INTERNATIONAL SEVEN JOURNAL
OF HEALTH RESEARCH
ISSN: 2764-9415

# Cow's milk as an inflammatory factor, an exploratory study on the social network Instagram

**DOI: 10.56238/isevjhv2n6-004**
Receipt of originals: 20/11/2023
Publication acceptance: 12/06/2023

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## ABSTRACT

Introduction: Cow's milk is a source of nutrients, including water, protein, carbohydrate, fat, vitamins, minerals, and enzymes. However, it has been the target of criticism that raises doubts about its impacts on human health, with the association of cow's milk consumption with inflammatory processes. Objective: To map and analyze information about cow's milk as a pro-inflammatory factor disseminated by health professionals on the social network of the Instagram® platform. Method: an exploratory study was carried out from 07/03/2023 to 11/03/2023 on the social network Instagram®. Brazilian profiles in the health area were selected, such as physicians, nutritionists, physiotherapists, psychologists, and nurses, regardless of gender, who had at least one image or video publication related to milk as an inflammatory factor. The publications were analyzed in terms of communicative practice, interaction with users, content and quality of information disseminated. Results: Publications in video format showed higher engagement when compared to image publications. Among the opinions on cow's milk, 9 profiles suggested an association with inflammation and a negative impact on health, while 11 profiles support its consumption. 60% of the publications analyzed did not present scientific articles to support their

views. Conclusion: The social network Instagram® has proven to be an important strategy for the dissemination of content related to health and citizen participation. However, it is necessary to consider the limits and challenges of its use, especially the propagation of information without scientific basis.

**Keywords**: Diet, Food and nutrition, Cow's milk, Inflammation, Social media.

## 1 INTRODUÇÃO

Milk is a liquid produced by the mammary glands of female mammals, which is used to feed their young. The amount of each component of milk can vary according to the species and the living conditions of the animal. Each species of mammal has milk adequate for the needs of its offspring in the first months of life, providing the necessary nutrients for its growth and development (WHO; PAHO, 2022; Walstra *et al.*, 1986;). Cow's milk (VL) is a source composed of nutrients, including water, protein, carbohydrate, fat, vitamins, minerals, and enzymes (Embrapa, 2022; Mendes, 2016).

VL encompasses 20 proteins including K-lactalbumin, K-lactoglobulin, bovine serum albumin, bovine immunoglobulins, and caseins (Ferreira *et al.*, 2016). LV proteins have a high biological value and are an excellent source of essential amino acids indispensable for the body, namely: leucine, histidine, isoleucine, lysine, methionine, phenylalanine, threonine, tryptophan, and valine. The carbohydrate present is lactose, a disaccharide that undergoes transformation into glucose and galactose by digestion, and contributes around 30% of the total caloric value of milk. Milk fat is one of the richest components of this food, representing 46% to 53% of the total energy value and is easily digestible (Tombini *et al*., 2012). Additionally, milk is recognized for its high calcium content, playing a key role in preventing osteoporosis and promoting bone health (Embrapa, 2022; Mendes, 2016).

Brazil is considered one of the world's largest producers of LV. However, this product has been the target of criticism that raises doubts about its impacts on human health, with the association of VL consumption with inflammatory processes (Embrapa, 2022). Inflammation is an essential process of the innate immune system, crucial for triggering physiological responses such as tissue repair and the elimination of pathogens. However, the excess of inflammatory process can lead to tissue damage (Salajegheh, 2016). The uncertainty about whether or not cow's milk is inflammatory has generated confusion among the population regarding its value as a food. For this reason, recent scientific studies are dedicated to exploring aspects of milk composition

and its relevance to human health, ranging from the fat fractions, proteins, and lactic acid bacteria, to the mineral compounds and functional properties of this food (Embrapa, 2022).

According to the Consensus of the Brazilian Association of Nutrology (ABRAN) and the Brazilian Society of Food and Nutrition (SBAN), there is, so far, no scientific evidence that justifies classifying milk and its derivatives as inflammatory foods. On the contrary, studies indicate that consumption of low-fat dairy products may have a positive impact on reducing inflammatory biomarkers in adults by (ABRAN; SBAN, 2023).

However, it is important to highlight that in individuals with a predisposition to allergy or intolerance to milk components, the consumption of this food can trigger immune responses, largely related to its proteins. These reactions are known as food allergies, since milk proteins have physicochemical characteristics that can be compared to antigens (Barbosa *et al.*, 2019).

