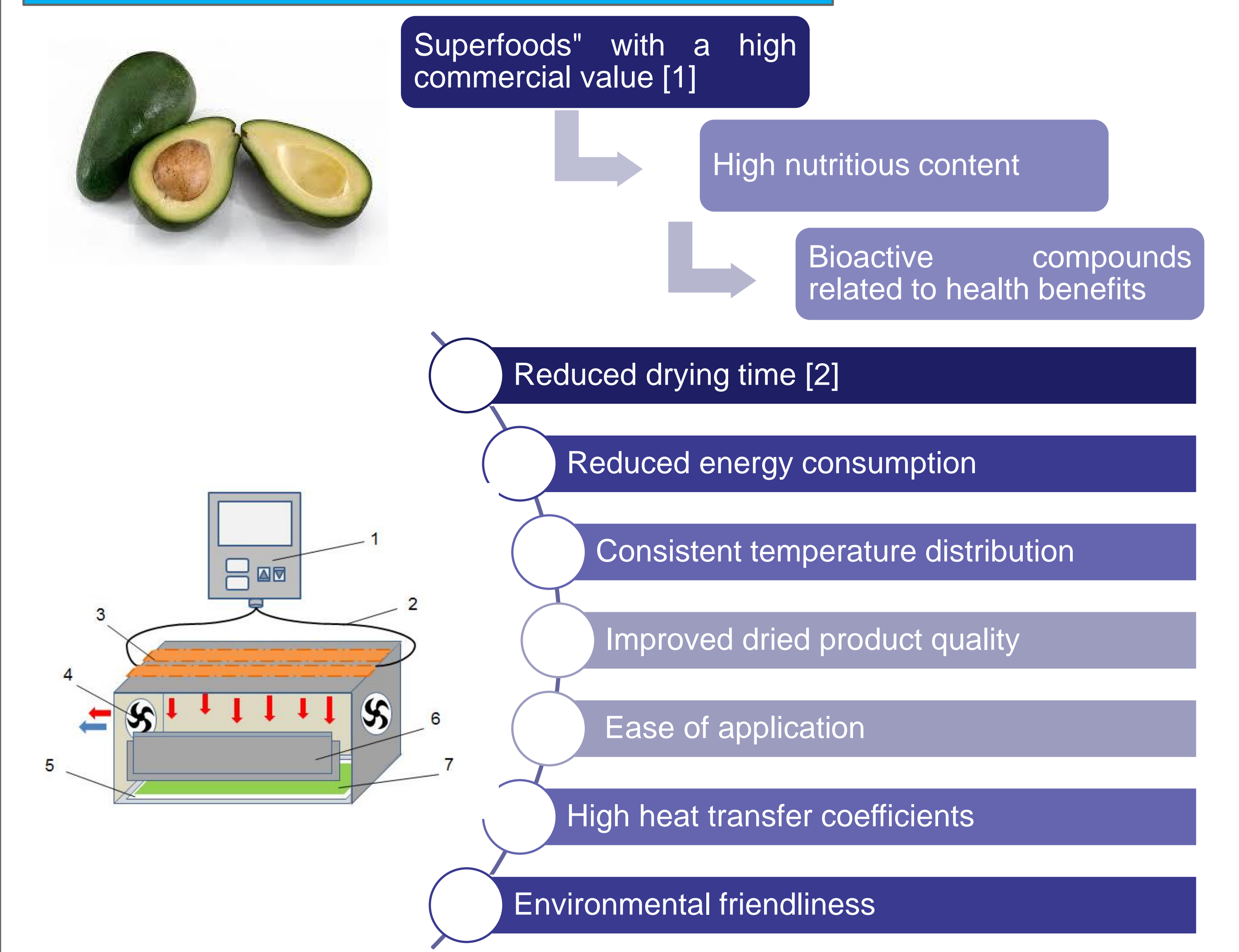


ABSTRACT

In this study, avocado pulp with a good nutritional profile and economic value was dehydrated using infrared drying to produce pulp powder, which shows potential application in nutritional supplements. An experimental design with two factors, namely maltodextrin level (0% and 9%) and infrared temperature (ranging from 65 to 80 °C), was used. Responses related to the physicochemical properties of the resulted powder were observed, including peroxide value, total polyphenols, total chlorophylls, antioxidant activity, and color parameters (L*, a*, and b* values). The quality of dried products may be harmed by drying either at a high temperature or for an extended period of time. The coating substance maltodextrin was found to be beneficial in limiting unexpected changes in avocado pulp subjected to infrared drying. The highest quality of dried avocado could be obtained via infrared drying of avocado pulp with 9% maltodextrin at 70 °C, as illustrated by the exceptional retention of total polyphenols, total chlorophylls, and antioxidant activity, being 95.1, 95.2, and 94.4%, respectively. Moreover, the short drying time (35–55 min) led to the minimization of lipid oxidation and the absence of peroxide compounds in all sample [4]

