THE CHLOROPHYLLS OF THE GRAPE

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The composition and amounts of the various forms of chlorophylls in the grape have not been studied, although their presence is not a matter of doubt [1]. The influence of chlorophylls on the quality of certain products of the treatment of the grape is also known, particularly in the case of wine where their presence affects the formation of the color range and taste characteristics [2]. The existing technology of the preparation of grape raw material predetermines different degrees of elimination of the elements of the grape in the formation of the composition of the musts which explains the necessity for taking the specific nature of the chemical composition of the initial raw material into account in order to obtain a product of given quality.

In the present communication we give information on the qualitative and quantitative compositions of various forms of chlorophylls in the ripe grape of the culture vine *Vitis vinifera* L. of white (Aligoté, Chasselas, Riesling) and red (Cabernet, Golubok, Odesskii chernyi) varieties. The chlorophylls were isolated from homogenates of the component parts of the grapes by a modified Bligh-Dyer method [3]. The combined green pigments were precipitated with petroleum ether and separated from the accompanying carotenoids and lipids by column chromatography on a mixture of sucrose and starch (3:1) [4]. Separation into individual forms was carried out by thin-layer chromatography on silica gel in the heptane–methyl ethyl ketone (5:3) system. The identification and quantitative determination of the chlorophylls was carried out on the basis of spectrophotometric and chromatographic data [4, 5].

The composition and amounts of the various forms of chlorophylls in the component parts of grapes of the Aligoté variety were as follows (%):

Form of Chlorophyll	Flesh	Skin	Seeds
Pheophytin a	22.0	14.1	8.4
Pheophytin b	15.8	9.4	6.2
Pheophorbide a	4.8	4.0	3.6
Pheophorbide b	3.0	2.7	1.6
Chlorophyll a	26.3	36.6	42.7
Chlorophyll b	12.4	16.0	14.5
Chlorophyllide a	9.8	9.2	15.9
Chlorophyllide b	5.9	8.0	7.1
Total amount of pigments, mg/kg	142	664	209

In all the grape varieties investigated, the composition of the chlorophyll fractions was the same, and the group distribution was similar, in spite of some differences. The highest chlorophyll content was found in the skin. The amount of pigments in the seeds was usually somewhat higher than in the flesh. The red varieties of grape were distinguished by greater amounts of chlorophylls in the flesh and skin. Thus, for example, for the Cabernet variety the amount of chlorophyll in the flesh was 217 and in the skin 821 mg/kg. In the seeds of the red varieties, the amount of chlorophylls was, on an average, 10-25% lower than in those of the white varieties. The flesh differed from the other elements of the grape by its high content of magnesium-free forms of chlorophyll, which is evidently connected with the conversion of chlorophyll under the conditions of an acid medium [4]. The presence of phytol-free forms of chlorophyll is explained, to all appearance, by the activity of chlorophyllase, which is widely distributed in plant tissues [1]. The relative amounts of the main representatives — chlorophylls a and b — were highest in the seeds (>55%) and somewhat lower in the skin (≈50%). In all cases, the amount of the a forms of chlorophyll and

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its derivatives was greater than that of the b forms. This feature was more clearly pronounced for the red varieties of grape, which is possibly connected with the increased amount of phenolic compounds in them, these being natural antioxidants capable of inhibiting the oxidative conversion of the a forms of chlorophylls into the b forms.

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