Among these antigens, the most common involves immunoglobulin E (IgE). IgE-mediated responses are frequent and can occur rapidly, often within minutes to up to 2 hours after ingestion of small amounts of VL. These reactions may result in worsening of respiratory symptoms, with increased mucus production and, in some cases, trigger asthma attacks, especially in individuals who have cow's milk protein allergy (CMPA) (ABRAN; SBAN, 2023).

Another physicochemical characteristic often questioned and widely disseminated on the internet is the supposed relationship between casein protein and inflammation, which may be associated with its absorption through the intestinal villi. In the intestinal environment, casein breaks down into its constituent proteins, namely α-casein, β-casein, and κ-casein (ABRAN; SBAN, 2023). According to Seidita *et al.* (2023), lactose intolerance is the most frequent food intolerance worldwide. It is a condition in which the intake of VL and fresh dairy products causes a non-immune-mediated reaction characterized by gastrointestinal symptoms, mainly diarrhea, abdominal pain, bloating, acid regurgitation, retrosternal heartburn, nausea, dyspepsia, and to a lesser extent, extra-intestinal symptoms, especially fatigue, skin diseases, and headache.

In view of the above, the purpose of this study is to identify and map the information about cow's milk disseminated by health professionals on the social network of the Instagram® platform. The aim is to analyze the approaches of the social network profiles with scientific foundations regarding the consumption of cow's milk by human beings, analyzing the potential risks and benefits for health. Thus, we seek to understand the presence and quality of information related to cow's milk as a possible inflammatory factor, considering the source of this information and the credibility of the professionals involved in its dissemination.

## 2 METHODOLOGY

An exploratory study was carried out on Instagram® with the purpose of investigating the information disseminated on the platform about VL consumption. The study was conducted in two distinct phases. In the first stage, we established inclusion criteria for the selection of the profiles that would be analyzed in this study. These criteria included the choice of profiles of Brazilian health professionals, such as physicians, nutritionists, physiotherapists, psychologists and nurses, of both sexes, who had at least one image or video publication related to milk as an inflammatory factor. In addition, the selected profiles were Brazilian, with the main language in Portuguese and active on the platform, that is, they had at least one publication between July 2023 and the end date of data collection. These profiles were identified through those who followed the advice of health professionals or institutions linked to the Ministry of Health, such as the Federal Council of Nutritionists (CFN), Regional Council of Nutritionists (CRN), Brazilian Academy of Sciences (ABC), Brazilian Medical Association (AMB), Oswaldo Cruz Foundation (Fiocruz), Federal Council of Medicine (CFM) and the Brazilian Association of Nutrology (ABRAN). It was also verified whether the professionals had adequate licensing to work in the area.

The second stage of the study involved the mapping and characterization of profiles on the social network Instagram®. The type of publication, the approach and veracity of the content were analyzed, as well as characteristics of the communicative practice, such as the visual presentation, the number of followers, likes, comments, views and the frequency of updating the profile.

Data collection was carried out from 07/03/2023 to 11/03/2023. This collection was done independently, using an anonymous Instagram® account created in June 2023. In order to minimize possible algorithmic influences and bias, the account had no followers, did not follow other accounts, location data was not tagged, and the language used was Portuguese. To carry out the collection, a computer was used, with the location previously disabled, since Instagram® hid the number of likes of the posts when accessed by the mobile application (Fernández, 2023). After the selection of 20 profiles, they were characterized through the manual collection of the following data: username, gender, area of professional training, number of followers, date of entry on Instagram®, date of last publication, total number of publications on the initial and final date of the survey and the activity of each profile. The total number of posts was categorized according to the period before and after the last publication, between 07/03/2023 and 11/03/2023. The percentage (%) of activity of the profiles was calculated from the initial date of the survey (07/03/2023) and the final date (11/03/2023), where the number of new posts in this interval was verified to evaluate the % of activity on the Instagram® page.

Screenshots were taken of the selection of posts about cow's milk as an inflammatory factor, which were used for the qualitative analysis of the data. A database was organized using the Microsoft Excel® program, and then a descriptive analysis of the quantitative data was performed. The specific date of publication related to the topic was collected and with regard to the content related to the association of cow's milk with increased inflammation in humans in each post, the analysis considered the following approaches: identification of inflammatory markers influenced by the consumption of cow's milk; analysis of the arguments presented by the authors about this association; verification of whether the author was a duly licensed health professional; evaluation the author's position for or against the theory that cow's milk is an inflammatory food; evaluation of the author's level of influence; whether or not there was a theoretical basis to support the publication; Visual presentation (image/video). Subsequently, the posts were also evaluated for compliance (yes/no) with the guidelines of the Nutritionist's Code of Ethics and Conduct (2018).

