
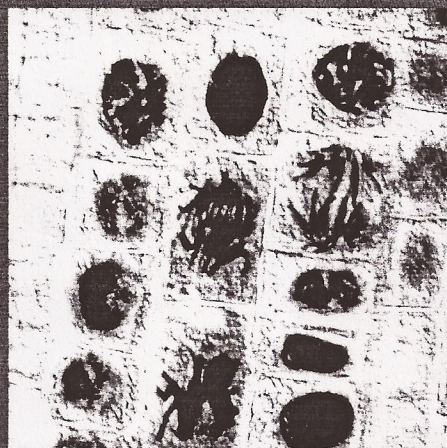
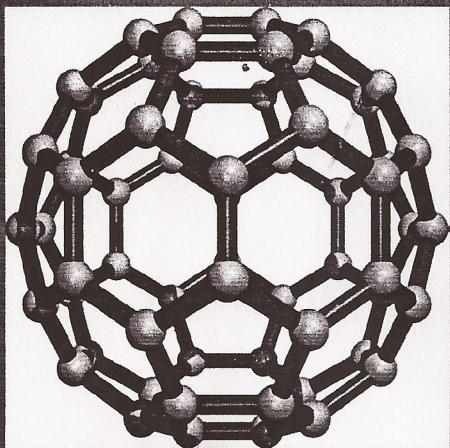
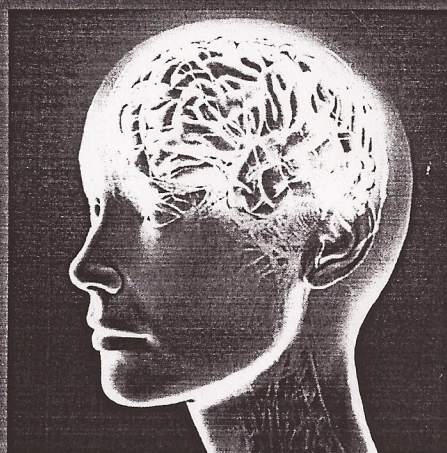
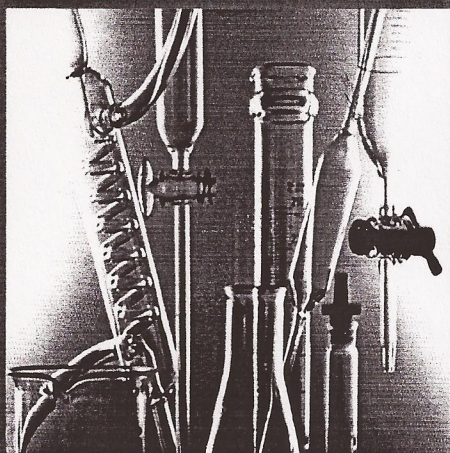


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1 H Hydrogen 1.00794				
3 Li Lithium 6.941	4 Be Beryllium 9.01218			
11 Na Sodium 22.98977	12 Mg Magnesium 24.305			
19 K Potassium 39.0983	20 Ca Calcium 40.078	21 Sc Scandium 44.9559	22 Ti Titanium 47.88	23 V Vanadium 50.9415
37 Rb Rubidium 85.4678	38 Sr Strontium 87.62	39 Y Yttrium 88.9059	40 Zr Zirconium 91.224	41 Nb Niobium 92.9064
			42 Mo Molybdenum 95.94	



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Action of surfactants on the biochemical and morphometric parameters of soft wheat (*Triticum aestivum* L.)

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Abstract

The effect of 1% aqueous solutions of various surfactants on content of free proline and protein, activity of some enzymes of nitrogen and energy metabolism and quantitative changes in anatomical structure of wheat have been studied. Significant accumulation of free proline was shown in roots of wheat plants of Shagala variety exposed to surfactants. It was found out that protein content in seeds of a number of mutant lines increased from 5 to 9%, in compare with the initial varieties Shagala and Zhenis.

It was established that mutants, induced by surfactants, had a significantly higher or lower enzymatic activity in comparison with the original varieties. Mutant lines 1, 7, 23 and 24 represented breeding value on the basis of "leaf pubescence".

Introduction

Kazakhstan is one of the largest grain-producing countries. Area, occupied by major food crop – wheat, is more than 14 million hectares. One of the main factors that increase the grain harvest is a way of breeding – creating high-yielding varieties with the complex of valuable economically important traits and properties.

Success in solving this problem depends on the level of genetic diversity of initial collections of hybrid populations, as well as on methodology of selection of desired genotypes within the breeding process.

Directed mutational variability can be induced by chemical compounds that are involved in plant metabolism and have regulatory mode of action [1]. Chemical compounds, that cause variability with a positive effect, should be picked as mutagens. One of possible choices is surfactants.

Results of experiments on various biological effects and violations of the structure and functions of organisms exposed to synthetic surfactants can be found in literature [2, 3]. Thus, the effect of different concentrations of aqueous solutions of sodium dodecyl sulfate on the viability of aquatic plants (*Potamogeton crispus* L.) showed that the surfactant influenced morphological

characteristics of plants, depending on the level of exposure [3].

Study of wheat growth under the influence of anionic detergent and nonionic surfactant showed both positive and negative effects, depending on concentration and time of treatment. The reason for stimulation of growth is still not clear.

However, the authors have shown that surfactants can have different effects on the organism: interact with structural proteins and enzymes, with cytomembranes, improve absorption of auxin, dissociate the chlorophyll-protein complex, and suppress the synthesis of proteins and DNA [4].

The study of genetic and biochemical characteristics of induced mutants provides an opportunity not only to clarify the mechanisms of mutational variability, but also resolve issues related to the rational use of induced mutants in plant breeding [1].

Plants with altered quantitative and qualitative characteristics, steadily inherited through generations M_1 - M_3 , have been previously obtained using preliminary treatment of seeds with water solutions of surfactants.

For wheat varieties Zhenis and Shagala plants of M_1 generation were obtained, characterized by different morphological characteristics: forms of spikes, grains, length