OPINION

on the competition for holding an academic position 'Professior' announced in SG, issue 55, dated 28 June 2024, in professional field 4.2. Chemical Sciences, scientific specialty (Physical Chemistry - dispersion formulation for cosmetics and household chemicals) with a single candidate: Associate Professor Krastanka Georgieva Marinova.

Prepared by Assoc. Prof. Khristo Ivanov Khristov, PhD, member of the Scientific Jury assigned under Order No PA-38-368 dated 08 July 2024 of the Rector of Sofia University 'St. Kliment Ohridski'

Assoc. Prof. Krastanka Georgieva Marinova, PhD, enters this competition with 22 scientific articles, 8 of which were published in Q1 journals, 5 – in Q2 journals and a chapter in a monograph. These articles generated over 480 citations. Her total number of articles amounts to 46 with over 1900 citations. Assoc. Prof. Marinova took part in 32 scientific projects and contracts financed under national and international programmes and funds, being the Project Leader of 5 of them. She was involved in the development of two patents: US Patent No US 8,151,635 B2, 2012, and US Patent App. 16/091,353, 2017. Her record of participation at national and international scientific forums shows 42 attendances with 30 presentations (13 delivered in person) and 12 posters. Assoc. Prof. Marinova supervised and co-supervised graduates, 18 and 7 respectively, and co-supervised 3 PhD theses. Since 2010 she has lectured 4 BS and 4 MS courses in ecochemistry, cosmetics and household chemicals, as well as 2 courses in basic mathematics. Since 2017 she has been the Head of the Masters Programme in Cosmetics and Household Chemicals at the Faculty of Chemistry and Pharmacy, Sofia University.

Assoc. Prof. Marinova is a member of the European Colloid and Interface Society, and of the Bulgarian Association of Cosmetologists, being Association's elected President since 2017. She has represented the Faculty of Chemistry and Pharmacy at the Bulgarian National Association of Essential Oils, Parfumery and Cosmetics since 2016, being Association's Control Council member between 2019 and 2023, and Management Board member since 2023. She participated in several scientific and education networks as a visiting lecturer or as an R&D team member.

Assoc. Prof. Marinova research has been focused mainly in three physicochemical strands:

1. Development and validation of new experimental methods to determine surface tension and rheology of expanding and solidifying fluid interfaces. Articles [1,4,7,9,21]

Developed are an original procedure and a device for a sycronized pressure measurement and axially symmetrical drop and bubble time-profile determination within small time intervals which allow obtaining information about the instance of transition from fluid to elastic surface layers The main advantage is that the procedure (and device) makes it possible to study nonhomogenous anisotropic interfaces and highly viscous systems. A broad spectrum of system physicochemical parameters were measured and the results were published in articles [**1,4,7,9,21**] having a total of 135 citations thus far.

2. Experimental study and physicochemical description of surface properties of nontrivial systems such as systems having very high elasticity and/or viscosity, and composition which depends on the order of component addition, and on temperature [2,6,10,11].

Natural surfactants, called saponins, possess nontrivial bioactivity while being also an effective foam and emulsion stabilizer. These properties make them suitable ingredients in vaccines, food supplements and other products. **[2]** The core surface properties of highly purified Quillaja saponins aqueous extracts were analysed in detail. Studied was the competitive adsorption of hydrophobin (protein) and sodium dodecyl sulfate (an anionic surfactant) via experiments involving parallel and consecutive adsorption of both substances. Expansion elasticity of layers studied reached a high maximum as a function of surface tension which could be explained by the occurance of a phase transion in the protein adsorption layer. **[6]**

It is well-known that hydrophobin molecules have a high crosslinking ability which prompts the formation of a gel-like structure of high mechanical strength, thus making them a good foam and emulsion stabiliser. The study results, described in article **[10]**, indicated that hydrophobin ability to form a dense adsorption layer which blocks oil molecule transition may be used to stabilise microcapsules of perfumes, fragrances, colouring agents or preservatives.
Systematic model experiments to characterise surface tension, surface rheology and thin foam film drainage of a triple surfactant mixture containing nonionic alkyl polyglycoside, ionic sodium lauryl dioxyethylene sulfate and zwitterionic cocamidopropyl betaine were conducted. It was confirmed that delayed foam and thin film drainage correlated with increased surface viscoelasticity in the presence of fatty alcohols. **[11]**
In the last ten years, these articles have generated 163 citations, thus indicating the topical nature and high scientific value of the studies.

3. **Physicochemical characterisation of multicomponent systems applicable to cosmetics and household chemicals, including formulations to be employed in practice**

Contemporary cosmetics and household chemicals use predominantly multicomponent disperse systems with a structure, stability and efficiency directly associated with the properties of stabilizing and/or structuring substances used. Disperse systems for both cosmetic products and detergents were formulated under a systematic physicochemical approach. Stable microcapsules of silicon particles were obtained for capsulation of oils and perfumes via a consecutive and/or parallel adsorption. Studied and optimized were compositions for surface cleaning in household and industrial settings, in personal hygiene, etc., as well as compositions for cosmetic emulsions containing new oils aimed to replace effectively some critical for the cosmetic industry raw materials. [**3,5,8,11,12,13,14,15,16,17,18,19,20,22**]. The articles reflecting this topic have generated 160 citations.
Assoc. Prof. Marinova scientific and applied research along with the large number of citations (over 1900) in scientific literature demonstrate overwhelming that her results exceed significantly the minimum national requirements for the academic position ‘Professor’. Her tutoring and lecturing experience (described above) is also impressive.

CONCLUSION

Assoc. Prof. Krastanka Georgieva Marinova is an internationally renowned researcher with admirable scientific and applied achievements. Her scientometric data exceed substantially the national minimum criteria for holding the academic position ‘Professor’. I strongly recommend to the honourable Scientific Jury to award the academic position ‘Professor’ to Assoc. Prof. Krastanka Georgieva Marinova.

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(Assoc. Prof. Khristo Khristov, PhD)