## 3 RESULTS

After applying the inclusion criteria, 20 of the most relevant profiles were selected to be included in this study. Of the profiles analyzed, 55% are male, while female profiles represent 45% of the total. The selected profiles comprise 12 nutritionists, 5 doctors, 1 physiotherapist, 1 psychologist and 1 nurse. The number of followers ranged from 3,323 to 2,400,000, with an average of 289,340 followers.

Table 1. General characterization of the selected profiles.

| | N | % | |
|---|---|---|---|
| **Sex** | | | |
| Male | 11 | 55 | |
| Female | 9 | 45 | |
| **Healthcare** | | | |
| Nutritionists | 12 | 60 | |
| Doctors | 5 | 25 | |
| Physiotherapists | 1 | 5 | |
| Psychologists | 1 | 5 | |
| Nurses | 1 | 5 | |
| **Number of followers** | | | |
| Lower number | 3.323 | - | |
| Largest number | 2.400.000 | - | |
| **Creation of profiles (year)** | | | |
| Older Profile | 2011 | - | |
| Latest Profile | 2017 | - | |

Source: Prepared by the authors (2023)

The oldest profile was created in 2011, while the most recent was created in 2017. Codifications were adopted in the study, where "P" represents professional/profile and the numbering indicates the position in the table, with the objective of preserving the identity of the professionals and profiles included in this analysis. It is important to note that all the profiles selected for this study are active according to the criteria established in the study (Chart 1).

Table 1. Characterization of the profiles selected in the study.

| Profile code | Gender | Vocational training area | No Followers (03/07/2023) | Check-in date | Date of last publication | In total publications until 07/03/2023 (initial date of the survey) | In Total publications 03/11/2023 (end date of the survey) | Profile Activity % |
|---|---|---|---|---|---|---|---|---|
| P1 | Male | Nutritionist | 17.600 | March 2014 | 03/07/2023 | 1.879 | 1.938 | 3,1 |
| P2 | Female | Nutritionist | 3.323 | October 2012 | 09/05/2022 | 685 | 717 | 4,5 |
| P3 | Female | Nutritionist | 90.500 | August 2013 | 03/07/2023 | 4.616 | 4.856 | 4,9 |
| P4 | Male | Nutritionist | 907.000 | November 2011 | 03/07/2023 | 4.626 | 4.732 | 2,2 |
| P5 | Male | Nutritionist | 1.100.000 | November 2013 | 03/07/2023 | 1.787 | 2.196 | 18,6 |
| P6 | Feminno | Nutritionist | 15.900 | March 2014 | 18/12/2022 | 136 | 155 | 12,2 |
| P7 | Female | Physiotherapist | 108.00 | May 2014 | 02/07/2023 | 922 | 1.022 | 7,7 |
| P8 | Male | Nutritionist | 63.000 | June 2011 | 25/06/2023 | 923 | 990 | 6,7 |
| P9 | Male | Nutritionist | 362.000 | September 2012 | 03/07/2023 | 5.207 | 5.359 | 2,84 |
| P10 | Female | Nutritionist | 8.086 | Dezembro 2014 | 03/07/2023 | 341 | 414 | 17,6 |
| P11 | Male | Nutritionist | 115.000 | May 2014 | 13/04/2023 | 1.792 | 1.812 | 1,1 |
| P12 | Male | Nutritionist | 12.200 | Dezembro 2013 | 25/06/2023 | 357 | 376 | 5,0 |
| P13 | Female | Physician | 10.800 | June 2017 | 03/07/2023 | 323 | 369 | 12,4 |
| P14 | Male | Doctor | 56.800 | May 2012 | 03/07/2023 | 1.540 | 1.657 | 7,0 |
| P15 | Maculino | Doctor | 901.000 | March 2012 | 03/07/2023 | 1.631 | 1.863 | 12,4 |
| P16 | Female | Nurse | 475.000 | September 2013 | 03/07/2023 | 1.209 | 1.316 | 8,1 |
| P17 | Male | Psychologist | 319.000 | May 2016 | 03/07/2023 | 5.817 | 6.088 | 4,4 |
| P18 | Male | Doctor | 424.000 | May 2012 | 03/07/2023 | 648 | 690 | 6,0 |
| P19 | Female | Nutritionist | 13.600 | June 2012 | 03/07/2023 | 1.762 | 1.783 | 1,1 |
| P20 | Female | Physician | 784.000 | April 2014 | 03/07/2023 | 3.260 | 3.558 | 8,3 |

