INFLUENCE OF CARRIER AGENTS ON THE CHEMICAL COMPOSITION AND PHYSICAL PROPERTIES OF BLUEBERRY (*VACCINIUM MYRTILLUS* L.) POWDER PRODUCED BY SPRAY DRYING

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INTRODUCTION

Phenolic compounds, especially anthocyanins, are the main bioactive compounds with functional benefits in blueberries. During the processing and storage significant amount of these compounds decreases. One of the pronounced methods for the increasement of the shelf life of the bioactive compounds, protecting from environmental conditions and avoiding oxidation is encapsulation. The aim of the research was to evaluate the influence of maltodextrin and inulin on the quality of blueberry juice powder.

MATERIALS AND METHODS

Corn maltodextrin (14 – 17 dextrose equivalent) and chicory inulin were used for the experiment. The blueberry juice was mixed with 10, 20 and 30 % of maltodextrin, also with 10, 20 and 30 % of maltodextrin and inulin at the ratio 1:1. The same additives were added to the blueberry juice dissolved in distilled water at the ratio 1:2 (the additive:distilled water). The blueberry juice with additives was spray dried by LabPlant SD-06 (Keison products, United Kingdom). Juice drying parameters: supplied liquid flow - 436.5 ml h^{-1} or 7.28 ml min^{-1} (± 10%); air flow-87.6 m^3val^{-1}. Inlet and outlet air temperatures 140 °C / 70° C. A constant pressure of 0.8 bar was maintained, a 2 mm nozzle was used. It was calculated blueberry juice powder yield by the equation of Saavedra-Leos et al. (2019) and the spectrophotometric method was used to determine the content of total phenols, anthocyanins and antioxidant activity.

RESEARCH RESULTS

Table. 1. The blueberry juice powder yield, %

Blueberry juice powder	Powder yield, %	
	Undissolved in water	Dissolved in water
MSMD10	2.33±0.08c	3.19±0.27d
MSMD20	3.26±0.14d	3.97±0.13ef
MSMD30	3.69±0.28e	4.40±0.16g
MSMDI10	0.00±0.00a	0.00±0.00a
MSMDI20	1.83±0.27b	3.91±0.14ef
MSMDI30	3.17±0.24d	4.11±0.16f

Note: significant differences between averages in the column are marked with different small letters, when p ≤ 0,05. MSMD10 – blueberries juice powder with 10 % of maltodextrine, MSMD20 – with 20 % of maltodextrine, MSMD30 – with 30 % of maltodextrine, MSMDI20 – with 20 % of maltodextrine and inuline (1:1), MSMDI30 – with 30 % of maltodextrine and inuline (1:1).

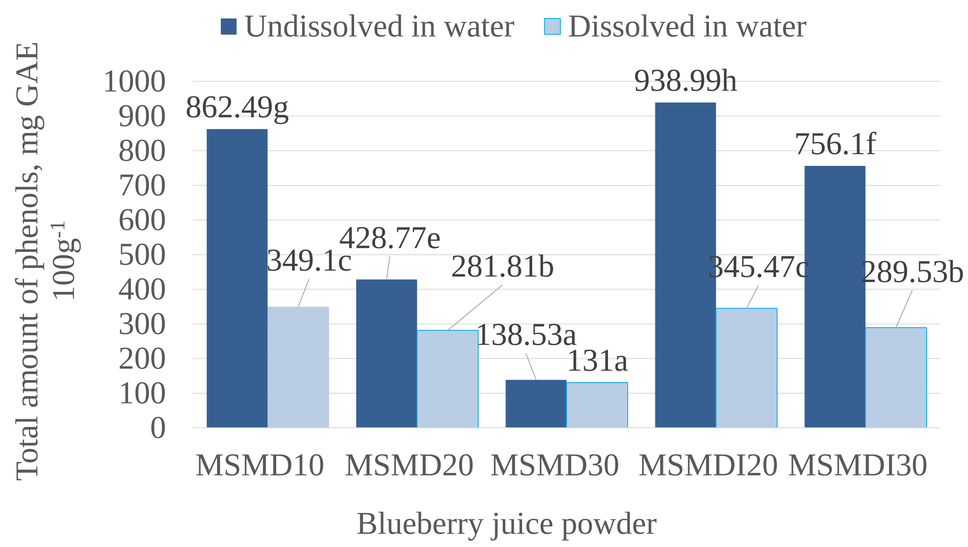

Fig. 2. Total amount of phenols in blueberry juice powder, mg GAE 100 g $^{-1}$

Note: significant differences between averages in the columns are marked with different small letters, when p ≤ 0,05.

