

UV-sensitivity of free and immobilized on chitosan matrix proteases

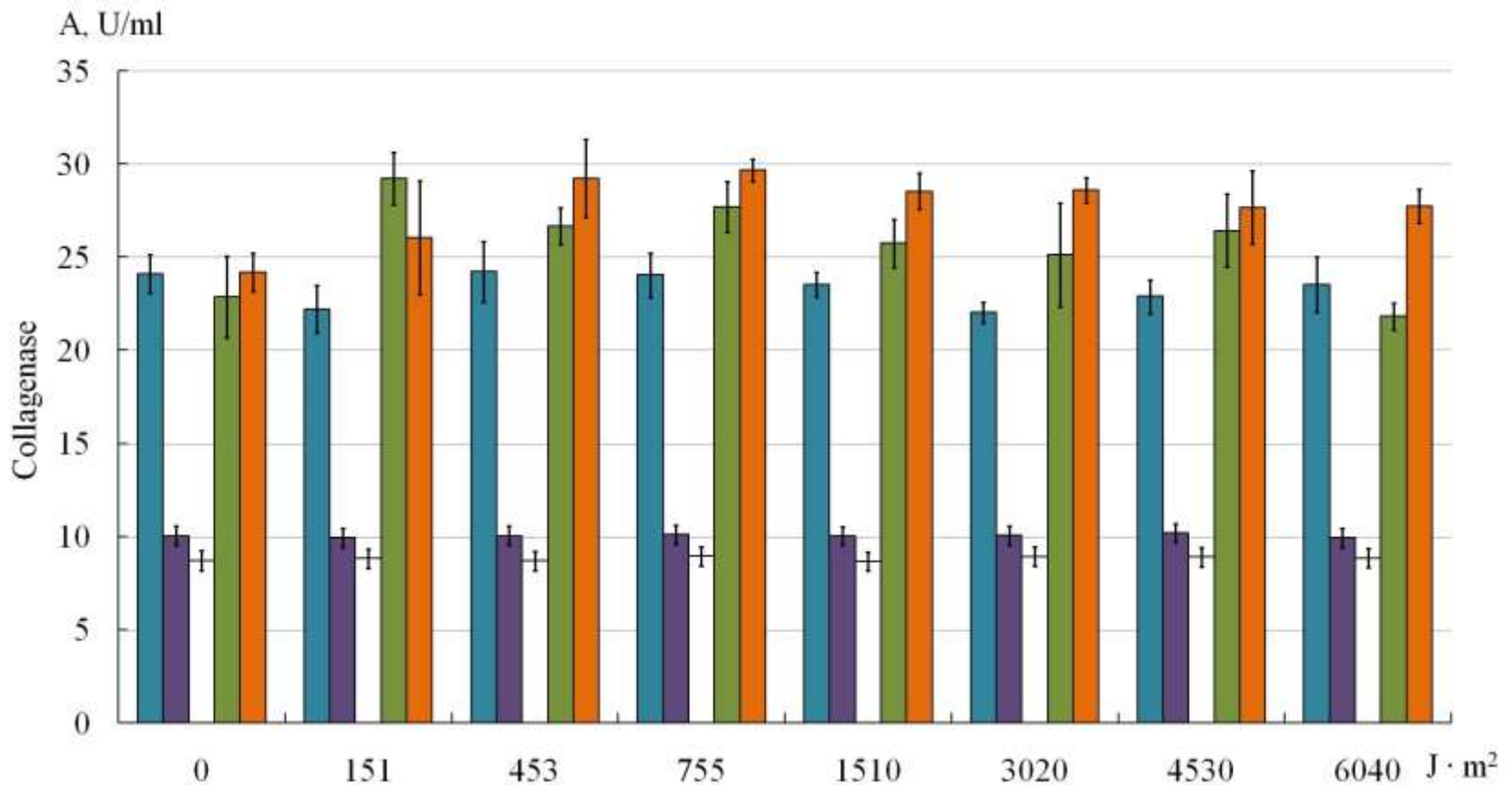
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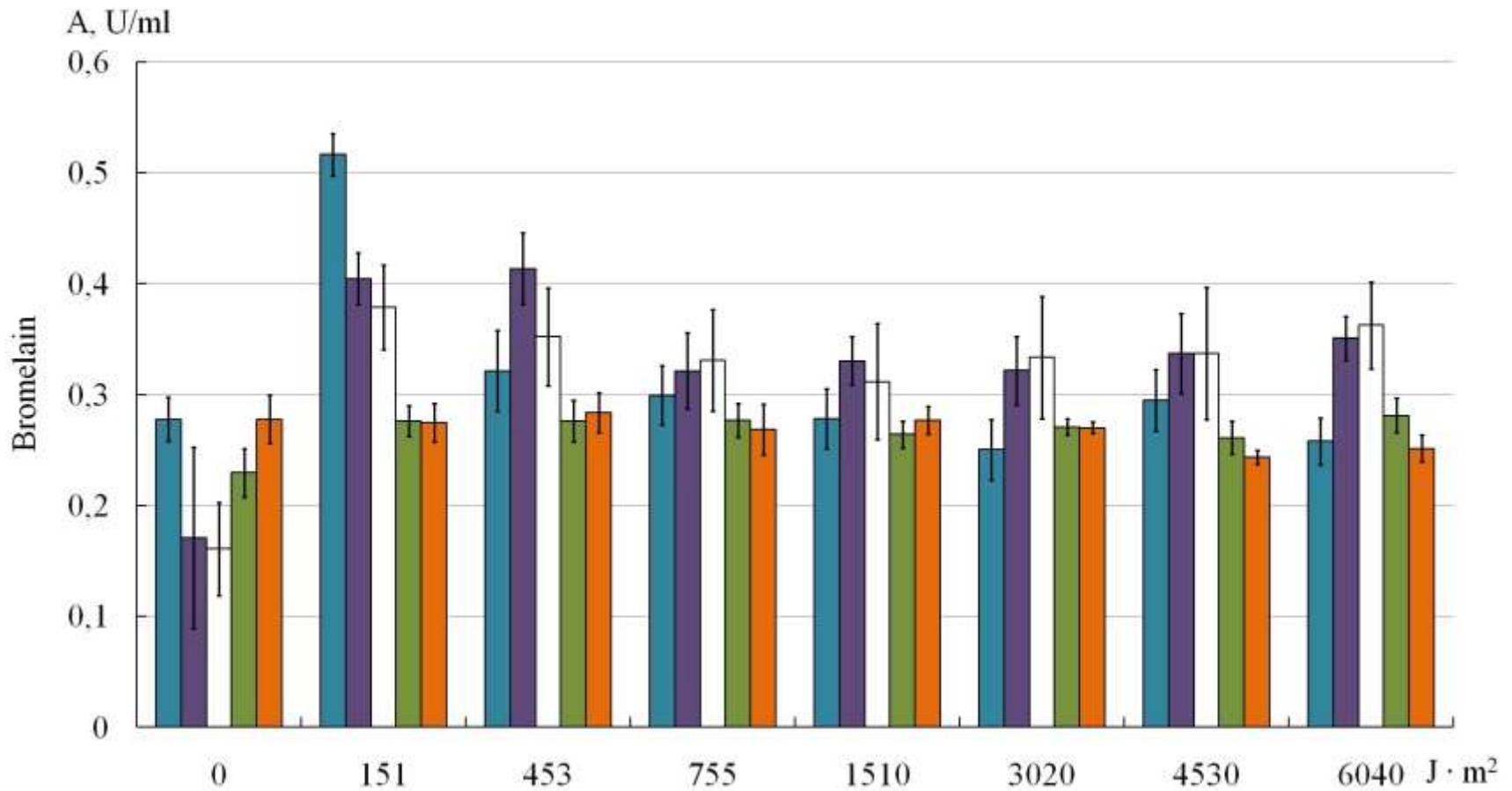
Methods

- Ficin, papain, bromelain, collagenase (Sigma), trypsin («MP biomedical») were chosen as objects of study. bovine serum albumin (BSA) was used as a substrate for hydrolysis. Chitosan (< 100, 200 and 350 kDa) and chitosan succinate («Bioprogress»). was used as a carrier for immobilization.