Source: Prepared by the authors

As far as the visual presentation is concerned, the sequence of images and short videos were the most used. The posts were mostly updated weekly or monthly. Videos seem to have greater potential for sharing, considering the total number of views found on the profile posts (Chart 2). Regarding the approach of the content, it was found that the most common theme was "Benefits of cow's milk consumption", followed by "Cow's milk as an inflammatory factor", "Allergies and intolerances to cow's milk", "Anti-inflammatory properties of cow's milk" and "Harms of casein present in cow's milk".

Table 2. Characterization of the content of the analyzed publications in active profiles

| Profiles | Post Title | Present approach | Presented theoretical framework | Compliance with CFN guidelines (2018) | Visual presentation type | Publication Date | Assortment No. | Preview for the videos | Comments |
|---|---|---|---|---|---|---|---|---|---|
| P1 | "Who here can and likes to consume milk and yogurt?" | Benefits of Consuming Cow's Milk | Yes | Yes | Images with caption | 30/09/2023 | 468 | - | 18 |
| P2 | "Milk, what's up? DOES IT IGNITE?" | Cow's milk consumption according to SBAN and ABRAN guidelines | Yes | Yes | Video with caption | 28/09/2023 | 208 | 4.713 | 58 |
| P3 | "Is milk good? Is it bad? Does it ignite?" | Benefits of Consuming Cow's Milk | Yes | Yes | Images with caption | 28/09/2023 | 2.413 | - | 139 |
| P4 | "Do you still believe it when they say milk is inflammatory??? ?" | Cow's milk consumption | Yes | Yes | Images with caption | 13/07/2023 | 4.602 | - | 269 |
| P5 | "You can drink your milk and coffee in peace!" | Consumption of cow's milk as an inflammatory factor | Yes | Yes | Video with caption | 05/09/2023 | 8.822 | 206.853 | 329 |
| P6 | "100ml or 1 litre? How much are we talking about? For whom? Is it bad for everyone?" | Myths and Truths of Cow's Milk Consumption | No | Yes | Images with caption | 03/09/2023 | 788 | - | 39 |

| | | | | | | | | | |
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| P7 | "Too much milk on a daily basis is BAD. If you want to continue taking TOME, life is yours. But then don't COMPLAIN or BLAME GOD. Cow's milk and its derivatives have been removed from the recommendations for a healthy diet that is made annually by Harvard College. Replace with VEGETABLE milk and you're done! All sorted out!!" | Cow's milk as a gas cause, worsens gastritis, reflux, rhinitis, sinusitis, bronchitis and promotes inflammation. | No | Yes | Video with caption | 15/08/2023 | 306 | 11.000 | 28 |
| P8 | "Is milk inflammatory or not? Understand" | Food allergies and intolerances related to cow's milk consumption | Yes | Yes | Images with caption | 17/08/2023 | 586 | - | 42 |
| P9 | "Food withdrawal and reintroduction tests are more complex. It's not simply vilifying milk or casein and treating different diseases with totally different pathophysiologies as the same." | Vilification of cow's milk consumption | No | Yes | Images with caption | 16/09/2023 | 1.815 | - | 67 |
| P10 | "Oh, I nourish, but I don't drink milk anymore." Yes, you are not required to drink milk, all the ingredients in it can be consumed in other ways.<br><br>But stop taking it because you think that milk is bad for your | Milk May Improve Inflammatory Biomarkers | Yes | Yes | Images with caption | 02/05/2023 | 51 | - | 5 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | health, and that it's not nutritious. you're exaggerating" | | | | | | | | |
| P11 | "One more ultimatum! I know I talk about this topic a lot, but this time it will be the last! If not, I'll be back... Don't forget to share it with those who are afraid of milk and those who need to understand this once and for all." | Benefits of Consuming Cow's Milk | Yes | Yes | Images with caption | 04/10/2023 | 109 | - | 7 |
| P12 | "A few more important points: - Milk has no preservative; - Milk does not contain hormones; - Milk has no pus; - Milk is not a poison" | Demystifying the Fear of Drinking Cow's Milk | Yes | Yes | Images with caption | 19/07/2023 | 277 | - | 7 |
| P13 | "Do you like to have that glass of milk? And dairy products, are there no shortage in your fridge? Today's question is very common in the office - Dr. should I drink milk? Is Dr. milk bad? So from the office straight to Instagram, today's answer." | milk as an inflammatory factor due to the casein present in cow's milk according to his opinion. | No | Yes | Video with caption | 10/10/2022 | 18.800 | 607.000 | 588 |
| P14 | "Is casein bad? Yes, the molecular size of casein is enormous, making it | Milk and dairy products are inflammatory foods due to casein | No | Yes | Images with caption | 03/07/2023 | 1.150 | - | 66 |

