



PRELIMINARY STUDIES ON THE ANTIBACTERIAL EFFECT OF THE ASSORTMENT OF POLYFLORAL HONEY FROM THE WESTERN PART OF ROMANIA

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Abstract: Honey is a bee product that has antimicrobial activity, between different types of honey there being differences in terms of effectiveness and mechanisms of action against the same type of microorganism. The purpose of this study was to evaluate the antibacterial activity of polyfloral honey in western Romania. Honey was tested in the following concentrations: 80%; 60%; 40%; 20%; 10%; 5%. Two Gram+ bacterial strains (*Staphylococcus aureus* ATCC 29213, *Streptococcus pneumoniae* ATCC 49619) and three Gram- strains (*Enterococcus faecalis* ATCC 29213, *Escherichia coli* ATCC 25922 and *Salmonella typhimurium* ATCC 14028) were used in the study. The results of this study show that polyfloral honey from the western part of Romania has an antiproliferative effect on the bacterial strains tested, depending on the applied concentration. The highest inhibition rates were recorded on *Salmonella typhimurium*, *Streptococcus pneumoniae* and *Staphylococcus aureus*, and the lowest values were recorded in the bacterial strains *Enterococcus faecalis* and *Escherichia coli*.

text

• Introduction

Honey is well known as a natural antioxidant, the components responsible for the redox properties of honey being fulfilled by phenolic acids, flavonoids, vitamins and enzymes, as well as a small amount of minerals, especially copper and iron. In addition, in the last two decades, research in the field of apitherapy has intensified, so that new valences of these products with various pharmacological properties, with antioxidant potential have been discovered, antitumor, antimicrobial, antifungal, antiallergic, anti-inflammatory, hepatoprotective, in the treatment of cardiovascular diseases, digestive diseases, diabetes, etc.

The purpose of this study was to evaluate the antibacterial activity of polyfloral honey from the western part of Romania

• Material and method

- **Biological material.** The biological material tested was an assortment of polyfloral honey certified as organic, from a beehive located in the mountainous area of western Romania, in the area of Făget.
- **Experimental variants** Honey was diluted with sterile distilled water and the following 5 concentrations were achieved: c1 - 80%; c2 - 60%; c3 - 40%; c4 - 20%; c5 - 10%; c6 - 5%.
- **Microorganisms used in the study.** The study of the effect of polyfloral honey of different concentrations was performed by using 6 standardized bacterial strains: two bacterial strains Gram+ (*Staphylococcus aureus* ATCC 29213, *Streptococcus pneumoniae* ATCC 49619) and three strains Gram- (*Enterococcus faecalis* ATCC 29213i, *Escherichia coli* and *Salmonella typhimurium* ATCC 14028).
- **Testing the viability of microorganisms** 100 µl of microbial culture and 50 µl of polyfloral honey solution from each tested concentration were introduced into the wells of the microplates. The microplates were incubated for 6 hours at a temperature of 37° C. After this time interval 10 µl 0.5% TTC solution was introduced into each well and incubation was continued for another 2 hours at the same temperature of 37° C. The results were read on the TECAM SUNRISE micro spectrophotometer at a wavelength of 460 nm.

