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The grinding process as a determinant of the chemical properties of freeze-dried fruits

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Fruit are characterised by chemical properties that play a significant role in the functioning of the human body. Many fruits are available only at certain times of the year. For this reason, fruits are preserved, including through freeze-drying. Freeze-dried fruits are available on the Polish market in various forms, including whole fruit and those ground into grits or powder. The grinding process of freeze-dried fruit can alter the chemical properties of these products.

The study aimed to assess the effect of the grinding process on selected chemical properties of freeze-dried fruits. The research material consisted of freeze-dried strawberries, raspberries, cherries, blueberries, blackcurrants, and blackberries, in whole form and as grits and powder. They were purchased online.

Chemical properties were determined based on the determination of water content and activity, total anthocyanin content, vitamin C, total polyphenolic compounds, and the degree of free radical reduction. The obtained results were statistically analysed. The effects of species and the grinding process on the analysed chemical parameters in freeze-dried fruits were determined using multivariate analysis of variance (ANOVA). The significance of differences between the study groups was tested using Tukey's test. Relationships were considered statistically significant at $p < 0.05$.

The study showed that whole freeze-dried fruits had lower water content and activity, higher levels of anthocyanins, vitamin C, and polyphenolic compounds, and a greater ability to reduce free radicals than ground freeze-dried fruit. Grinding into grits or powder significantly reduced the chemical properties of the analysed products. Furthermore, significant differences in the chemical properties of freeze-dried fruits were observed across species.