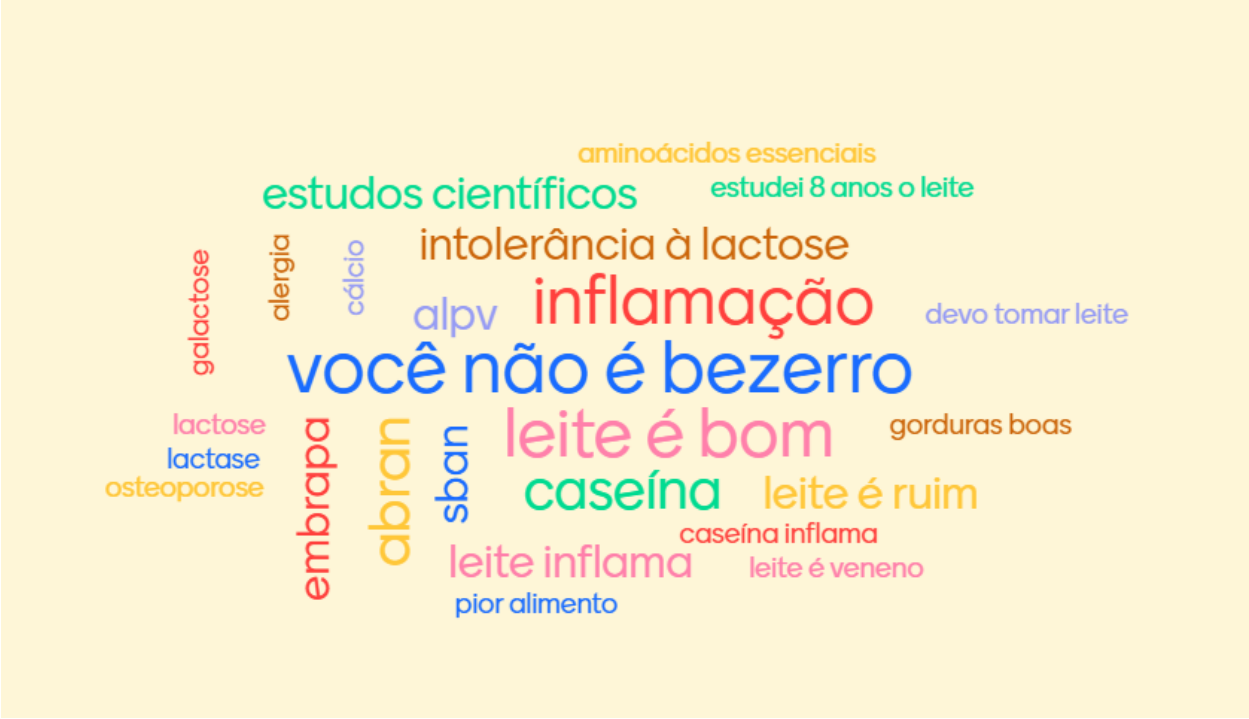
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | difficult to absorb by the intestinal mucosa, favoring a malabsorption of nutrients and being very inflammatory to our intestine." | | | | | | | | |
| P15 | "ARE YOU A CALF? Cow's milk is highly inflammatory for humans, increasing the prevalence of numerous diseases, such as: Asthma, depression, anxiety, bronchitis, rhinitis, migraine, irritable bowel syndrome, osteoporosis..." | Possible harms caused by the consumption of cow's milk | Yes | Yes | Images with caption | 26/09/2023 | 23.759 | - | 1.784 |
| P16 | "Do you know about the harmful effects of milk?" | Cow's milk can be inflammatory and cause intestinal permeability | No | Yes | Video with caption | 29/06/2023 | 23.500 | 929.000 | 419 |
| P17 | "INFLAMMATORY processes must be avoided today<br>-<br>Be careful what you consume<br>-<br>INFLAMMATION caused by diet is the cause of many ailments<br>-<br>It's time to treat the issue with the seriousness it suggests." | Avoid the consumption of cow's milk as a way to prevent inflammatory processes in the body. | No | Yes | Video with caption | 09/09/2023 | 9.705 | 181.000 | 421 |
| P18 | "Cow's milk is the worst food for human beings!" | Cow's milk may be the worst food in existence based on your own experience | No | Yes | Video with caption | 19/08/2023 | 20.700 | 342.292 | 1.136 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| P19 | "I challenge 15 days without milk!<br><br>Who's up for it?<br><br>Milk is not essential for human life!! We can survive very well without it." | Challenge to fasting cow's milk to avoid allergies and inflammatory processes | No | Yes | Images with caption | 21/09/2023 | 130 | - | 18 |
| P20 | "Milk and Your Gut: Unraveling the Effects! Let's explore the relationship between milk consumption and its possible impacts on the gut. Have you noticed any changes when consuming milk or are you curious to understand more about how it affects your digestive health?" | Possible symptoms that the consumption of cow's milk causes in the intestine | No | Yes | Images with caption | 28/08/2023 | 406 | - | 8 |

