

## 8. Use and assimilation of the protein of wheat bread with rice protein concentrate by the body

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During the characterization of bakery products, an important indicator is biological value of proteins, which characterizes their quality, the ability to ensure plastic processes and the synthesis of metabolically active substances, and is determined by the presence of essential amino acids in them, their ratio with substitutes and digestibility in the gastrointestinal tract [1].

Utilitarian coefficient characterizes the balance of all EAA proteins with respect to physiological norm. It is used to compare the protein composition of various food products based on their amino acid composition and inadequacy of their use in the body. Redundancy coefficient shows the mass fraction of EAA in 100 g product, which is not fully used by the body. DCAS is the average excess of EAA in comparison with the smallest amino acid score of the limiting amino acid [2]. These indicators were calculated for wheat bread with rice protein concentrate (Table 1).

**Table 1. Utilitarian coefficient, redundancy coefficient, coefficient of difference of amino acid score (DCAS) and biological value of bread with rice protein**

Indicator	Rice protein concentrate, % to wheat flour			
	0 (control)	4	8	16
Utilitarian coefficient	0.49±0.01	0.19±0.01	0.15±0.01	0.12±0.01
Redundancy coefficient	36.90±1.11	153.49±1.26	207.80±1.28	259.78±1.33
DCAS	0.46±0.01	2.71±0.01	4.19±0.01	6.04±0.01
Biological value (%)	99.53±2.49	97.29±2.49	95.81±2.49	93.96±2.49

Analysis of the change in the utilitarian coefficient showed that the addition of rice protein concentrate, even in a small amount, led to a decrease in the degree of balance of essential amino acids in relation to the physiologically necessary norm by 61.2-75.5%. The mass of essential amino acids, which are used by the body for anabolic needs, naturally decreased. An increase in the value of DCAS when adding rice protein concentrate indicates that the amino acids contained in the control are more fully used by the body. However, despite significant differences in these indicators, in general, the biological value of bread does not decrease critically and is quite high, namely higher than 90%.

### References:

1. Deinychenko, G., Zolotukhina, I., Skrynnik, V., Deinychenko, L., & Kravchenko, T. (2020). Biological value of protein of culinary products based on milk-protein concentrate. *EUREKA: Life Sciences*, (3), 31-37. <https://doi.org/10.21303/2504-5695.2020.001287>
2. Litvynchuk, S., Galenko, O., Cavicchi, A., Ceccanti, C., Mignani, C., Guidi, L., Shevchenko, A. (2022). Conformational Changes in the Structure of Dough and Bread Enriched with Pumpkin Seed Flour. *Plants*, 11, 2762. <https://doi.org/10.3390/plants11202762>