ISSN: 2230-9926

Available online at http://www.journalijdr.com

IJDR

International Journal of Development Research
Vol. 09, Issue, 11, pp. 31337-31339, November, 2019

RESEARCH ARTICLE OPEN ACCESS

ANALYSIS OF THE PROTEIN CONTENT IN WHEY PROTEIN DIETARY SUPPLEMENTS

[1]Jaqueline Andrea Custódio Trevizan, [2]Anny Rosi Mannigel, [2]Graciene de Souza Bido, [2]André Ribeiro da Costa, [2]Ricardo Andreola and *[2]Daniele Fernanda Felipe

[1]Student of the Master's Program in Science, Technology and Food Safetyat the University Center of Maringá - UNICESUMAR, 1610 Guedner Ave Maringá, Paraná, Brazil
[2]PhD, Professor of the Master's Program in Science, Technology and Food Safety at the University Center of Maringá - UNICESUMAR, Maringá-Paraná. Researcher at ICETI - Cesumar Institute of Science, Technology and Innovation, 1610 Guedner Ave Maringá, Paraná, Brazil

ARTICLE INFO

Article History:
Received 28th August, 2019
Received in revised form
17th September, 2019
Accepted 11th October, 2019
Published online 20th November, 2019

Key Words:
Supplements, Protein,
Whey protein.

Corresponding author:
Daniele Fernanda Felipe

ABSTRACT

Currently, the consumption of whey protein dietary supplements has been growing. With the increased demand for this product, industries have increasingly developed whey protein-based products. This work aims to analyze the protein content of these products, verifying if the amount of protein found in the labels are truly the ones found in the product. For this verification, five best selling brands were selected on the market and a sample of 200 grams of each product that was submitted to an analysis using the Kjeldahl method was collected. Of the five samples collected, two samples had protein levels below that expressed on their respective labels, thus being out of compliance with current legislation. Inadequate protein levels in whey protein samples may harm consumers of the product, who purchase them in an attempt to increase protein intake and often fail to obtain the expected protein intake without consequently achieving the desired physiological results.

Citation: Jaqueline Andrea Custódio Trevizan, Anny Rosi Mannigel, Graciene de Souza Bido *et al.* 2019. "Analysis of the protein content in whey protein dietary supplements", *International Journal of Development Research*, 09, (11), 31337-31339.

INTRODUCTION

There is a growing demand for people of all ages to exercise and, associated with this growth, there is an increase in the consumption of dietary supplements, especially those with protein contente obtained from whey, called whey protein (Cardoso *et al*., 2018). Whey protein intake favors muscle recovery and protein synthesis, decreases fatigue and body fat, being a good strategy for nutritional supplementation (Terada *et al*., 2009). Whey obtained from the aqueous portion after desorption can be processed by various protein separation techniques to obtain whey protein concentrate (WPC) or isolate (WPI), and there is also hydrolysate whey (WPH) (Souza, Palmeira and Palmeira, 2015; Lockwood *et al*., 2017). WPC70 and WPC80 (70% and 80% concentrations of protein, respectively) are the most common forms of whey protein used within protein supplements, largely due to pricing and organoleptic characteristics compared to other forms of whey (Hulmi, Lockwood and Stout, 2010).

Protein quality is important to the gain and maintenance of muscle mass. Protein quality is a function of protein digestibility, amino acid content, and the resulting amino acid availability to support metabolic function (Devries and Phillips, 2015). Whey protein supplementation is superior at increasing muscle mass gains with concomitant resistance training compared to other protein supplements (i.e., soy protein, casein protein), which are a rich source of essential aminoacids (Lockwood *et al*., 2017). Whey protein is one of the highest-quality proteins given its amino acid content (high essential, branched-chain, and leucine amino acid content) and rapid digestibility (Devries and Phillips, 2015). By expanding the products marketed as food supplements, the companies that produce them do not always accomplish the standards set by the regulatory agencies. Thus assuming that the labels of the supplements are not in accordance with the legislation, consumers may be misled into composition or promises associated with the effects of these products (Timoteo and Ferreira, 2017). With increasing consumption of whey protein

type food supplement several industries have been producing these types of supplements.The objective of the present work was to evaluate the protein content of whey protein type food supplements, to verify the accuracy of the information on the label considering the protein content.

MATERIALS AND METHODS

Five samples of whey protein supplements of different brands were randomly chosen from establishments located in Maringá, Paraná. The products were named samples 1, 2, 3, 4 and 5, containing two hundred grams of the product. The protein content of the samples was analyzed using the Kjeldahl method, following the methodology described in the Manual of Physical - Chemical Methods for Food Analysis of the Adolfo Lutz Institute (ADOLFO LUTZ INSTITUTE, 2008). In this method, the determination of protein content is based on the nitrogen content present in the sample by the Kjeldahl digestion process, presenting three stages: digestion, distillation and titration. Thus, the total nitrogen content was determined in three stages: In the 1st stage (Digestion) 3 mL of concentrated sulfuric acid, 2 g of potassium sulfate and 0.1 g of copper sulfate (catalysts) were added to the samples. and the sample was digested in a digester block at 350 until green coloration. In the 2nd stage (Distillation) the digestor tube was connected to the nitrogen distiller and 15 mL of 40% sodium hydroxide was added, in an Erlenmeyer was placed 5 ml of boric acid and 4 drops of Kjeldahl indicator that acts in changing the staining according to pH and the samples were distilled to 50 mL. In the 3rd stage (Titration) approximately 6 mL of hydrochloric acid was added to the sample. After the data were tabulated and the protein content of the different samples was calculated. Total nitrogen content was converted to total protein content using the conversion factor of 6.38 because protein supplements for athletes are classified as dairy products (ADOLFO LUTZ INSTITUTE, 2008). The results were compared with the content described on the label and the percentage difference calculated.