INTRODUCTION



RESULTS AND DISCUSSION

The Quality of Avocado Flesh

Table 1. The physicochemical properties of avocado pulp powder obtained by infrared drying. [4]

Characteristics	Unit	Value
Moisture	g/100 g	82.4 ± 0.5
TPC	mg GAE/g d.b	5.33 ± 0.06
TCC	µg/g d.b	260.38 ± 5.52
AA	mg TE/g d.b	1.60 ± 0.05
PV	meq/kg	Not detected
Color parameters		
L* value		60.87 ± 0.59
a* value		-23.11 ± 0.96
b* value		55.82 ± 1.13

Total Polyphenols, Total Chlorophylls, and Antioxidant Activity

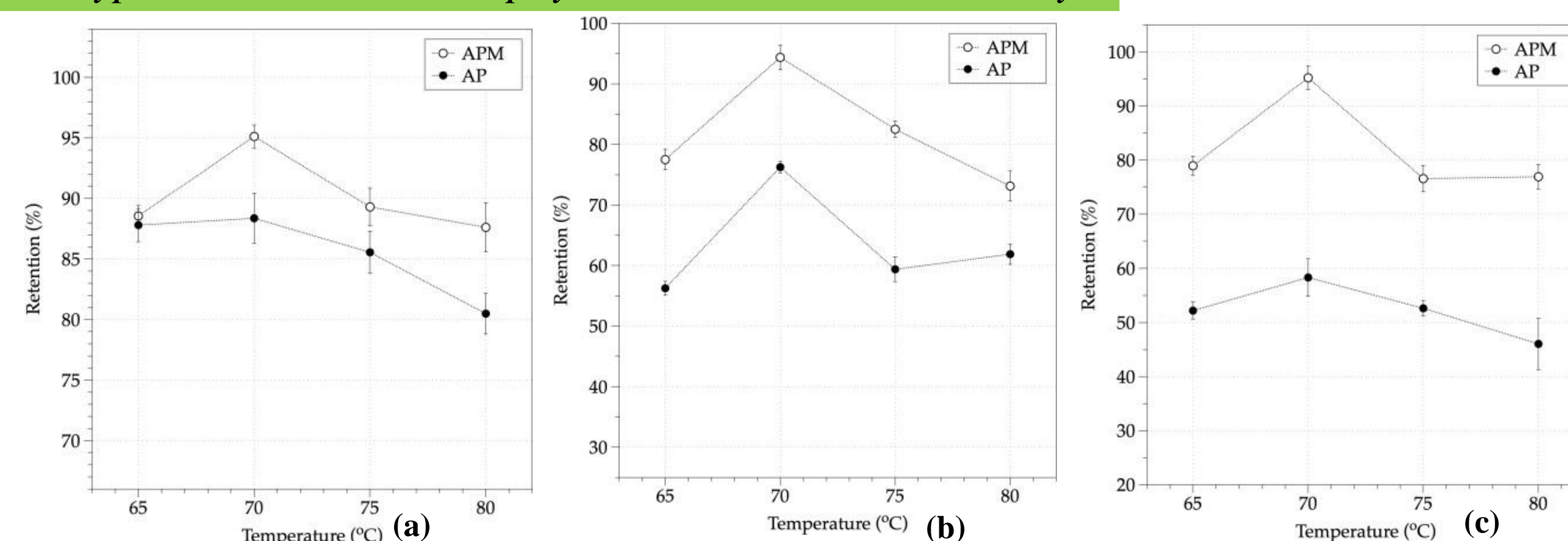


Figure 1. The retention of total polyphenols (a), total chlorophylls (b), and antioxidant activity (c) of avocado pulp powder obtained by infrared drying at different drying temperatures and formulations [4]

Table 2. Pearson correlation coefficients between the total phenolic content (TPC), total chlorophyll content (TCC), antioxidant activity (AA), and color parameters (L*, a*, b*) of avocado pulp powder obtained by infrared drying. [4]

	TPC	TCC	AA	L*	a*	b*
TPC	1					
p-value	-					
TCC	0.83	1				
p-value	7.1×10^{-7}					
AA	0.77	0.90	1			
p-value	9.6×10^{-6}	2.4×10^{-9}				
L*	0.93	0.72	0.71	1		
p-value	6.7×10^{-11}	7.0×10^{-5}	1.1×10^{-4}			
a*	-0.79	-0.82	-0.73	-0.78	1	
p-value	5.2×10^{-6}	7.8×10^{-7}	6.0×10^{-5}	5.7×10^{-6}		
b*	0.93	0.91	0.79	0.87	-0.91	1
p-value	2.5×10^{-11}	8.1×10^{-10}	3.9×10^{-6}	4.5×10^{-8}	6.1×10^{-10}	

Correlations in bold are significant at the 1% level (2-tailed).