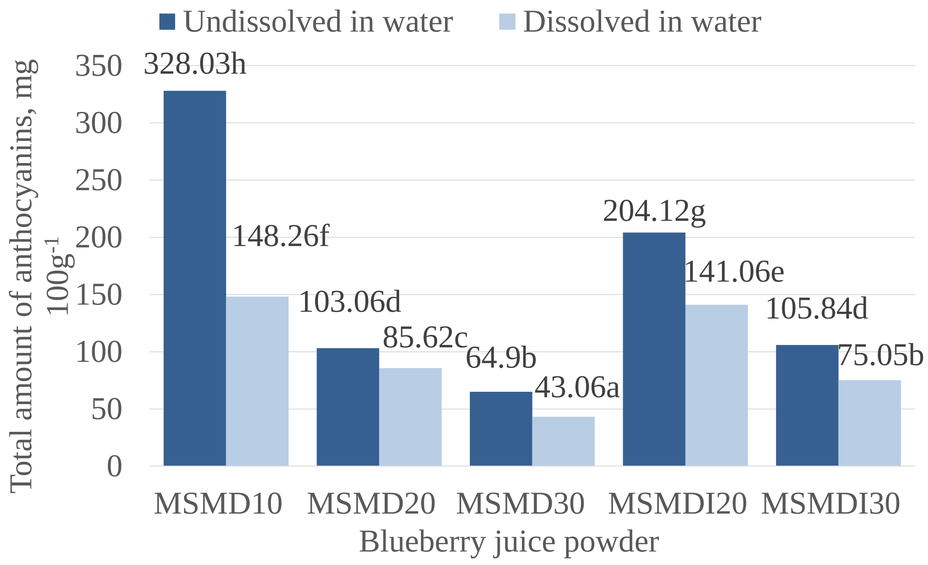

Fig. 3. Total amount of anthocyanins in blueberry juice powder, mg 100 g $^{-1}$

Note: significant differences between averages in the columns are marked with different small letters, when p ≤ 0,05.

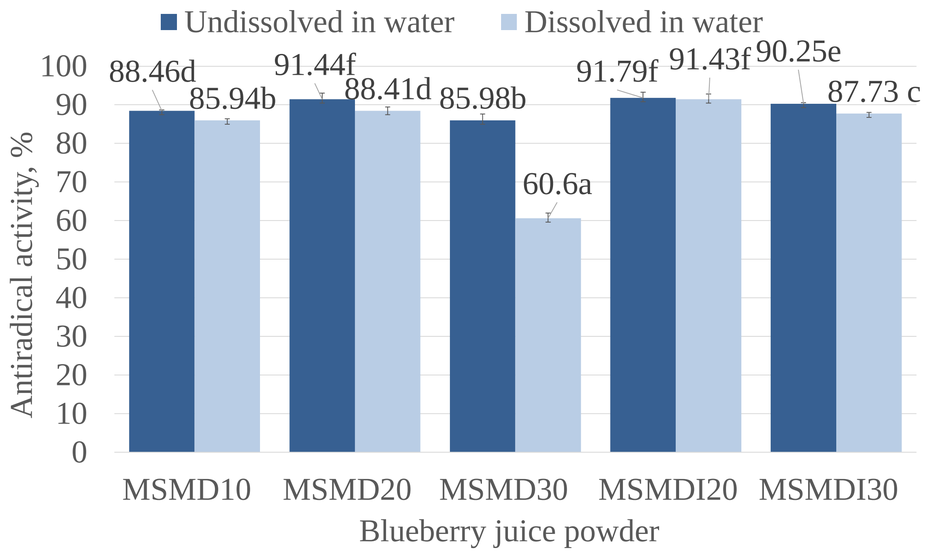

Fig. 4. Antioxidant activity of blueberry juice powder, %

Note: significant differences between averages in the columns are marked with different small letters, when p ≤ 0,05.

CONCLUSIONS

The results obtained in this study demonstrate that additives dissolution before spray drying results in a higher powder yield but a lower amount of biologically active substances and antioxidant activity of powder. The mixture of inuline and maltodextrine resulted the higher content of phenols, anthocyanins and antioxidant activity of powder. Prebiotic dietary fiber such as inulin demonstrate the potencial use as alternative carrier agent with additional nutritional value.

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