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"TRADITIONAL" CHARCOAL, COMBINED SORBENTS AND NEW POSSIBILITIES FOR DETOXIFICATION

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Background and Objectives: Advances in medical technology and scientific research in the twenty-first century have prompted a reassessment of the efficacy, indications, and limitations of traditional methods used in efferent therapy. This has led to new approaches to intra- and extracorporeal detoxification, including a shift from conventional, nonspecific carbon-based hemosorbents to synthetic, selective, multimodal sorbents. Research is also focused on developing selective enterosorbents with standardized properties, established long-term safety profiles, and potential for personalized applications. In this context, natural materials offer a promising source of novel sorbents, underscoring the continued relevance of traditional approaches in modern medicine.

Materials and Methods: In the 1980s, the A. N. Natishvili Institute of Experimental Morphology and the Biotechnology Center of the Georgian Academy of Sciences initiated investigations into the biological effects and potential therapeutic applications of Georgian natural zeolites, particularly clinoptilolite-containing tuffs. The present study summarizes a part of this research. The investigation comprised two experimental series. In the first series, ascitic fluid obtained from patients with decompensated liver cirrhosis of various etiologies was analyzed for medium-molecular-weight peptides, proteins, electrolytes, trace elements, ammonia, urea, creatinine, and lipoproteins. In the second series, in vitro perfusion experiments were conducted using a column containing Tedzami zeolite. Samples were evaluated at 30, 45, and 60 minutes of perfusion to assess the sorption capacity of the material.

Results: The experiments demonstrated that Tedzami zeolite was capable of adsorbing medium-molecular-weight peptides, proteins, ammonia, urea, and creatinine, indicating its potential for removing selected metabolic waste products and potentially toxic compounds. Changes in electrolyte concentrations were also observed during perfusion. An increase in cation and anion concentrations was reported at 15 minutes, followed by a return toward normal levels at 45

minutes. This dynamic response warrants further investigation to clarify the underlying mechanisms and determine its clinical significance.

Conclusions: The findings suggest that Georgian natural zeolite, particularly clinoptilolite-containing Tedzami tuff, may have potential as a sorbent for selected endogenous compounds. Further experimental and clinical studies are necessary to characterize its selectivity, sorption kinetics, effects on electrolyte homeostasis, biocompatibility, and safety. These investigations may contribute to the development of natural and combined sorbent systems as potential adjuncts to contemporary detoxification strategies.