• Results and discussions

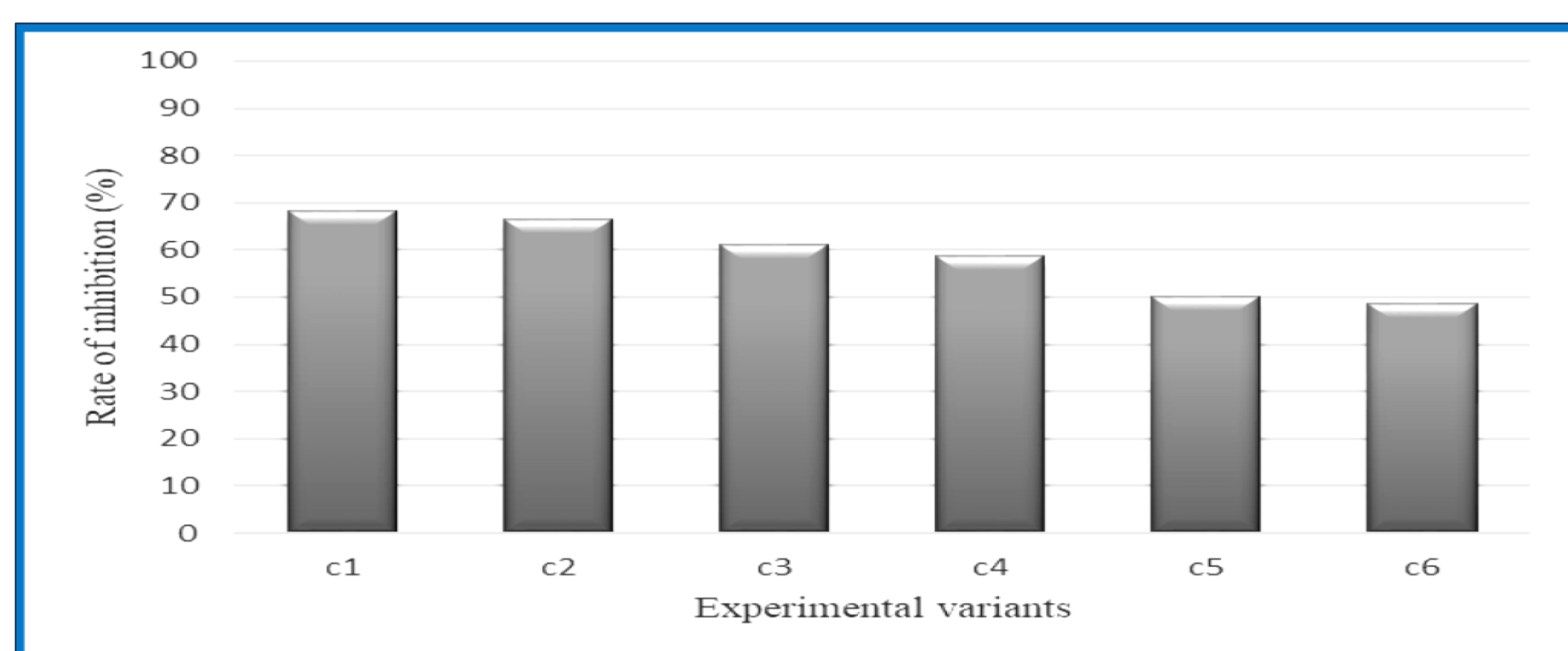


Figure 1. Rate of inhibition of the action of polyfloral honey on the bacterial strain *S. aureus*

