

# **Examination of digestibility and sensory properties of high protein cream**

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My thesis topic is Examination of Digestibility and Sensory Properties of High-Protein Cream main purpose is to investigate the effect of different proteins that focus on physicochemical, rheological, sensory, and in-vitro digestibility properties of high protein Totu cream ( egg white-based protein product from Hungary). Three types of proteins such as whey protein concentrate (7.5%), collagen peptide beef (7.5%), and white rice protein (2.5%) were used in my experiment. The analytical experimentation included dry matter content, pH, color ( $L^*$ ,  $a^*$ ,  $b^*$ ), rheological (flow curve, viscosity curve properties), sensory evaluation, and *in vitro* protein digestibility (IVPD%).

Methodology was prepared with dry matter content was measured by oven drying at 105 °C to measure the total solid content of our samples after complete removal of moisture. pH was measured with a calibrated digital pH meter to determine to assess the acidity or alkalinity of the cream. Colorimeter is CR-400 is a handheld portable measurement instrument to quantify the visual appearance of the cream samples in terms of lightness ( $L^*$ ), redness ( $a^*$ ), and yellowness ( $b^*$ ). Rheological behavior was analyzed with an Anton Paar MCR 92 rheometer was applying by the Herschel–Bulkley model to evaluate yield stress ( $\tau_0$ ), consistency coefficient (K), and flow behavior index (n) to characterize the flow of the samples. Sensory evaluation was conducted by four panelists under double-blind conditions using a 9-point hedonic scale to rate the color, smell, fruit taste, sweet taste, texture and overall impression. Digestibility was assessed using the INFOGEST in-vitro digestion method (oral, gastric, and intestinal phases) followed by Kjeldahl analysis for protein determination by using a Gerhardt

digestion and distillation system to estimation of protein bioavailability and comparison of how different protein sources behave during digestion.

As the results, it shows that adding different protein source influenced the the samples of Tótu cream. The collagen peptide beef sample showed the highest dry matter content ( $31.47 \pm 0.17$  %), which mean better water holding capacity, while the whey protein concentrate (WPC) sample was the lowest pH ( $5.17 \pm 0.05$ ) due to natural acidity. In case of color measurement, white rice protein cream was the lightest and most yellow because of the natural pigment of the white rice, while whey protein concentration (WPC) shows slightly darker and redder due to Maillard reactions during preparation. Rheological behavior shows that all my samples are non-Newtonian, shear-thinning (pseudoplastic) fluids therefore the white rice protein sample had the highest viscosity and yield stress, making it thicker and less spreadable, while whey protein concentration (WPC) was the most fluid and smooth. From the sensory evaluation, whey protein concentration achieved the highest overall impression (8.25/9) also got the high rating of flavor and texture, followed by collagen peptide beef and white rice protein. Over and above that, the digestibility experiment was carried out by INFOGET protocol. for *in vitro* protein digestibility (IVPD%) all three fortified had high digestibility. WPC showed the highest digestibility ( $97.04 \pm 0.21$ %), White rice protein and collagen peptide beef had similarly high values (96.6% and 96.2%), demonstrating efficient enzymatic breakdown. The control (94.01%) the lowest therefore it can be guaranteed that protein fortification increased total digestible protein. The RSD% values 0.22% to 0.96% indicate acceptable repeatability by replicates. Due to similar values for both IVPD% and RSD% therefore there was no significant ( $p = 0.00026 < 0.05$ ).

In conclusion, this thesis work experiment can confirm that the protein fortification Totu cream with adding more nutritious, sensory varieties, and digestibility among all three different protein samples was suitable. Whey protein concentrate (WPC) was the best overall performance. It had a smooth texture, great overall impression by panelists, and excellent digestibility. Therefore, it can be considered as a new product development with high protein content and easy to digest in the human body.