



# Total content of flavonoid and derivatives of dihydroxycinnamic acid of biscuits prepared with wheat and quinoa flour

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## Introduction

Today, bioactive compounds have an increasing role in the diet of modern man. Flavonoid compounds and derivatives of dihydroxycinnamic acid are micronutrients in our diet for which it has been reported to have multiple biological effects. In addition, quinoa flour is increasingly used today because it increases the biological value of wheat bakery products by increasing the content of proteins, minerals and antioxidant compounds. Total flavonoids content and derivatives of dihydroxycinnamic acid of biscuits prepared with wheat (90%) and quinoa (10%) flour was investigated.

## Materials

Biscuits were produced from composite flours prepared by mixing whole wheat flour and quinoa flour: 90:10. The dough was prepared by mixing eggs (36%), honey (17%) and sugar (50%) in a mixing bowl for 5 minutes. Each composite flour (100%) with the addition of dough rising agent (1.2%) and the spices were added to the mass and the dough was mixed for another 5 min. After 20 minutes of resting, the dough was divided into smaller pieces (27 g) and the honey biscuits were shaped by hand, forming a hemisphere 2 cm high. Due to spreading during baking, a distance of 3 cm between the pieces of dough was made. The baking was conducted in a baking oven at a temperature of 200 °C for 12 minutes. Baked biscuits were left to cool down for 3 to 4 hours.

## Results

A difference was observed in the content of total flavonoids in wheat flour and quinoa flour, whereby the presence of flavonoids was not registered in wheat flour extract. Statistically significant differences were observed in the content of dihydroxycinnamic derivatives in wheat flour and quinoa flour. The presence of flavonoids was not registered in biscuit extracts. The reason for this can be a significant impact on the reduction of flavonoids of quinoa seeds after the baking process. The results indicated that the content of dihydroxycinnamic derivatives in the biscuit extracts was relatively close to the content in the flour used. This may be due to the relatively good thermal stability of these components. Namely, it is known that crosslinking of the cinnamoyl groups in the copolymers of dihydroxycinnamic acid affect the thermal stability.

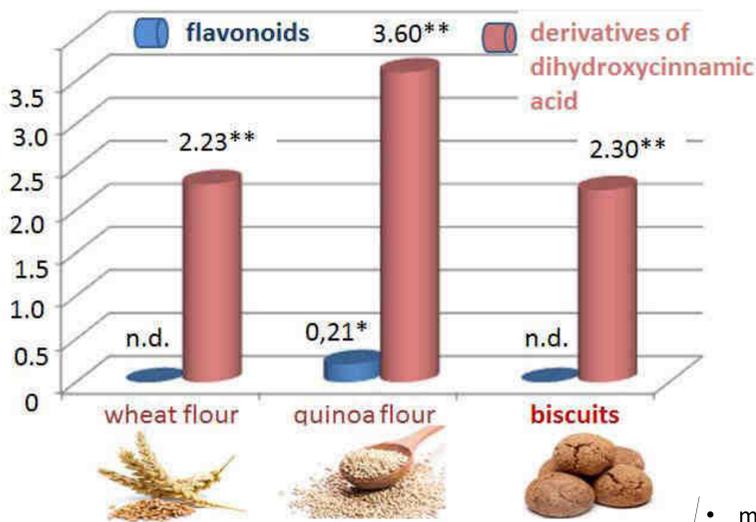


Figure 2. Content of flavonoid and derivatives of dihydroxycinnamic acid of wheat and quinoa flour and biscuits

\* mg quercetin equivalents/g dry weight sample  
\*\* mg chlorogenic acid equivalents/g dry weight sample  
n.d. - not detected

## The aim

The aim of this work was to determine the content of flavonoids and derivatives of dihydroxycinnamic acid of biscuits prepared with wheat and quinoa flour.

