

## The influence of thermal processing on the goat milk antioxidant properties

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### Abstract

Milk and dairy products are an integral part of the human diet due to the content of important nutritional compounds, such as proteins, essential amino acids, fatty acids, calcium and biological compounds important for the consumer physiological functions.

In recent years in the Republic of Moldova, goat's milk has become a common raw material in the diversification of local dairy products, industrial production. Goat's milk is characterized by a well-balanced chemical composition, namely due to the ratio between casein fractions ( $\beta$  and  $\alpha$  casein), the fat content and quality, respectively fat-soluble vitamins, the lactoferrin content that contributes to the formation of special functional properties.

In the context of the milk thermal processing, manufactured at industrial scale, the purpose of this scientific paper is to identify how thermal treatment methods affect the antioxidant properties of goat milk.

Goat milk samples were used for the research: whole, pasteurized, heat-treated UHT, powdered milk. The antioxidant activity was determined by the method based on the discoloration of the stable DPPH radical and the total content of polyphenols according to the Folin-Ciocalteu method.

The results obtained showed that the UHT milk has the highest antioxidant activity, followed by powdered milk and pasteurized milk. Whole milk showed the lowest antioxidant activity. Thermal treatment can increase the milk antioxidant capacity due to the proteins degradation and the exposure of thiol groups, which can act as hydrogen donors, as well as the formation of Maillard reactions compounds, especially melanoidins, which have a strong antioxidant activity.

Polyphenols are inorganic chemical compounds with a prominent antioxidant character, reduce oxidative stress, have anti-inflammatory, anti-cancer and immuno-protective qualities. The content of polyphenols largely depends on the milk fat content. Thus, the results obtained showed maximum values for whole and pasteurized milk, followed by UHT milk and powdered milk. Also, a thermal treatment at high and long-term temperatures will contribute to reducing the polyphenol content.

The obtained results show that heat treated goat milk, besides the fact that it keeps its chemical composition, obtains special functional properties, being fortified with natural biologically active compounds obtained as a result of protein degradation and from temperature-catalyzed reactions between milk components.

**Keywords:** goat milk, caseine, antioxidant activity, polyphenol

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