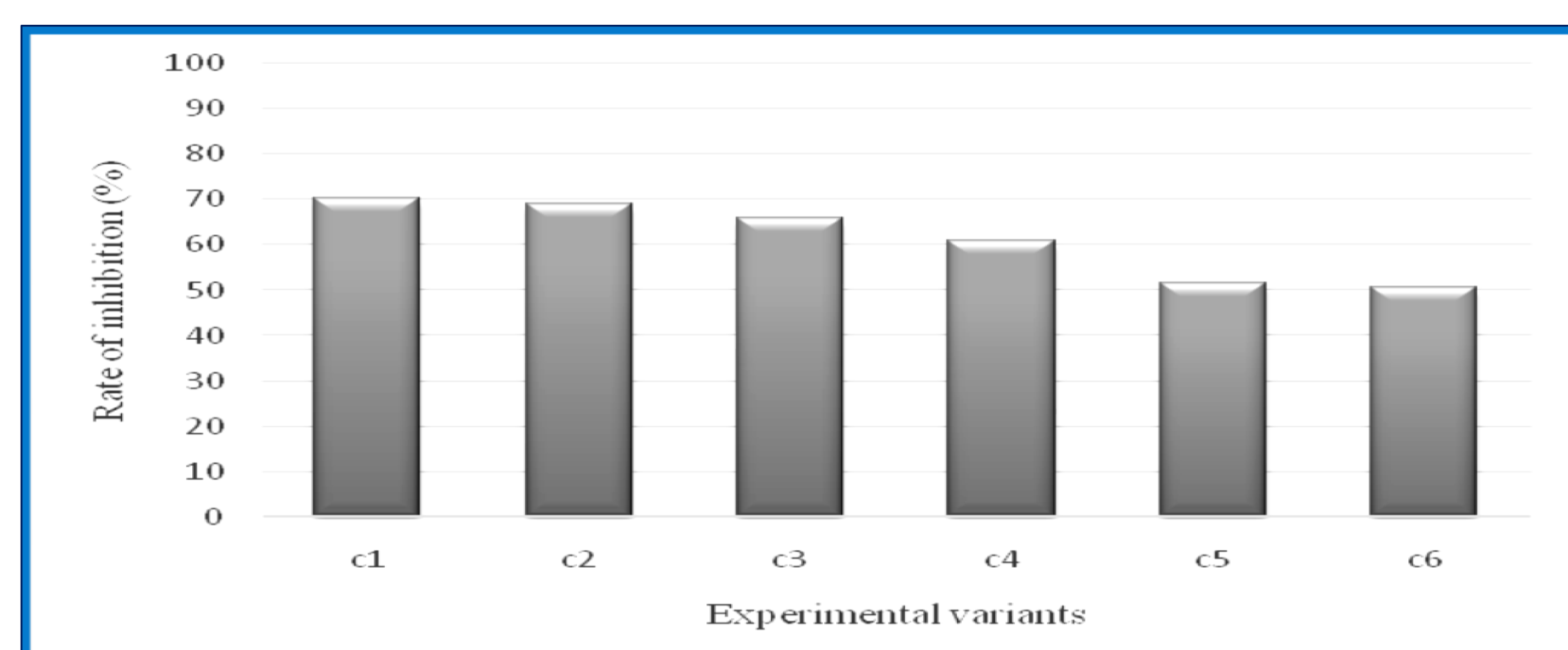


Figure 2. Rate of inhibition of the action of polyfloral honey on the bacterial strain *S. pneumoniae*

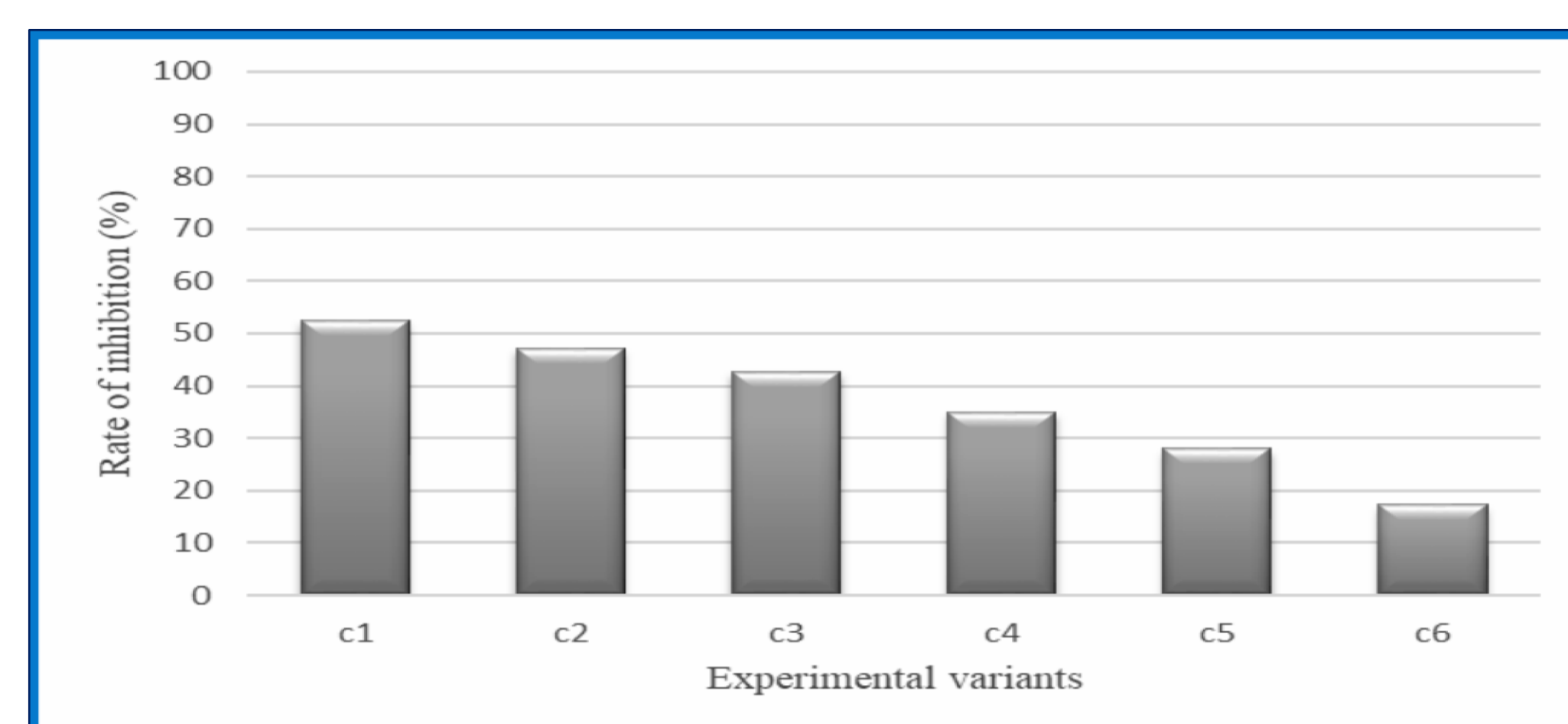


Figure 3. Rate of inhibition of the action of polyfloral honey on the bacterial strain *E. faecalis*