Source: Prepared by the authors

The most frequent words in the titles of the posts can be seen in Figure 1, showing the use of terms such as "inflammation", "casein", "CMPA", "milk is bad", "milk is good", "you are not a calf", "calcium" and others.

Figure 1 – Word cloud with the most used terms in the twenty posts analyzed




Source: Prepared by the authors

## 4 DISCUSSION

In this study, a significant similarity was observed between the female and male profiles. The gender distribution was balanced, with 55% of the profiles being male and 45% female. Representative profiles from five different areas of health were selected: physicians, nutritionists, physiotherapists, psychologists and nurses, with the aim of obtaining a comprehensive view of the role of VL as an inflammatory factor. It was observed that this topic is predominantly addressed by nutritionists, constituting 60% of the professional body in question. Most of these nutritionists express a position in favor of the consumption of cow's milk, with only one nutrition professional expressing his opposition to this consumption.

The other professionals who adopt an unfavorable attitude towards the consumption of cow's milk are distributed among physicians, physiotherapists, psychologists and nurses, representing a total of 40%. In summary, the analysis reveals that 55% of the professionals surveyed were in favor of the consumption of cow's milk, while 45% are unfavorable to this consumption.

Variations were observed in the activity and engagement of the profiles studied, with percentages ranging from 1.1% to 18.6%. Regarding the publications analyzed in this study, it was found that likes ranged from 51 to 23,759 on posts containing images, while posts that included videos had a wider range and likes ranging from 208 to 23,500, along with a number of views

ranging between 4,713 and 929,000. The analysis revealed that posts in video format demonstrated a higher likelihood of engagement. This result is in line with research conducted by technology companies HubSpot and Mention (2022), which indicated that in-feed video posts receive approximately double the engagement when compared to other formats, such as images, stories, or IGTV videos that appear on the platform's timeline.

Specifically, the health professional with the highest number of followers among those analyzed was P5, as illustrated in Chart 1, a nutritionist who had 1,100,000 followers. In addition, it stood out as the profile with the most significant activity rate, reaching 18.6% over four months. In his publication, where he expressed support for the consumption of LV through a video, he managed to get 8,822 likes and 206,853 views. It is relevant to note that, despite having the highest number of followers, it did not get the highest number of likes among the selected posts. P15, a doctor, surpassed him in this regard, with 23,759 likes on a post that contained images and captions and took a stand against the consumption of VL. This professional stood out for being the only one among the professionals who took a stand against the consumption of VL because he included a scientific article in his publication to support his position.

Among the publications that incorporated videos, the profile P16, a nurse who also spoke out against the consumption of VL, achieved the highest level of engagement. Her video post has amassed 23,500 likes and 929,000 views. However, it's important to note that engagement varied considerably across profiles, especially among those with the highest activity rates. It is also noteworthy that the titles of the publications of the posts adopted a colloquial language, making them accessible both to professionals in the area and to laymen on the subject. This linguistic approach promoted a broader discussion in the comments of the publications.