- The protease immobilization was carried out by the adsorption. The determination of the protein amount in samples and their catalytic activity was carried out by the modified Lowry method. UV irradiation of proteases was performed using doses 151–6040 J/m².

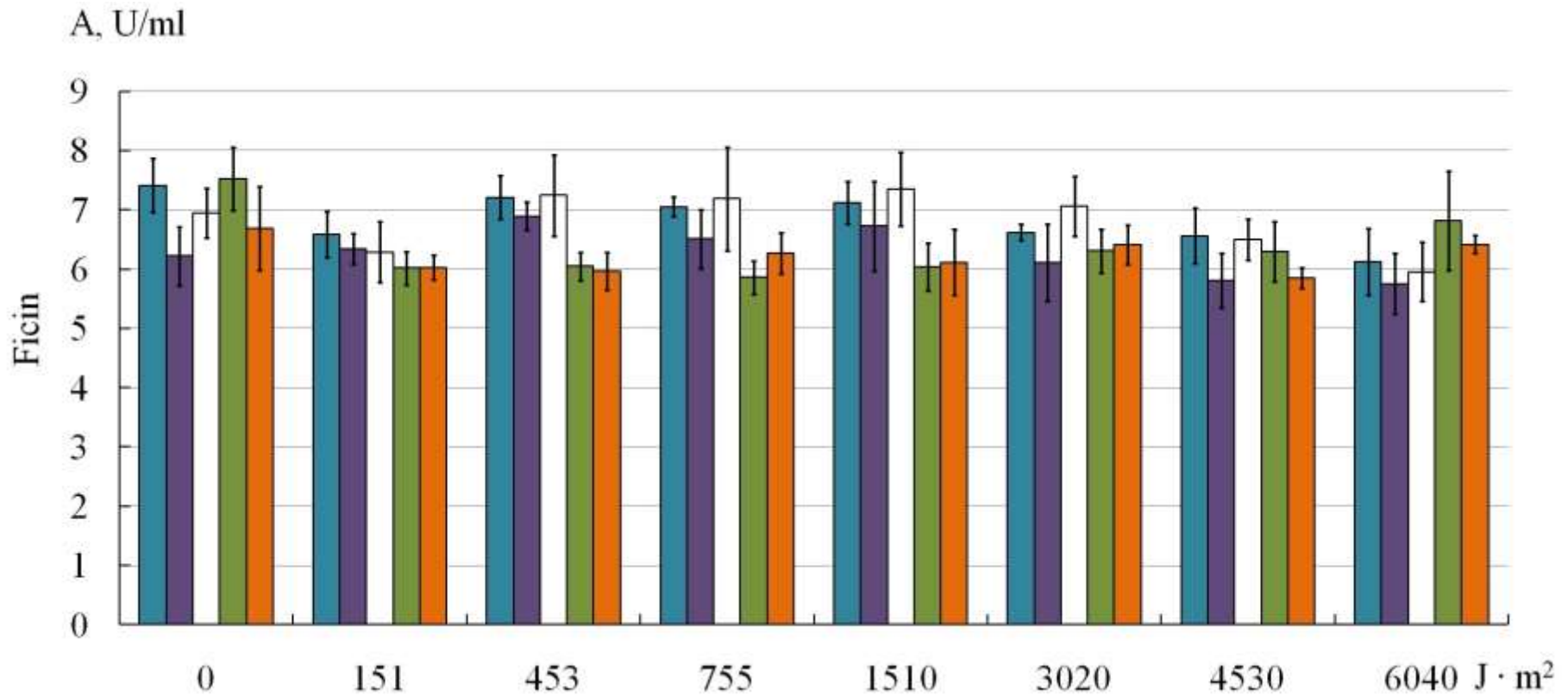
Effect of UV irradiation on the specific catalytic activity. In the graph, blue color is used for the free enzyme, violet for the enzyme immobilized on low molecular weight chitosan, white for that immobilized on succinate chitosan, green for the enzyme immobilized on medium molecular weight chitosan, orange or the enzyme immobilized on high molecular weight chitosan.