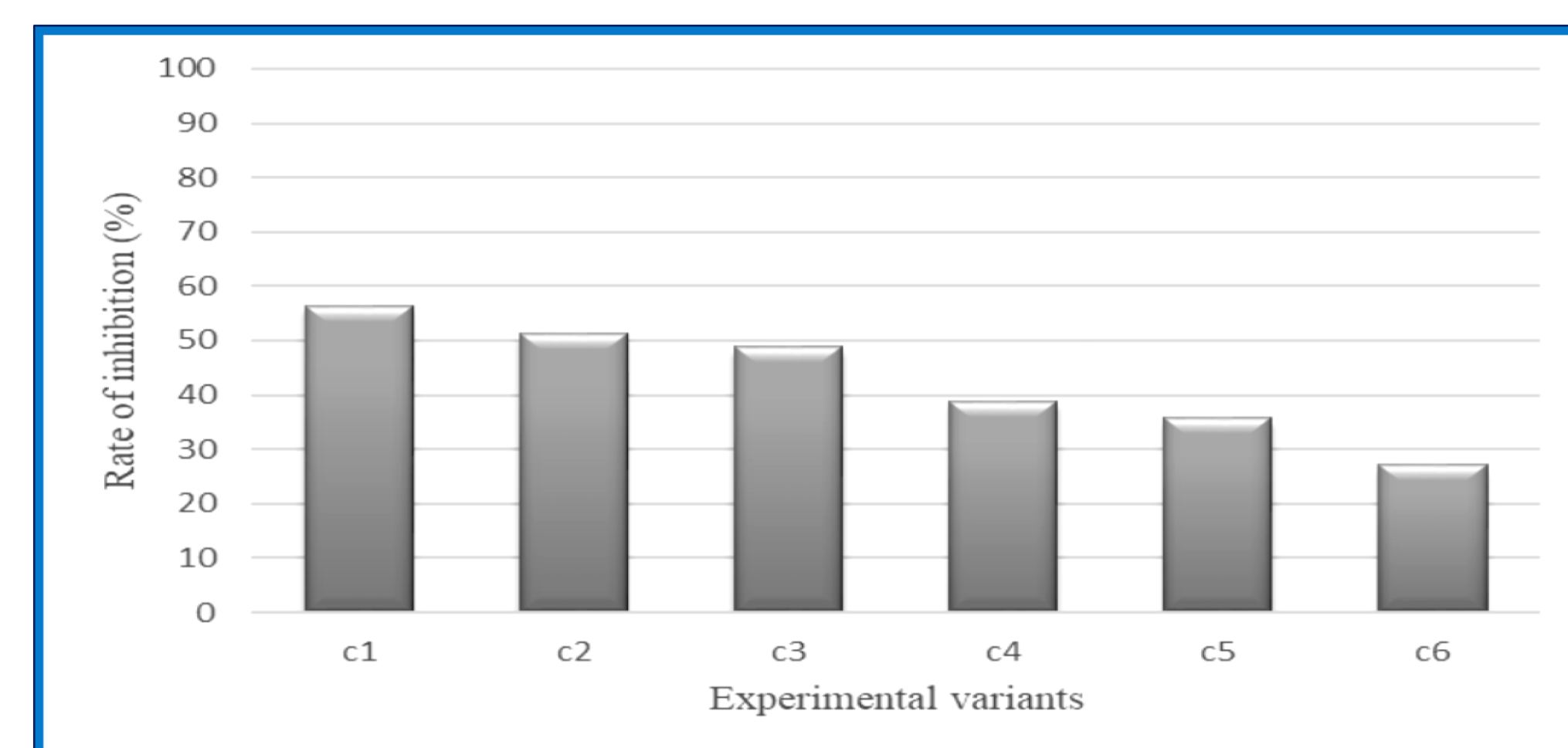


Figure 4. Rate of inhibition of the action of polyfloral honey on the bacterial strain *E. coli*

