1}. The FTIR spectra were interpreted in terms of characteristic absorption bands associated with functional groups present in the commercial formulations.

pH measurement

The pH of the antacid preparations was measured using a calibrated pH meter. In addition to the initial pH measurements, changes in pH were monitored following incremental addition of acid for the investigated samples. Triplicate measurements were recorded at the specified volumes.

Results

Acid-neutralising capacity

The experimental ANC values obtained from the back-titration procedure are presented in Table 2. The measured ANC values ranged from 8.0 to 19.3 mEq/g. Eno produced the lowest measured ANC, whereas Rennie produced the highest. Gaviscon and Gastavit produced slightly different ANC of 10.846 mEq/g and 10.769 respectively. The difference between the lowest and highest measured values was 11.3 mEq/g, indicating considerable variation in the quantity of HCl neutralised per gram of formulation. Expressed relative to the Eno value, the measured ANC of Rennie was approximately 2.4 times higher. The replicate titration measurements were generally close to their corresponding means. The supplied statistical summary reported final calculated HCl-equivalent values of 0.292, 0.396, 0.842, and 0.703 g HCl/g antacid for Eno, Gaviscon, Gastavit, and Rennie, respectively, with an overall mean of 0.558 g HCl/g and a

Copyright *Author (s) 2026. Distributed under Creative Commons CC BY 4.0*
Received*: 02-09-2026 -* ***Accepted****: 01-11-2026 -* ***Published****: 10-11-2026*

standard deviation of 0.2575 g HCl/g.

Comparison of ANC among formulations

The observed differences in ANC are consistent with differences in the reported active compositions of the products. Rennie contains calcium carbonate and magnesium carbonate, both of which are carbonate-based acid-neutralising agents. Each mole of carbonate can consume two equivalents of HCl under complete reaction conditions. The reported composition of Rennie therefore provides a chemically plausible basis for substantial acid consumption. Gaviscon and Gastavit both contain bicarbonate and calcium carbonate in combination with alginate-based components. Their measured ANC was almost identical with slight difference of 0.077mEq/g in the present study. Eno contains sodium bicarbonate and anhydrous sodium carbonate together with citric acid. Its measured ANC was 8.0 mEq/g. The presence of citric acid in the formulation is relevant when interpreting the overall acid–base behaviour because it can participate in internal acid–base reactions with carbonate and bicarbonate components. The results therefore indicate that nominal classification as an "antacid" does not imply identical neutralisation behaviour. Instead, the measured ANC reflects the composition and relative quantities of the chemically active components, as well as their reaction under the experimental conditions (Table 2).

Table 2. Acid-neutralising capacity of the investigated antacid products

Antacid	ANC (mEq/g antacid)
Eno	8.000
Gaviscon	10.846
Gastavit	10.769
Rennie	19.300

pH characteristics

The initial pH values varied among the four formulations are presented in Table 3, ranging from 0.26 for Gastavit to 1.55 for Rennie. Rennie recorded the highest initial pH (1.55), followed by Gaviscon (1.39), Eno (1.35), and Gastavit (0.26). Gastavit, with a pH of 0.26, exhibited the most acidic condition, whereas Rennie, with a pH of 1.55, exhibited the least acidic condition among the four formulations. These results indicate that all four preparations were strongly acidic at the initial measurement stage. A product can have a high initial pH without necessarily possessing the greatest total acid-neutralising capacity, because pH reflects hydrogen-ion activity at a particular state, whereas ANC reflects the cumulative amount of acid consumed under specified conditions. The pH titration profiles further demonstrated progressive changes following acid addition. The final pH values showed considerable variation among the formulations. Rennie recorded the highest final pH of 11.25, followed by Eno at 9.26, Gastavit at 8.67, and Gaviscon at 8.16. The final pH values of all four formulations exceeded 7, indicating that the antacids were alkaline at the end of the recorded measurements. The increase in pH indicates a shift from strongly acidic to alkaline conditions during the experimental procedure. Rennie's larger pH increase suggests that its mixture underwent the greatest change in measured pH, whereas Gaviscon exhibited the smallest change. Rennie exhibited the highest final pH (11.25), indicating the most alkaline final condition among the tested formulations. This result suggests that Rennie reached a more alkaline state than the other antacids. However, a greater change in pH does not necessarily correspond to a greater quantity of acid neutralised. Because pH is a logarithmic measure of hydrogen-ion activity, changes in pH cannot be interpreted as directly proportional to the quantity of acid consumed. Thus, these observed profiles of the selected antacids demonstrate that acid–base behaviour is dynamic and cannot be adequately represented by a single initial pH measurement.