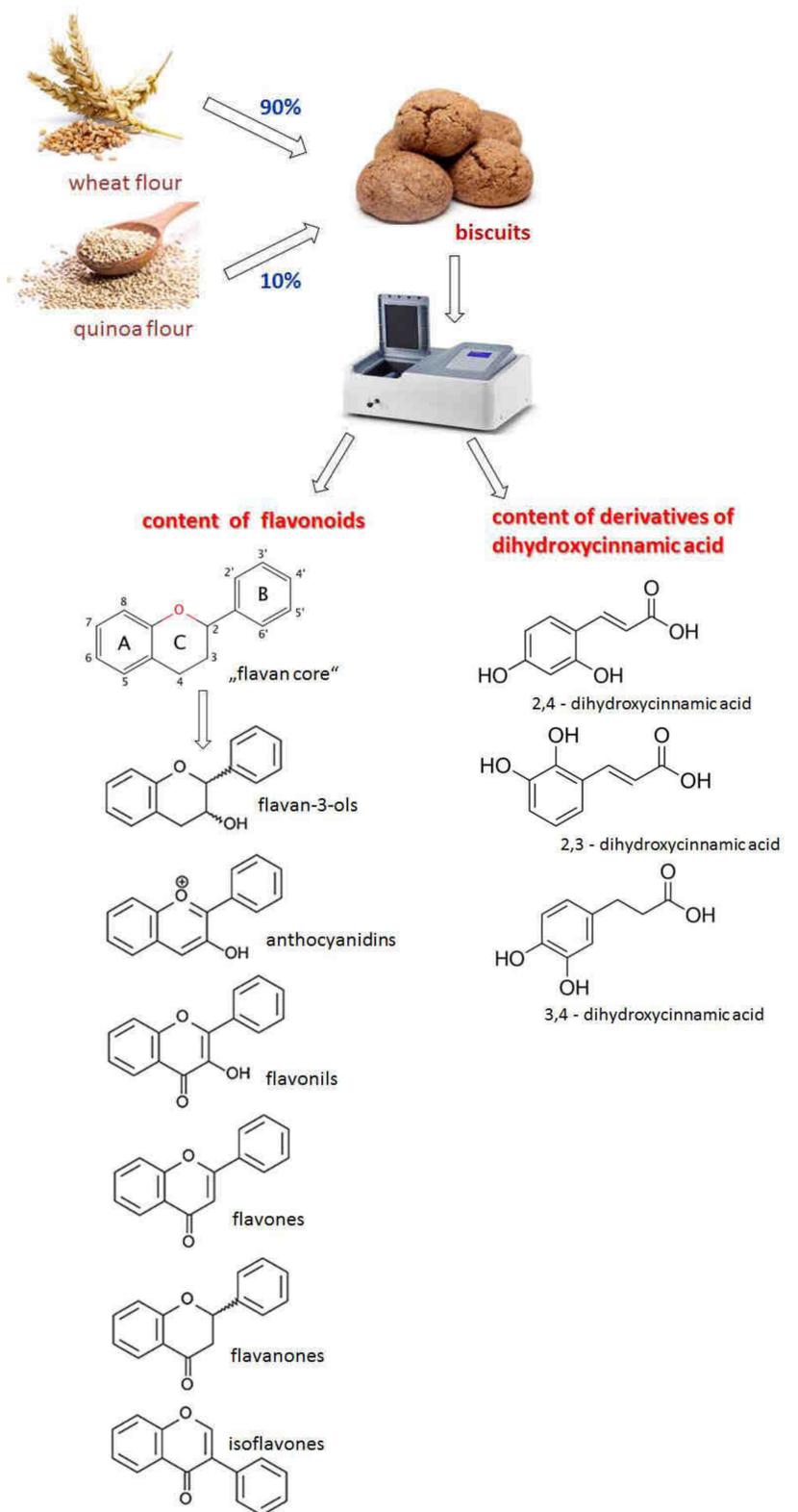


Figure 1. Schematic representation of materials and methods of work.

## Conclusions

The obtained results indicate a significantly different thermal stability of the tested components in the prepared biscuits.