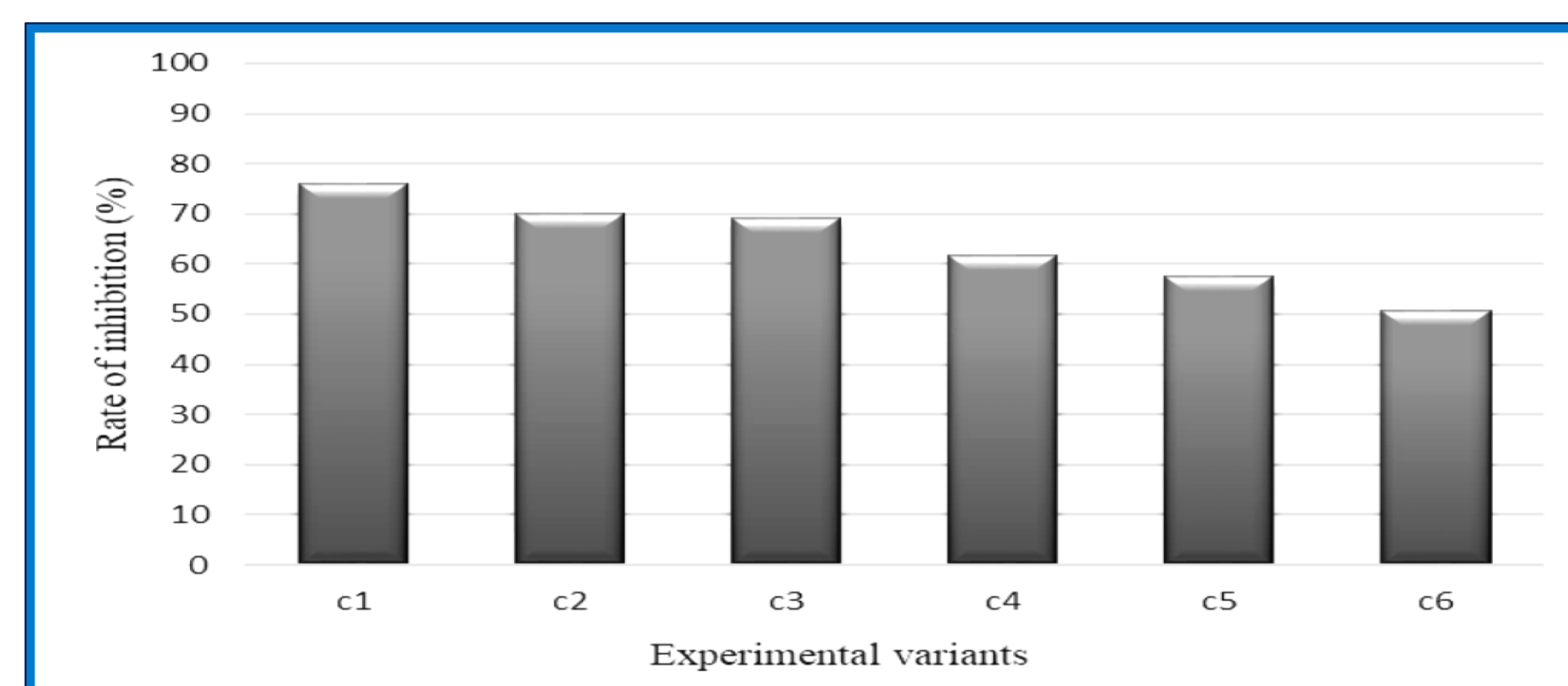


Figure 5. Rate of inhibition of the action of polyfloral honey on the bacterial strain *S. typhimurium*

• Conclusions

- Analyzing the results of our study, it is found that polyfloral honey, from the western part of Romania, has an antiproliferative effect on the tested bacterial strains, in a dose-dependent manner. The **highest inhibition rates** recorded, as a result of the application of polyfloral honey, were obtained at concentrations of 80%, 60% and 40% (c1, c2, c3) on the strains of *S. typhimurium*, *S. pneumoniae* and *S. aureus* (74.90-49.75; 70.20-50.60; 67.20-47.45).
- In the case of *E. faecalis* and *E. coli*, the values of inhibition rates were between 51.50-16.30% and 55.45-25.21%, respectively, an antibacterial effect with moderate intensity of polyfloral honey, being registered only when applying the concentrations c1, c2 and c3, respectively 80%, 60% and 40%.