THE ACIDIFIER FROM UNRIPE APPLES – SOURCE OF NATURAL ACIDITY

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The unripe apples, obtained from agrotechnical operations or physiological falls, are not used for food. These are a source of natural organic acids, the dominant being malic acid (about 70-90%) [1, 2], and other valuable substances. In the food industry there is a need for sources of natural acidity. For this purpose, experimental samples of acidifiers from unripe apples were obtained [3]. At the same time, the rational use of these fruits will contribute to solving ecological problems [4]. In this paper, the content of dominant organic acids in apple acidifiers was studied.

The acidifiers were obtained from unripe apple fruits of 4 varieties: Coredana, Golden Rezistent, Rewena și Reglindis. These were picked between June 1 and July 24, 2020 from the experimental lots of the Scientific-Practical Institute of Horticulture and Food Technologies, Chisinau, Republic of Moldova. The fruts were harvested during development at 45^{th}, 58^{th}, 71^{st}, 84^{th} and 97^{th} days after the full bloom. The titratable acidity, expressed in malic acid, was determined by titration with alkaline NaOH solution (0.1 N) in the presence of the phenolphthalein indicator [5]. The concentrations of malic and citric acids were determined by the capillary electrophoresis method [6].

In this paper, the titratable acidity and the content of predominant acids in apple acidifiers were studied. According to the literature, the dominant acids in apples are malic and citric [7]. The titratable acidity decreases on average from 29,5 $^{g}/_{dm^3}$ to 12,0 $^{g}/_{dm^3}$. The content of organic acids during fruit development decreases, as a large part of the acids are used in the process of respiration and are converted into carbohydrates. [8].

In acidifiers the content of malic and citric acid varies between the limits 16,35 $^{g}/_{dm^3}$ and 9,24 $^{g}/_{dm^3}$ and, respectively, 2,86 $^{g}/_{dm^3}$ and 1,68 $^{g}/_{dm^3}$, depending on the variety of apples from which they were obtained and the period of their harvest (figures 1 and 2).

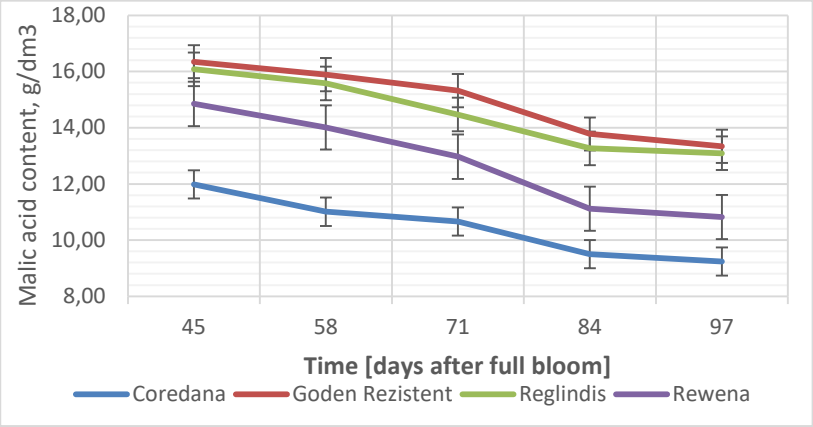

Fig. 1. Malic acid content in acidifiers from unripe apples of varieties Coredana, Golden Delicios, Reglindis, Rewena during the development of fruits. Source: authored

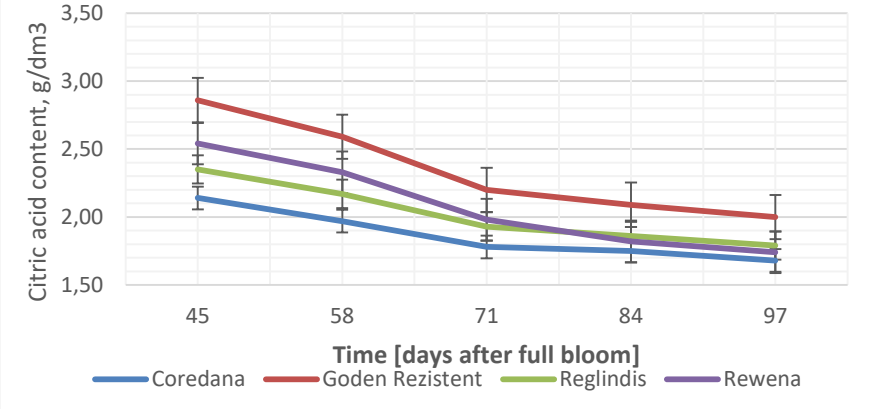

Fig. 2. Citric acid content in acidifiers from unripe apples of varieties Coredana, Golden Delicios, Reglindis, Rewena during the development of fruits. Source: authored

All types of acidifiers contained a relatively high concentration of malic acid and citric acid, representing 71.09% - 81.24% and 8.66% - 14.46% of the total acidity content.

The apple acidifiers contain significant amounts of native organic acids, the dominant acids being malic and citric. They can supply the necessary sources of natural acidity in the food industry, especially in the preservation of fruits and vegetables, substituting acidifiers of chemical / biochemical origin. This can improve the nutritional value of food.

Also, obtaining fo acidifiers from unripe apples as a source of acidity for the food industry is an important direction in the context of sustainable development.

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