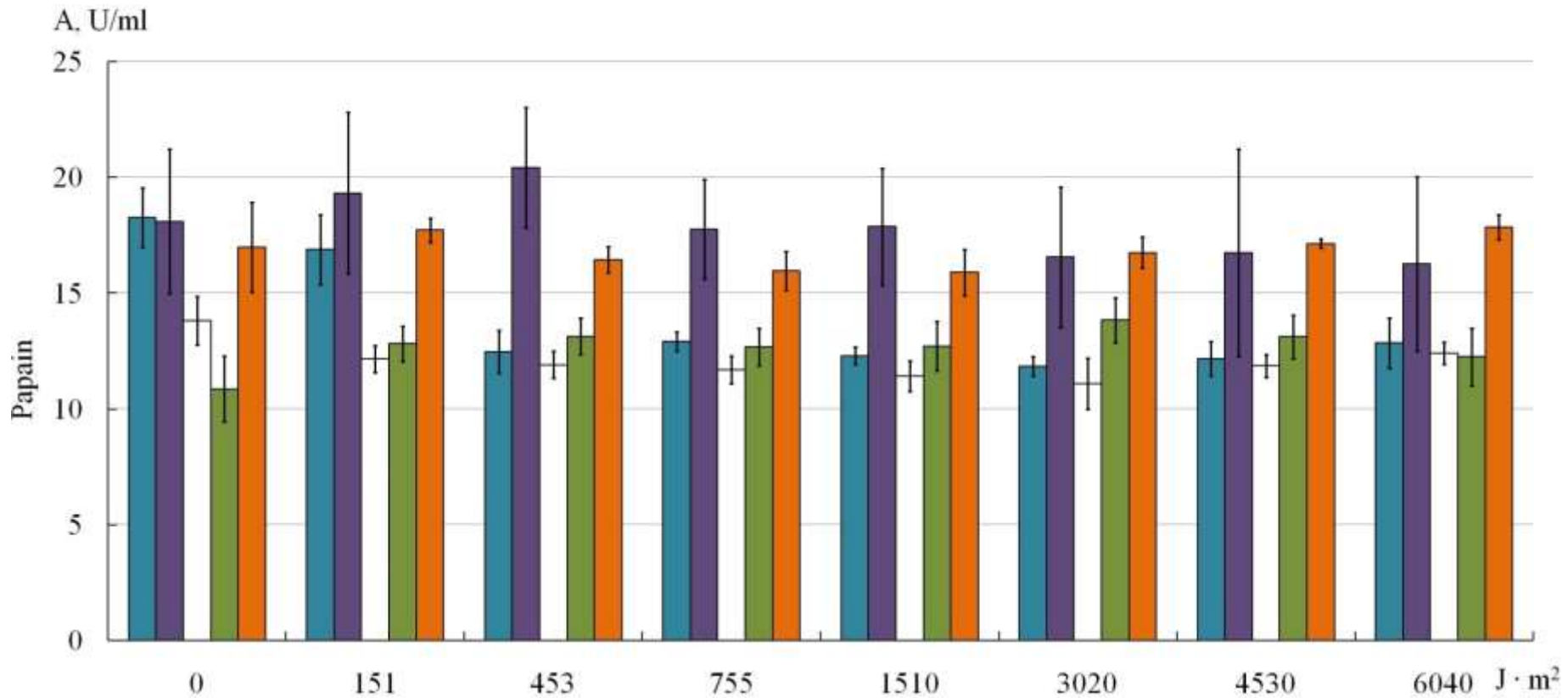
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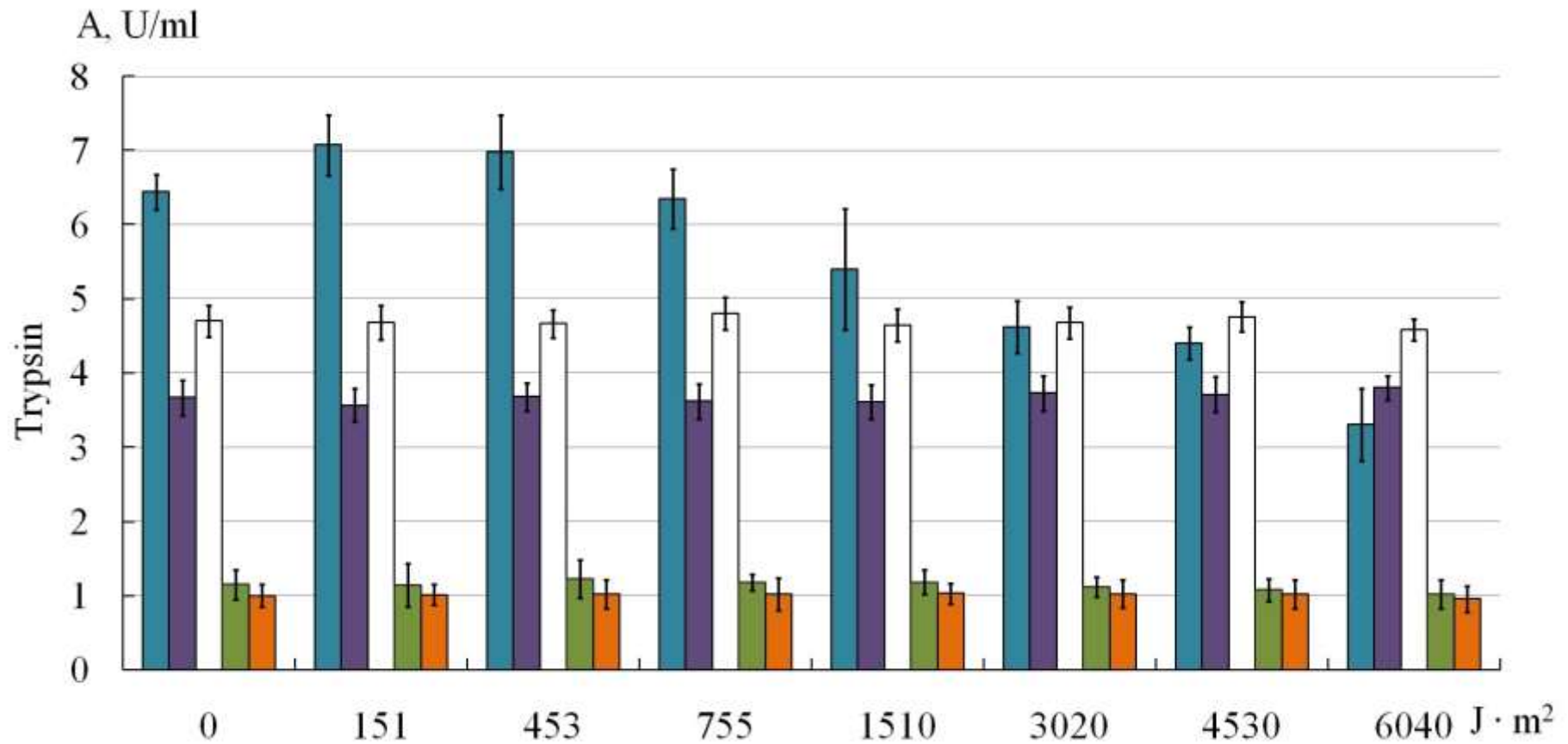
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Conclusions

- The UV exposure changes more likely the enzymatic activity of free protease molecules than that of the immobilized state. Immobilization leads to an increase in the stability of heterogeneous biocatalysts with respect to UV irradiation in comparison with free enzymes.
- The chitosan matrix probably plays the role of photoprotector for immobilized : collagenase, trypsin, ficin, bromelain and papain.
- The obtained results can be useful in the development of ways to combine the effects of UV radiation, proteases and chitosan to repair a wound or a burn and to shorten the time of skin healing, as well as when in optimization of the sterilization conditions for the drugs containing collagenase, trypsin, ficin, bromelain or papain.