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Editorial

Milk as an Antacid in the Human System

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The stomach, a vital component of the human digestive system, produces hydrochloric acid, an essential element in the chemical breakdown of food. However, the acid produced continuously challenges the acid-base neutrality in the digestive tract, which the robust digestive system typically maintains. Unfortunately, modern times have led to a stressful lifestyle and an erratic diet, which has made people more prone to ailments that can disrupt the balance of H^+ concentration in the body. Excessive or uncontrolled acid secretion can cause a problematic condition known as hyperacidity or heartburn, affecting 10-20% of the global population and potentially leading to severe complications like peptic ulcers, esophagitis, and Barrett's esophagus. The most commonly used agents for controlling hyperacidity are pharmaceutical antacids.

Pharmaceutical antacids may provide quick relief (< 5 min) for heartburn. They are made from weak bases and do not prevent acid overproduction. Instead, they neutralize excess acid and raise the pH level of gastric contents in the stomach. However, some antacid agents can be harsh and cause side effects, including constipation, diarrhea, formation of hard or black stools, and even Aluminium containing antacids can cause serious health conditions like aluminum intoxication, osteomalacia and hypophosphatemia [2]. It is advisable to abstain from the usage of antacids that comprise of sodium bicarbonate during pregnancy. This is due to the potential risk of alkalosis and fluid overload [7]. High levels of calcium-containing antacids have been linked to kidney stones and constipation. Furthermore, long-term use of antacids may result in alkalosis, arterial hypertension, heart failure, vomiting, and renal disease [3]. Therefore, it is essential to use pharmaceutical antacids cautiously and only under medical supervision. Milk-based antacids have gained significant attention, particularly in light of recent developments that have seen several pharmaceutical antacids removed from the National List of Essential Medicines (NLEM) released on 13 September, 2022.

Milk's ability to resist changes in pH, also known as its buffering capacity, is a highly significant property that plays a pivotal role in preventing acidification or alkalization. The exceptional buffering capacity of milk makes it an optimal treatment for non-ulcer dyspepsia, a condition that is characterized by hyperacidity [6]. Milk serves as an excellent buffer system, mainly due to the contributions of proteins, soluble phosphates, citrate, colloidal calcium phosphate, bicarbonate, etc. The constituents of rennet whey and casein contributed 20.9%, 46.4%, and 32.7% respectively to the total buffering capacity of cow milk [5]. Milk salts were found to contribute approximately 37% of the total buffering capacity of cow milk [10].

A scientific study on human subjects to elucidate the impact of milk and meals on gastric pH in humans revealed that following ingestion, there was a marked escalation in gastric pH from a basal level of pH 1.5 to a zenith of pH 7.1. Intriguingly, this pH level was sustained above 3.5 for 43 ± 22 minutes and remained elevated above the basal level (pH 1.5) for 61 ± 20 minutes [4]. Another human study to evaluate the efficacy of incorporating whole mare and camel milks into the diets of peptic ulcer patients was carried out by Sharmanov., *et al*. [9]. The findings were striking, demonstrating complete healing and a decline in ulcer size in 93%, 90%, and 70% of the patients who received mare, camel, and cow milk, respectively. The researchers concluded that mare and camel milk possess superior antacid properties than cow milk.

The initial documentation of the utilization of milk proteins for antacid purposes was brought forth by Paterson., *et al*. [8], who obtained a patent for an innovative aluminum caseinate preparation as a new antacid substance. Another patent secured by Weinstein [13] pertained to the development of a nutritive antacid composition consisting of casein, lactalbumin, and a mixture of both, combined with selected antacid reagents such as calcium carbon-

ate and aluminum hydroxide. The product was formulated using lactalbumin, casein, or a blend of both. A patented process has been developed by Voelter and Lippert [12] for extracting "relaxin" from fresh cow milk and regular "decaseinated" milk powder. According to their claims, the resulting precipitate, which contains relaxin, can be utilized as a pharmaceutically active substance or as an antacid to alleviate gastric and intestinal disorders. Beekman and Vogel [1] innovated novel gastric antacids comprising of aluminum hydroxide combined with nonfat milk, milk protein concentrate, whole milk, egg albumin, lactalbumin, gelatin, and a soy milk product. Thesiya., *et al*. [11] have recently been awarded a patent for their milk protein-based antacid tablets. These chewable tablets are primarily composed of rennet casein and whey protein concentrate, obtained through a specially designed ingredient optimization process to ensure an acceptable sensory profile in terms of taste and texture/chewability. The development of such tablets holds promise for their potential nutritive as well as therapeutic properties.

Bibliography

1. Beekman SM and Vogel CH. "Preparation and properties of new gastric antacids II. Aluminum hydroxide-protein dried gels". *Journal of the American Pharmaceutical Association* 49 (1960): 201-204.

2. Cooke NS., *et al.* "Antacid-induced osteomalacia and nephrolithiasis". *Archives of internal medicine* 138 (1978): 1007-1009.

3. Gabriely I., *et al*. "Clinical problem-solving, back to basic". *The New England Journal of Medicine* 358 (2008): 1952-1956.

4. Isal JP., *et al*. "Effect of milk and of meals on gastric pH in human subjects, comparison with an antacid". *Cahiers de Nutrition et de Dietetique* 16 (1981): 125-128.

5. Lucey JA., *et al.* "The acid base buffering properties of milk". *Milchwiss* 48 (1993): 268-272.

6. Lutchman D., *et al.* "Evaluation of the buffering capacity of powdered cow's, goat's and soy milk and non-prescription antacids in the treatment of non-ulcer dyspepsia". *South African Medical Journal* 96 (2006): 57-61.

7. Mahadevan U. "Gastrointestinal medications in pregnancy". *Best Practice and Research in Clinical Gastroenterology* 21 (2007): 849-877.

8. Paterson LO. "Process of preparation of Aluminum caseinate". *Patent No: US 2721861* (1951).

9. Sharmanov TSh., *et al.* "Efficacy of managing peptic ulcer patients with diets including whole mare's and camel's milk". *Voprosy Pitaniya* 3 (1981): 10-14.

10. Shugailo NM and Alekseev NG. "The buffer system of cows' milk and human milk". *Tekhnologiya novykh Produktov Dlya Detskogo I Lechebnogo Pitaniya* (1983): 69-71.

11. Thesiya AJ., *et al.* "A milk-protein based nutritive antacid and a process for its preparation". *Patent No.: 402839* (2022).

12. Voelter W and Lippert T. "Process of preparing relaxin from milk". *Patent No: US4624804* (1986).

13. Weinstein BR. "Nutrient antacid composition and method of making the same". *Patent No: US 2940897* (1956).