Of the 20 publications selected, 9 stated that cow's milk contributes to an increase in systemic inflammation and worsening of health in general. On the other hand, 11 publications defend the consumption of cow's milk by the population. To describe the results, the posts were divided into two main themes related to VL as an inflammatory factor, based on the main findings. The first theme addressed the posts in favor of the consumption of cow's milk, which emphasize arguments such as: a) the consumption of cow's milk is harmful only for people with casein or lactose intolerance; b) the consumption of cow's milk is not inflammatory and may even have anti-inflammatory effects; and c) milk does not pose a health risk. On the other hand, in the second theme, there are posts that do not indicate the consumption of cow's milk and highlight arguments such as: a) the casein present in milk as a cause of intestinal inflammation; b) milk as a general generator of inflammation; and c) the consumption of milk as harmful to health.

## 4.1 PROFESSIONALS WHO ARE IN FAVOR OF THE CONSUMPTION OF COW'S MILK

Three posts, P1, P3 and P4, highlighted that VL is not harmful to health. What was stated by the profiles is in agreement with the recent consensus of ABRAN and SBAN (2023), which clarified the main doubts about the consumption of VL by the general population, where they highlighted the benefits of this product, in addition to associating the food with a wide range of health benefits, including positive effects on the prevention of chronic diseases, cardiovascular diseases and osteoporosis, as well as in the enhancement of cognitive performance, among others. A study involving 15,105 adults aged 35-74 years, of both sexes, demonstrated that higher dairy consumption is associated with a lower chance of having increased TG/HDL-C values, an important predictor of risk for cardiovascular diseases, bringing health benefits (Ribeiro et al., 2020).

Four other posts, P2, P8, P10, and P11, emphasized the possible anti-inflammatory effects of VL. According to Hess et al. (2021), in a literature review article on the relationship between dairy and inflammation, despite the absence of sufficient evidence to recommend dairy foods as "anti-inflammatory", extensive clinical research addressed in this article clearly suggests that dairy foods do not affect the concentrations of biomarkers associated with chronic systemic inflammation. A meta-analysis conducted by Benatar et al. (2013) consolidated the results of six randomized controlled trials (RCTs), concluding that there was no significant difference in fasting plasma C-reactive protein (CRP) between high-dairy and low-dairy diets, regardless of whether they were low-fat or full-fat dairy products. It is noteworthy that the limitation of this meta-analysis lies in the fact that CRP was the only biomarker of inflammation considered. In an additional systematic review conducted by Labonté et al. (2013), they examined the impact of a high-dairy diet compared to a low-dairy diet on biomarkers of inflammation in overweight or obese adults. This study revealed that dairy consumption did not result in increased blood concentrations of biomarkers of low-grade systemic inflammation in overweight or obese adults.

Bordoni et al. (2017) adopted an "inflammatory score" approach to evaluate the results of 52 trials focusing on the effects of dairy on biomarkers of inflammation. This scoring system offers a consolidated metric to summarize the impact of dairy foods on 98 biomarkers of inflammation commonly evaluated in nutritional studies, recognizing the complexity of inflammation and the difficulty in characterizing it through a single biomarker. The results of Bordoni et al. (2017) indicated that the "inflammatory score" was, in general, lower in diets that included dairy, with similar findings seen in studies involving both low- and high-fat dairy.

Overall, dietary interventions with VL have demonstrated a subtle anti-inflammatory effect in individuals without sensitivity or allergy to this product. Currently available evidence consistently indicates that high-dairy diets do not exert differentiated effects on the concentration of biomarkers of systemic inflammation, such as CRP, IL-6 and TNF-α (ABRAN; SBAN, 2023; Embrapa, 2022; Mendes, 2016; Seidita *et al.*, 2023).

Posts P5, P6, P9 and P12 showed that the consumption of VL only in patients diagnosed with casein or lactose intolerance was the cause of inflammation. According to ABRAN and SBAN (2023), the consumption of cow's milk can trigger inflammatory processes in individuals diagnosed with CMPA. In this case, the complete exclusion of any amount of milk, its derivatives and products containing milk in their composition is required.