Table 3. Initial pH values of the investigated antacids and final PH

Antacid	Initial pH	Final pH	Change in pH
Eno	1.35	9.26	+7.91
Gaviscon	1.39	8.16	+6.77
Gastavit	0.26	8.67	+8.41
Rennie	1.55	11.25	+9.70

Note: Change in pH was calculated as final minus initial pH

ATR-FTIR characterisation

ATR-FTIR measurements provided evidence of several functional groups within the commercial formulations. The principal absorption bands reported in the study are summarised in Table 4. The broad OH absorption occurred in the region 3292.13–3340.70 cm^{-1}. The supplied interpretation associated these absorptions with hydroxyl-containing structures and reported the relative absorption strength as Rennie > Gaviscon > Gastavit > Eno. C–O absorption bands were reported across approximately 1031–1419 cm^{-1}, while carbonyl-associated absorption was reported in the region 1540.51–1731.20 cm^{-1}. C–H absorption was reported principally within the 2850.88–2922.08 cm^{-1} region. Additional absorption features were reported for C–H_2/C–H_3 groups in Eno at approximately 1388.85 cm^{-1} and for C–N in Rennie at approximately 1051.31 cm^{-1}. A C–H_2 feature at approximately 1414.76 cm^{-1} was also reported for Rennie (Table 4).

Copyright *Author (s) 2026. Distributed under Creative Commons CC BY 4.0*
Received: *02-09-2026 -* ***Accepted:*** *01-11-2026 -* ***Published:*** *10-11-2026*

Table 4. Principal FTIR absorption bands reported for the antacid formulations

Functional groups	Eno	Gastavit	Gaviscon	Rennie
OH	3292.13	3306.96	3316.33	3340.7
C-O	1076.6-1267.88	1250-1419.67	1031.37	1186.18
C-H	-	2922.08	2889.88	2850.88-
				2919.2
C=O	1567.22	1540.51-	1648.22-1731.2	1548.88-
		1631.81		1633.05
C-H_2 or C-H_{3s}	1388.85	-	-	-
C-N	-	-	-	1051.31
CH2 m	-	-	-	1414.76

Discussion

The present study demonstrates substantial differences in the acid-neutralising capacities of four commercial antacid formulations available in Ajdabia, Libya. The measured ANC values ranged from 8.0 to 19.3 mEq/g, with Rennie showing the highest measured value, Eno the lowest, and Gaviscon and Gastavit yielding slightly different measured value ANC of 10.846 mEq/g and 10.769mEq/g. The variation is chemically meaningful because the formulations contain different active ingredients. Rennie contains calcium carbonate and magnesium carbonate, whereas Gaviscon and Gastavit contain combinations involving bicarbonate, calcium carbonate, and alginate-based components. Eno contains sodium bicarbonate and sodium carbonate together with citric acid. The relatively high ANC measured for Rennie is consistent with the presence of two carbonate-based neutralising agents.

Calcium carbonate and magnesium carbonate each have a theoretical capacity to consume two equivalents of HCl per mole. The result therefore illustrates the importance of considering the chemical identity and amount of active neutralising substances when interpreting experimental ANC. The equal ANC values measured for Gaviscon and Gastavit are also noteworthy. Although the products have different reported formulations, both contain sodium bicarbonate and calcium carbonate. The identical measured ANC does not imply identical chemical composition or identical physiological behaviour; rather, it indicates that, under the conditions of the present titration, the two formulations consumed equivalent amounts of HCl per gram of sample. The pH results provide an additional perspective.

