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Drying drop technology in wine quality control

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The last fifteen years we studied dynamics of self-organizing processes in sessile desiccated droplets of different complex fluids. This problem became very popular among researches all over the world at the moment. It is known that solvent evaporation increases the concentration of components which begin to form aggregates from nano- to submillimeter level. Non-uniform temperature distribution on the drop surface leads to appearance the flows dragging the aggregates to the drop's edge. Then usually gelation of organic components and crystallization of mineral ones take place closer to the central zone. Thus solid-state centro symmetrical spot arises. We developed sensor device+software system for registering and quantitative comparison the dynamics of bottom-up processes in drying drops using acoustical impedansometry. It was found that at the same environment this dynamics could be passport characteristics of the liquid. Every test requires one drop of liquid (3 μl) without any additional reagents and takes 15-20 min. So, it is possible to make rapid evaluation of correspondence of multicomponent liquids to their own standards. This approach has been tested for medical and veterinary diagnostics, quality control of drugs, dairy foods and beverages. Now we demonstrate how this technology can work in assessing the quality of wines. It was shown that every brand of wine has its own "dynamical portrait" which depends also on the grape sort and its place of growing. Some features of the "dynamical portraits" were detected which closely correlate with such factors as extract, ratio, reduced sugars, SO2, phenolic derivatives and organic acids. Further development of the technology is discussed.

Biography

Tatiana Yakhno has completed her PhD (Pathological Physiology) in 1982 from Nizhny Novgorod Medical Institute and Post-doctoral studies from Institute of Applied Physics RAS. She was awarded the degree of Doctor of Science (Biophysics) in 2011 in Institute of Theoretical and Experimental Biophysics RAS. Now she is a Leading Scientist of the Department of Radio-Physical Methods in Medicine. She has published more than 90 papers, book chapters and one monograph.

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