Of the 11 professionals evaluated, 7 presented scientific articles as a basis to support their arguments, while 4 stated that there are several studies supporting the content posted, however, they did not provide information about these researches. Although it is perceived that the arguments in favor of the potential benefits of cow's milk consumption by people without CMPA are supported by scientific evidence, it is important to highlight that 36% of the professionals in their posts do not support themselves with the use of scientific evidence.

In addition, although studies have identified possible benefits of consuming cow's milk, it is necessary to highlight that there is a caveat. The studies leave open the need for further research to further broaden the field of studies on the potential anti-inflammatory effects of cow's milk in healthy, overweight, obesity, cardiovascular disease (CVD) and metabolic diseases.

## 4.2 PROFESSIONALS WHO TAKE A STAND AGAINST THE CONSUMPTION OF COW'S MILK

Of the 9 authors who oppose the consumption of cow's milk, only one presented a scientific article that supports their arguments; the others only mentioned such knowledge acquired from studies. According to P7, cow's milk is bad for your health. This author was the only one approached in this study to present a scientific article based on his theory about the harm caused by VL to people in general. The work mentioned in this post is by Willett and Ludwig (2020), who published a review of the literature addressing several relevant aspects of health related to the consumption of VL milk by Americans.

Of the arguments raised in the article, the high consumption of cow's milk by Americans would be related to an increase in average height in young males, which in turn would increase the risk of fractures in the pelvic region. Regarding blood lipids, it was highlighted that dairy fat

revealed a higher risk of cardiovascular diseases compared to polyunsaturated or vegetable fat. In addition, in the cohort studies included in the review, cow's milk consumption was associated with a higher risk of prostate cancer, especially in its aggressive forms. As well as, overall dairy intake is correlated with an increase in the risk of endometrial cancer in postmenopausal women without hormone replacement therapy. In contrast, comprehensive analyses of meta-analyses and primary data indicate an inverse association between cow's milk consumption and colorectal cancer risk, possibly due to its high calcium content. An important limitation of the existing article lies in the fact that almost all of the prospective studies included were initiated in individuals aged middle age and older, while several risk factors for cancer operate in childhood or early adulthood.

The systematic review by Willett and Ludwig (2020) addressed several theories about the problems caused by VL consumption, however, the results presented corroborate what was demonstrated in the other articles already cited, where VL affects health markers in people with allergy or intolerance to its constituents. On the other hand, the general population does not show changes in markers of inflammation or disease due to the consumption of this food.

The posts referring to P13, P14, P19 and P20 highlighted cow's milk as an inflammatory food for the intestine, due to the presence of casein in its composition. CMPA generates this inflammation, which comes from the response given by the immune system in contact with casein. This pathology causes the destruction of the brush border of the intestinal mucosa, where the enzyme lactase is found, which in turn generates lactose intolerance. Importantly, CMPA is often confused with lactose intolerance, since both comorbidities have similar symptoms (Beltagi et al., 2022).

In posts P15, P16, P17 and P18, cow's milk inflames the body in general. However, we highlight that Nieman et al. (2020), in their systematic review, which evaluated the effects of dairy products on inflammation markers, in general, did not present adverse and/or potentially beneficial effects on systemic inflammation. They observed that some results on the beneficial effects of cow's milk were more commonly reported in studies that evaluated overweight/obese populations with a mean age greater than 42 years (between 31 and 54 years). In the same line of reasoning, Bordoni et al. (2017) conducted a systematic research, encompassing 52 clinical studies, in which these studies accumulated significant points based on different work characteristics, such as type of intervention, duration, design, and number of altered markers. From this approach, the authors concluded that dairy products possess anti-inflammatory properties, especially in interventions with fermented dairy products or in trials involving individuals with metabolic disorders.

## 5 CONCLUSION

In view of what was exposed in this study, it is concluded that most health professionals use their social networks without supporting their statements with scientific evidence, which can have a negative impact and influence people to erroneous knowledge. We observed that professionals, mostly doctors, claim that cow's milk is inflammatory, going so far as to categorize it as the worst food in the world and associating it with various pathologies, without providing scientific studies to prove their statements. On the other hand, most of the professionals who defend cow's milk as a healthy food with high nutritional value have a scientific basis in their statements, most of them being nutritionists.

To date, there is not enough scientific evidence to show that cow's milk can trigger inflammation in the body of healthy individuals. Therefore, for those people who do not have limiting conditions, such as lactose intolerance or CMPA, there is no need to stop their consumption. Further studies are needed to investigate the possible association of VL with inflammatory processes.

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