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## **NANOTECHNOLOGIES OF ADDITIVES-FILLERS FROM CHLOROPHYLL-CONTAINING VEGETABLES WITH RECORD CONTENT OF CHLOROPHYLL**

Chlorophyll-capacity vegetables (parsley, dill) are markedly different from other vegetable matter through high content of chlorophyll (up 1%), ascorbic acid,  $\beta$ -carotene, phenolic compounds, which possess immunomodulatory and anti-oxidant effect. These vegetables and dietary supplements are especially very popular in Japan after the effects of an atomic explosion at Fukushima, Hiroshima and Nagasaki. The Japanese believe that unsaturated conjugated compounds of chlorophyll have antiradiation, anticancer performance and significantly improve immunity, especially in combination with ascorbic acid and  $\beta$ -carotene, which in large quantities are in leafy vegetables. It is known that leafy vegetables are poorly saved and is a seasonal product. Traditional technologies of their processing are lead to significant loss of biologically active substances. In addition, during the processing and preserving of parsley and dill is discoloration and browning of chlorophyll, which is unstable to the influence of various factors (pH environment, temperature, oxygen, light, etc.). This is associated to the replacement of complex linked magnesium in chlorophyll molecule into hydrogen, as a result of this generation we get a feofityn which has brown color. Today powders to the chlorophyll containing vegetables (the chlorophyll containing vegetables) in Ukraine have not found the proper application.

In KSUFTT developed a new technology of finely dispersed powders from chlorophyll containing vegetables - parsley, dill with a particle size is ten times smaller than the traditional milling process. Comprehensive researches (using spectroscopic, chemical, microscopic methods) established patterns of change chlorophyll, carotene, phenolic compounds during coarse and fine grinding (without cold) to the particle size of 5...30 microns dried by vacuum drying CCV. Was established that during fine grinding dried CCV is not only to preserve but also a significant increase in the concentration of low-BAS, that is a more complete removal of them from the raw observed effect of "enrichment" of the product. Additive low molecular BAS during fine grinding (without liquid nitrogen) is 22...80%. Thus, increasing the concentration of chlorophyll a and b is 48 ... 51% of carotenoids - 45...55% ascorbic acid - 22...30%, of low molecular phenolic compounds - 56...80% compared to an initial material (Table 1).

**Table 1 - Physico-chemical parameters and content of biologically active substances in fresh green and finely dispersed powders-dyes from chlorophyll containing vegetables**

The quality score	Feedstock		Finely dispersed additives-dyes	
	greens of a parsley	greens of a dill	with greens of a parsley	with greens of a dill
Chlorophyll a i b, %	0,7±0,01	1,0±0,02	3,9±0,1	4,5±0,1
Carotene, mg in 100 g	3,7±0,06	1,7±0,03	17,9±0,5	8,2±0,2
Ascorbic acid, mg in 100 g	275,3±5,5	115,7±2,3	1344,0±23,3	656,7±12,5
Phenolic compounds (by the chlorogenic acid) mg in 100 g	151,2±3,1	536,2±10,7	776,4±15,8	2786,4±32,5
Tannins (for tannin), mg in 100 g	165,3±3,3	162,4±3,2	823,5±17,3	840,2±16,9
Ash content, %	2,5±0,05	2,7±0,05	11,7±1,6	14,0±1,8
Protein, %	4,5±0,1	4,3±0,1	21,50±2,3	21,24±2,3
Total sugar, %	2,3±0,04	2,1±0,04	11,3±0,9	10,5±0,7
Pectin, %	0,8±0,01	1,2±0,02	4,5±0,1	6,6±0,1
Cellulose, %	1,3±0,02	1,6±0,03	7,2±0,1	8,4±0,2
Acidity titrated, %	0,32±0,01	0,31±0,01	1,6±0,03	1,5±0,04
Humidity, %	85,5±1,7	86,1 ±1,7	7,8±0,1	7,7±0,2

Thus, for the first time in international practice shows that the mechanical action - finely dispersed grinding makes it possible to manipulate of material (plant material) at the molecular level and provides an opportunity to get powder in nanostructured form - biologically active compounds in free form with a molecular size of about one nanometer, which freed from covert forms - coupled complexes BUS with biopolymers (cellulose, protein, pectin, etc.) in free form. In parallel is mehanodestruktsiya and destruction of biopolymers plant material - proteins cellulose (from 30 to 40%) to their constituents - free amino acids and mono saccharides. Size of molecules of substances such as about one nanometer. In this way obtained additives are principally new consumer characteristics compared with initial raw material. New technologies allow us to more fully use the biological potential of materials. The end result is that developed and approved by regulatory documentation for "Vegetables fine dispersed powders" and conducted approbation of new technology in the production environment in the town of Kharkov.