RESULTS AND DISCUSSION

Table 1 presents the results obtained from the protein content analysis of whey protein samples expressed on wet basis, and the comparison with the respective values expressed on the label. There is no specific legislation stipulating upper and lower limits for protein content in whey protein supplements, there is only a tolerance limit of ± 20% between the stated nutrient value on the label and the analytical value obtained according to Resolution RDC no. 360 (BRAZIL, 2003). Thus, the evaluation of the results obtained in the analysis of whey protein samples was performed considering this tolerance limit. Samples 1,2 and 3, among the five samples evaluated, met the tolerance limit. However, samples 4 and 5 presented protein levels below the expressed in their respective labels, with values of percentage difference of 22.15% and 45.18%, respectively, thus being out of compliance with the tolerance limit. In research conducted by Timoteo and Ferreira (2017), when compared to the label, all samples found non-conformities according to the amount of protein, because all the quantities of the labels were above the analyzed samples. The same result was found in a study by Lovato et al. (2014) on protein supplement samples, which showed that the ratio of protein content to labeling is in disagreement with the legislation, and is also lower than recommended.

Tabel 1. Averages of protein content of whey protein supplement samples

Sample	Protein content on label (g)	Protein content obtained (g)	(%)*
1	71.46	71.38	0.12
2	81.66	74.96	8.20
3	63.80	56.54	11.38
4	74.01	57.62	22.15
5	81.66	44.77	45.18

Source: Research Data.
*tolerance limit of ± 20% between the stated nutrient value on the label and the analytical value obtained

This was also evidenced in a study by Silva and Souza (2016), in which for most samples the experimental values were lower than those reported on the labels. Thus, this non-conformity of the protein content found, characterizes a fraud for the consumer, both economically and nutritionally, since the consumer expects to ingest a greater amount of protein than the real, not obtaining the expected body results as for example, the largest gain in muscle mass.

Conclusion

The incorrect information about the protein content of labels, as shown in this paper, in addition to causing financial damage to consumers, can have a negative impact on their health, as they will be consuming less protein than the amount contained in the label. This even hinders the action of health professionals who also end up leading to incorrect information of the product. With this, it becomes important a greater responsibility of the companies as to the quality of the products, as well as a greater inspection of them by the regulatory agencies.

REFERENCES

Adolfo Lutz Institute. 2008. Physical - Chemical Methods for Food Analysis, Adolfo Lutz Institute, São Paulo, Brazil.

Brazil. Ministry of Health. Health Surveillance Secretariat. Resolution RDC nº 360, December 23, 2003. Approves technical regulation on nutrition labeling of packaged foods, making nutrition labeling mandatory.Official Gazette [of] Federative Republic of Brazil. Brasília, DF, December 26, 2003.

Cardoso, R.S., JBP Pereira, J.B.P., de Macêdo, M.R.C.,de Sousa, R.M.L., and dos Santos, A.F. 2018. Comparação do custo empregado à concentração proteica de suplementos à base de whey protein em São Luís-Ma. Revista Ceuma Perspectivas, 31, pp. 49-56.

Devries, M.C. and Phillips, S.M. 2015. Supplemental protein in support of muscle mass and health: Advantage whey. J. Food Sci., 80 (Suppl. S1), A8–A15.

Hulmi, J.J., Lockwood, C.M., and Stout, J.R. 2010. Effect of protein/essential aminoacids and resistancetraining onskeletal muscle hypertrophy: a casefor whey protein. Nutrition & Metabolism, 7, pp. 1-11.

Lockwood, C.M., Roberts, M.D., Dalbo, V.J., Smith-Ryan, A.E., Kendall, K.L., Moon, J.R. and Stout, J.R. 2017. Effects of hydrolyzed whey versus other whey protein supplements on the physiological response to 8 weeks of resistance exercise in college-aged males. *J. Am. Coll. Nutr.,* 236, pp. 16-27.

Lovato, F., Kowaleski, J., Santos, L.R., and Silva, S.Z. 2014. Avaliação da conformidade de suplementos alimentares

frente a legislação vigente. *Revista Brasileira de Nutrição Esportiva,* 8, pp. 330-335.

Silva, L.V., and Souza, S.V.C. 2016. Qualidade de suplementos proteicos: avaliação da composição e rotulagem. *Revista do Instituto Adolfo Lutz,* 75,pp. 1-17.

Souza, L.B.L., Palmeira, M.E. and Palmeira, E.O. 2015. Eficácia do uso de whey protein associado ao exercício, comparada a outras fontes proteicas sobre a massa muscular de indivíduos jovens e saudáveis. *Revista Brasileira de Nutrição Esportiva,* 9, pp.607-613.

Terada, L.C., Godoi, M.R., Silva, T.C.V., and Monteiro, T.L. 2009. Efeitos metabólicos da suplementação do whey protein em praticantes de exercícios com pesos. *Revista Brasileira de Nutrição Esportiva,* 3, pp.295-304.

Timoteo, G.R., and Ferreira, M.C.M. 2017. Análise do teor de macronutrientes em suplementos dietéticos tipo whey protein. *Revista Iniciare,* 2, pp. 96-107.

****