Rennie had the highest initial pH at 11.25, while Gaviscon had the lowest at 8.16. Eno and Gastavit had intermediate initial values of 9.26 and 8.67, respectively. The relatively high initial pH of Rennie corresponds with its high measured ANC, but the relationship between pH and ANC should not be treated as direct or interchangeable. pH describes the instantaneous acid–base state of the sample, whereas ANC describes the quantity of acid consumed during the analytical reaction. The titration profiles further demonstrate why a single pH measurement cannot substitute for ANC determination. The samples exhibited changing pH values as acid was progressively introduced, indicating differences in buffering and neutralization behavior. For example, the Rennie profile showed a pronounced increase in pH during the titration sequence, while the other formulations exhibited their own characteristic changes.

The FTIR results complement the titration and pH findings by providing information about the chemical characteristics of the formulations. The presence of O–H, C–O, C–H, and C=O absorption bands across the samples indicates that the commercial preparations contain multiple chemical constituents rather than a single active substance. The FTIR findings are particularly valuable because the commercial products differ considerably in composition. For example, alginate-containing formulations such as Gaviscon and Gastavit can produce absorption features associated with oxygen-containing organic structures, while carbonate and bicarbonate components contribute characteristic inorganic vibrational features. The observed spectra should therefore be interpreted as profiles of the complete pharmaceutical formulations rather than as direct measurements of ANC.

The combined findings demonstrate the complementary nature of the three analytical approaches. Back titration quantitatively measures acid consumption; pH measurements describe acid–base behaviour at specific experimental points; and ATR-FTIR provides information about functional groups and chemical composition. No single technique alone provides all of these forms of information. The study also illustrates the usefulness of relatively accessible analytical methods for comparative pharmaceutical evaluation. Back titration requires standard acid and base solutions, volumetric glassware, and an appropriate endpoint detection procedure, while pH measurement requires a calibrated pH meter. FTIR provides additional chemical characterisation where spectroscopic facilities are available. The combination is therefore potentially useful for laboratory-based screening and comparative assessment of commercial antacid formulations.

Conclusion

The present study provides a comparative analytical assessment of four commercial antacid formulations—Eno, Gaviscon, Gastavit, and Rennie—available in Ajdabia, Libya. The investigation combined acid–base back titration, pH measurement, and ATR-FTIR spectroscopy to evaluate the formulations from complementary analytical perspectives. The measured ANC values were 8.0 mEq/g for Eno, 10.846 mEq/g for Gaviscon, 10.769 mEq/g for Gastavit, and 19.3

Copyright *Author (s) 2026. Distributed under Creative Commons CC BY 4.0*
Received*: 02-09-2026 -* ***Accepted****: 01-11-2026 -* ***Published****: 10-11-2026*

mEq/g for Rennie. Thus, considerable differences were observed among products marketed for the same general therapeutic purpose. The initial pH values were 9.26, 8.16, 8.67, and 11.25, respectively, demonstrating alkaline characteristics across all four preparations. ATR-FTIR analysis identified characteristic absorption bands associated with hydroxyl, C–O, C–H, and carbonyl-containing groups, with additional bands assigned to C–N and C–H_2/C–H_3 groups in selected products. These results provide complementary evidence concerning the chemical characteristics of the formulations. Overall, the findings demonstrate that ANC, pH, and FTIR provide different but complementary types of analytical information. ANC quantifies acid consumption, pH characterises the acid–base state and its change during titration, and FTIR provides chemical-functional-group information. Their combined application therefore offers a broader characterisation of commercial antacid formulations than reliance on ANC alone.

Limitation of the study

The findings of this study should be interpreted within the limitations of the experimental design. The investigation included four products obtained from pharmacies in one city and therefore does not establish the quality of all products marketed in Libya. In addition, the reported ANC values are normalised to sample mass (mEq/g), whereas regulatory requirements may be expressed per labelled dose. Consequently, direct comparison with a regulatory dose-based specification requires conversion using the manufacturer's labelled dose and should not be made solely from the mEq/g values. The study also used phenolphthalein for endpoint detection in the back titration. Although this provides a practical visual endpoint, potentiometric determination can offer more objective endpoint detection when standardised pharmacopeial procedures are being followed. Therefore, the results are best interpreted as an experimental comparative assessment under the stated laboratory conditions rather than as a substitute for formal regulatory quality-control testing.

