CENTESIMAL ANALYSIS OF PROTEIN CONTENT IN WHEY PROTEIC SUPPLEMENTS


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ABSTRACT - Whey Protein is a high value biologic protein supplement of easy absorption, which has been widely used by practitioners of physical activity, since it has the potential to better lean mass gain. This study aimed to analyze the protein content in supplements like the Whey Protein, as well as the irregularities for the protein content presented on the labels of such products. This is an experimental study, which evaluated 10 different brands of protein supplements for its protein content, commercialized in Vitória da Conquista-Ba. We have used the Kjeldahl method proposed by IAL (2008). Based on the collected data, we have observed that 100% of the samples had some kind of irregularity. Therefore, it is necessary the continuous and strict attention during the health authorities inspection to ensure that consumers have access to accurate information for these physical activities products.

KEYWORDS: Whey protein; Kjeldahl; Label.

1. INTRODUCTION

Media often shows countless messages promoting their products and ideals to individuals, and promising the right conditions for them to be always fit (Dezan and Machado, 2011). Since athletes have a greater concern for their appearance, these sportsmen are constantly seeking for these substances in order to achieve their dreamt "perfect body" (Oliveira et al. 2015). In this sense, using protein rich supplements is increasing in large proportion among individuals, both men and women (Alves and Navarro, 2010; Rang et al. 2011; Kanda et al. 2016).

Studies have shown that the protein supplement mostly used in Brazil is the Whey Protein (Hirschbruch et al. 2008). This high nutritional quality protein supplement comes from the processing of cow milk during cheese making. During its production, there is formation of serum, which for a long time was discarded by the food industry. Usually associated with major environmental disturbances.
generated by inappropriate disposal. In the 70s, studies were carried out and the scientists turned their attention to the proteins presented in these supplements (Haraguchi et al. 2006).

Serum peptides are composed of beta-lactoglobulin, alpha-lactalbumin, bovine serum albumin and immunoglobulins. Beta-lactoglobulin have higher branched chain amino acid content and higher whey number of peptide bonds (45.0% - 57.0%). Alpha-lactalbumin is a major protein in human milk and, in quantity, it represents the second peptide serum of bovine milk, about (15% - 25%), being of fast digestibility and having larger quantities of essential amino acids such as lysine, leucine, threonine and cystine (Haraguchi et al 2006; Quinta and Manarini, 2014; Alves and Navarro, 2010; Kanda et al. 2016.).

This great demand for supplements is due to the increase in lean body mass, provided for presenting high digestibility and absorption of such substances, which, after physical exercise, promotes recovery and muscle protein synthesis (Haraguchi et al 2006; Kanda et al. 2016). Furthermore, studies suggest that the whey proteins have an anticarcinogenic and immunostimulatory capacity (Freire and Dias, 2010; Hsu et al. 2012.).

In a study, after evaluating the influence of protein supplements on muscle mass, Carrilho (2013) found that the individuals who consumed the protein supplement had positive results as muscular hypertrophy and strength, reduced body fat and increased muscle and liver glycogen.

Due to the various benefits provided by the protein supplements, many brands are available for sale; they were classified into three different types of Whey Protein, namely: the concentrated, isolated and hydrolyzed. The concentrated has about 35 to 80% of proteins. The isolated, regarded as the most pure, has about 90% protein, with minimal traces of other whey compounds. The hydrolyzed usually concentrates about 80% protein, and their composition has broken protein chains into smaller segments called peptides. It makes its digestion and absorption to occur quickly (Quinta and Manarini, 2014; Haraguchi et al. 2006).

In face of the large number of commercialized products based on the Whey Protein, it becomes relevant to assess the protein present in these products, since the figures printed on the label of products not always are real. This study aimed to analyze the protein content of supplements of different brands of Whey Protein type as well as the irregularities related to the protein content presented on the label of these products.

## 2. MATERIALS AND METHODS

The experiment was conducted at the Laboratory of Food Science in the Technology and Sciences College (FTC) in Vitória da Conquista, Bahia. The evaluated samples were obtained randomly in the supplement stores around the city, which composes ten different brands of protein supplements (Whey Protein). In order to ensure confidentiality, they were identified by the letters A, B, C, D, E, F, G, H, I, J. They were grouped according to the type of Whey and information on the labels. They are: Concentrated - three brands (all national); Isolated - five brands (three of international origin) and concentrated, Isolated and Hydrolyzed (two national brands featuring the three protein types). Protein analysis were performed according to the methodology described by the Adolfo Lutz Institute (2008), by the Kjeldahl method, which consists of three phases: digestion, distillation and nitrogen titration emanated from the sample (Galvani and Gaertner, 2006). We have used, as a nitrogen conversion, the factor of 6.38 for milk and dairy products. Protein content quantification was done by the Equation 1. These analysis were performed in triplicate and the results were expressed as mean and standard deviation.

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\% \text{ Proteins} = \frac{(V \times N \times 1,4)}{P} \times 6,38
\]
3. RESULTS AND DISCUSSION

We have found that 100% of the analyzed samples presented some kind of irregularity. In Table 1 we present the results of the protein centesimal composition in the Whey Protein samples. To evaluate the supplements, we considered: the classification of the kind of Whey, according to the protein content by Quinta and Manarini (2014); the comparison between the protein content specified on the label, the one found in the analysis, and the criteria described by the DRC 360/2003; which states that the product may present a difference (Label X analysis) of up to 20% more or less in the amount of proteins (Brasil, 2010).

