FEATURES OF PRODUCING GELS BASED ON CYCLIC DIPEPTIDES

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Gels, belonging to the class of soft condensed matter, are popular research objects owing to their high potential for application in various technologies. Alongside physical gels, supramolecular gels are being actively studied; they demonstrate biocompatibility, biodegradability, and the possibility of fine-tuning their properties, representing an environmentally friendly alternative to conventional synthetic polymers.

Cyclic dipeptides, derivatives of 2,5-diketopiperazines, are promising low-molecular-weight gelators capable of self-assembly into supramolecular structures through hydrogen bonding and van der Waals interactions. Gel materials based on them possess unique physicochemical properties and can be used in biomedical applications as delivery systems for active pharmaceutical ingredients, as well as in optoelectronics and catalysis. Despite the growing number of studies devoted to the gelation of cyclic dipeptides, the literature still lacks any established regularities describing these processes, and the general methodology for preparing such gels remains undefined.

In the present work, a comprehensive investigation of the gelation of a series of cyclic dipeptides: *cyclo*-(Phe-Phe), *cyclo*-(Phe-Leu), *cyclo*-(Phe-Ala), *cyclo*-(Leu-Val), *cyclo*-(Leu-Ala), and *cyclo*-(Val-Ala), was carried out in systems with organic solvents of various classes, both in the presence and in the absence of water. A search for a correlation between the ability of cyclic dipeptides to gel and the physicochemical parameters of these compounds, as well as the medium used, was carried out.