Future direction

The results reported in this study provide baseline comparative information for the selected commercial products available in Ajdabia, Libya. Further studies involving larger numbers of brands, multiple batches, labelled-dose normalisation, validated pharmacopeial procedures, and statistical comparison among replicate batches would strengthen assessment of commercial antacid quality and consistency.

Conflict of interest. Nil

References

1. Ayensu I, Bekoe SO, Adu JK, Brobbey AA, Appiah E. Evaluation of acid neutralizing and buffering capacities of selected antacids in Ghana. Sci Afr. 2020 Jul;8:e00347. doi: 10.1016/j.sciaf.2020.e00347.
2. Mankar SD, Musale P, Bhawar SB, Siddheshwar SS, Dighe SB. Exploring the synergistic effect in polyherbal chewable antacid tablets: Formulation and evaluation study. Curr Issues Pharm Med Sci. 2024 Sep;37(3):153–61. doi: 10.2478/cipms-2024-0025.
3. Shivani, Kumar C, Redhu R, Jangra K, Lather A. Development and evaluation of a Cassia tora-based herbal antacid suspension. J Appl Pharm Res. 2026 May;14(3):417–26. doi: 10.69857/joapr.v14i3.1870.
4. Ezeala IC, Nnadi CO, Onyeji CO. Post-market monitoring of efficacies and determination of acid-neutralizing capacity of some antacid formulations in Nigeria. Trop J Pharm Res. 2024 Nov;23(11):1301. doi: 10.4314/tjpr.v23i11.X.
5. Aghayere GE, Oriere OD, Akpovwobaa G. Comparative analysis of titrimetric and potentiometric method for the determination of antacid neutralizing capacity of antacids suspensions. J Appl Sci Environ Manag. 2025 Dec;836–41. doi: 10.4314/jasem.v29i11.59.
6. Alalor CA, Avbunudiogba JA, Builders FP, Okpara LO. Evaluation of the acid neutralizing capacity of some commercially available brands of antacid tablets in Nigeria. East Afr Sch J Med Sci. 2019 Jan;2(2019):12–6. Available from: http://www.easpublisher.com/easjms/
7. Ramadan M, Turk S. Assessment of the acid neutralizing capacity and other properties of antacid formulations marketed in the Gaza Strip. Israa Univ J Appl Sci. 2023 Apr;6(2):97–110. doi: 10.52865/qchr1551.
8. Jakaria M, et al. Comparative study among the different formulation of antacid tablets by using acid-base neutralization reaction. Glob J Pharmacol. 2015;9(3):278–81. doi: 10.5829/idosi.gjp.2015.9.3.95226.
9. Supriadi D, Milanda T, Anis YC, Muctaridi, Abdassah M. Calcium carbonate isolation from eggshell to meet pharmacopoeial standards and its effectiveness as an antacids. Int J Appl Pharm. 2023 Sep;15(5):204–9. doi: 10.22159/ijap.2023v15i5.48045.
10. Wannas AN, Al-Shaibani AJN, Obayes SK, Wennas ON. Comparative in vitro evaluation of marketed antacids and natural remedies in Iraq. J Chem Lett. 2026 Dec;7(1):102–10. doi: 10.22034/jchemlett.2026.579747.1393.
11. J.O D, Rasheed FM. Evaluation of the effectiveness of acid-neutralizing property of traditional antacids commonly used in India. J Sci Res. 2021;65(04):93–8. doi: 10.37398/jsr.2021.650416.
12. Garg V, Narang P, Taneja R. Antacids revisited: review on contemporary facts and relevance for self-management. SAGE Publications Ltd; 2022 Mar. doi: 10.1177/03000605221086457.

Copyright *Author (s) 2026. Distributed under Creative Commons CC BY 4.0*
Received*: 02-09-2026 -* ***Accepted****: 01-11-2026 -* ***Published****: 10-11-2026*