Table 1 – Protein Centesimal Composition found in Whey Protein samples – Laboratory analysis and Label

<table>
<thead>
<tr>
<th>Samples</th>
<th>Analysis (%)</th>
<th>Label (%)</th>
<th>RDC (360/2003) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A- Concentrated</td>
<td>16,43 ±0,01</td>
<td>16,00%</td>
<td>12,80 -19,2%</td>
</tr>
<tr>
<td>B- Concentrated</td>
<td>42,14± 0,00</td>
<td>52,50%</td>
<td>42,00 - 63%</td>
</tr>
<tr>
<td>C- Concentrated</td>
<td>56,17 ± 0,05</td>
<td>93,33%</td>
<td>74,60 - 111,99%</td>
</tr>
<tr>
<td>D- Isolated</td>
<td>45,86± 0,01</td>
<td>61,11%</td>
<td>48,88 -73,33%</td>
</tr>
<tr>
<td>E- Isolated</td>
<td>65,69 ± 0,00</td>
<td>89,00%</td>
<td>71,20 - 106,8%</td>
</tr>
<tr>
<td>F- Isolated</td>
<td>58,30± 0,00</td>
<td>77,41%</td>
<td>61,98 -92,89%</td>
</tr>
<tr>
<td>G- Isolated</td>
<td>62,62± 0,03</td>
<td>77,41%</td>
<td>61,92 - 74,30%</td>
</tr>
<tr>
<td>H- Isolated</td>
<td>53,58±0,01</td>
<td>72,72%</td>
<td>58,17-87,26%</td>
</tr>
<tr>
<td>I- Concentrated, isolated, hydrolysed</td>
<td>51,27± 0,14</td>
<td>65,71%</td>
<td>52,56 - 78,85%</td>
</tr>
<tr>
<td>J- Concentrated, isolated, hydrolysed</td>
<td>57,99± 0,01</td>
<td>77,5%</td>
<td>62,0 - 93%</td>
</tr>
</tbody>
</table>

Source: Research data.

For the supplements considered by the labels as ‘concentrated’ (A, B and C), only (B and C) fit in the standards. According to Quinta and Manarini (2014), for the supplement to be considered concentrated, it should provide between 35 and 80% protein in its composition. However, when comparing the protein label values with those obtained in the analysis, only brand A presented them properly. According to the RDC 360/2003, which establishes different values among the declared ones and those presented on the labels; we considered up to 20%, more or less, considering that the sample C is out of the recommended standard.
When evaluating the Whey samples declared as isolated (D, E, F, G and H), every one were out of established standards to be considered as such. According to Quinta and Manarini (2014), the isolated should contain about 90% protein in its composition. In the protein analysis, we could tell that all the samples showed values which were not consistent with the information contained on the labels, we mean, the values showed on the label were higher than those found in the protein analysis. When considering the information of RDC 360/2003, only the sample F fitted within the normal range.

For the samples containing the three types of protein (I and J), and considering the founds by Quinta and Manarini (2014), these proteins can only be fitted in the category of concentrated, since the figures presented in the sample I (51.27%) and J (57.99%) are only between 35-80%, which means they are out of the 80 and 90% to be considered hydrolysate and isolated, respectively. In addition, when comparing the protein content evidenced in the analysis with the values shown on the labels, both were out of which were previously established.

In a study developed by Oliveira et al. (2015), after evaluating 5 whey brands commercialized in Potiguar Natal, RN; We found protein values below the specified on the labels of all tested brands. Parreiras et al. (2014) evaluated 2 brands of Whey, one national and one international, by using the same method employed in this study (Kjeldahal). We have found that one of the samples showed 85.16% of protein in its composition and the other 77.69%. On the other hand, in this study, the larger protein value was 65.69% for the sample E.

According to Esper et al. (2007), this variability occurs because there is no company standardization for reporting the variations that may occur corresponding to the composition and quantity of the ingredients, which is another contributing factor to its inexistence in the Brazilian legislation.

According to Lobanco et al. (2009), the lack of uniformity among the different brands of commercialized supplements, and the difficulty found in most companies to reach the legislation requirements about nutrition information, promotes a harmful situation to consumers who wish to use this information to define better balanced and appropriate diets for their needs.

Leite et al. (2015) points out that the industries are using the products packaging as a marketing and advertising tool, and not for a real account of the product composition, this takes the consumer to choices that do not match the ones specified on the label.

4 CONCLUSION

The study confirmed that 100% of the analyzed products are in violation of current legislation. Therefore, it is necessary a continuous and strict attention during the inspection by the health authorities to ensure that consumers have access to accurate product information for physical activities athletes, through the product labeling.

It is noteworthy to emphasize that these commercial products have a high cost to purchase, and unfortunately. Consumers seek the products to enhance their performance and they end up being deceived by the false information given on the labels. Furthermore, we should encourage them to search for a trained professional who may properly prescribe and who are able to tell them if there is a real need for supplements, avoiding the indiscriminate usage of such products.

5 REFERENCES