Color Parameters

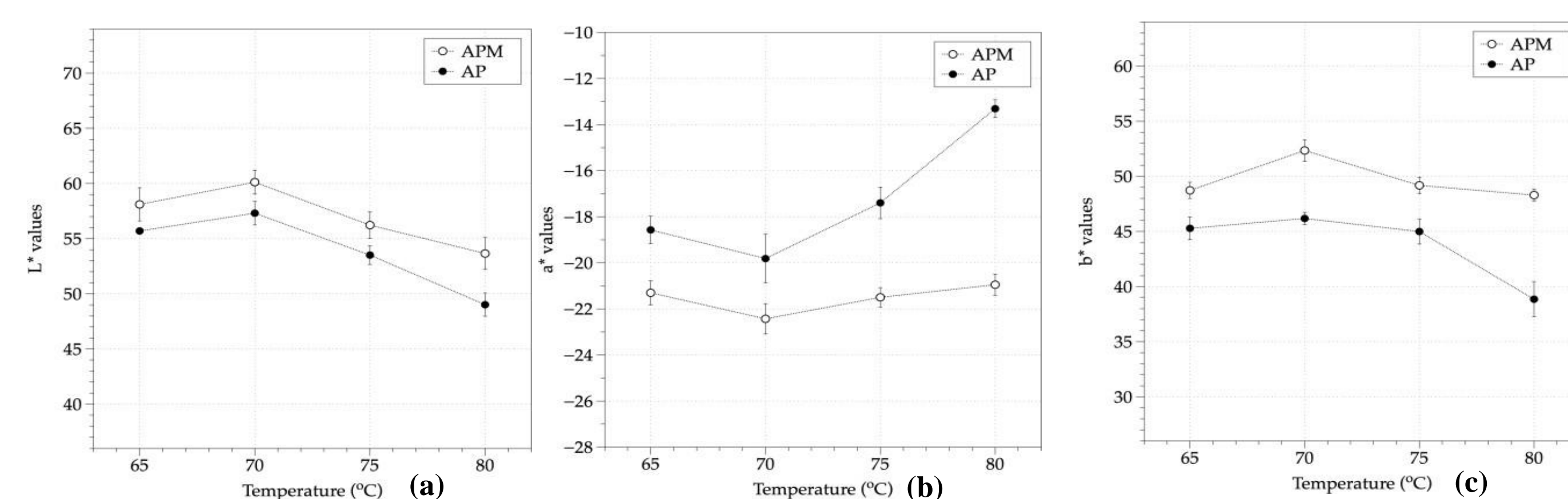


Figure 2. The changes in values of L* (a), a* (b), and b* (c) of avocado pulp powder obtained by infrared drying at different drying temperatures and formulations. [4]

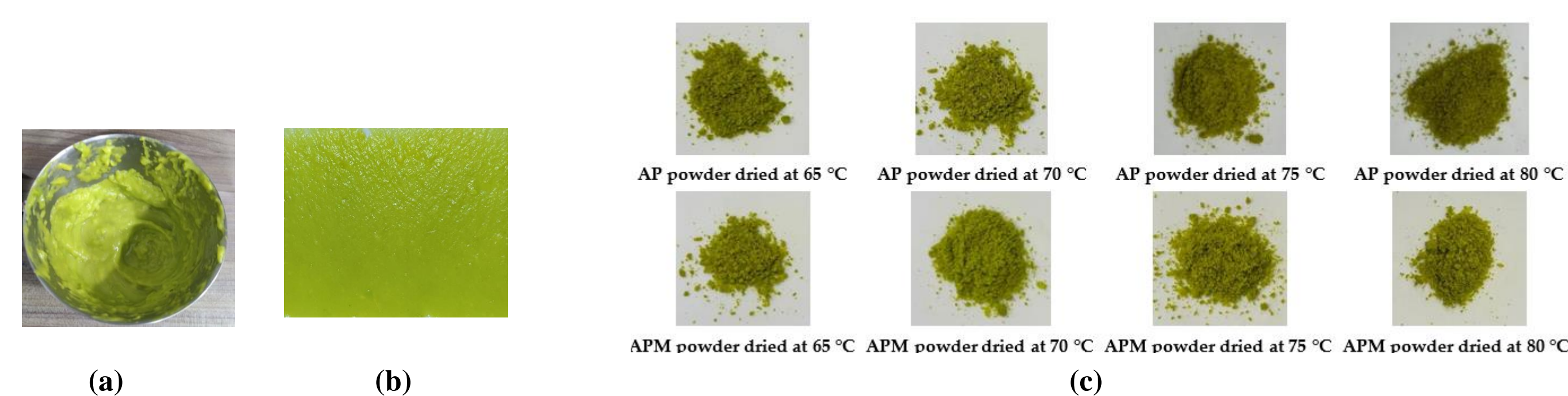
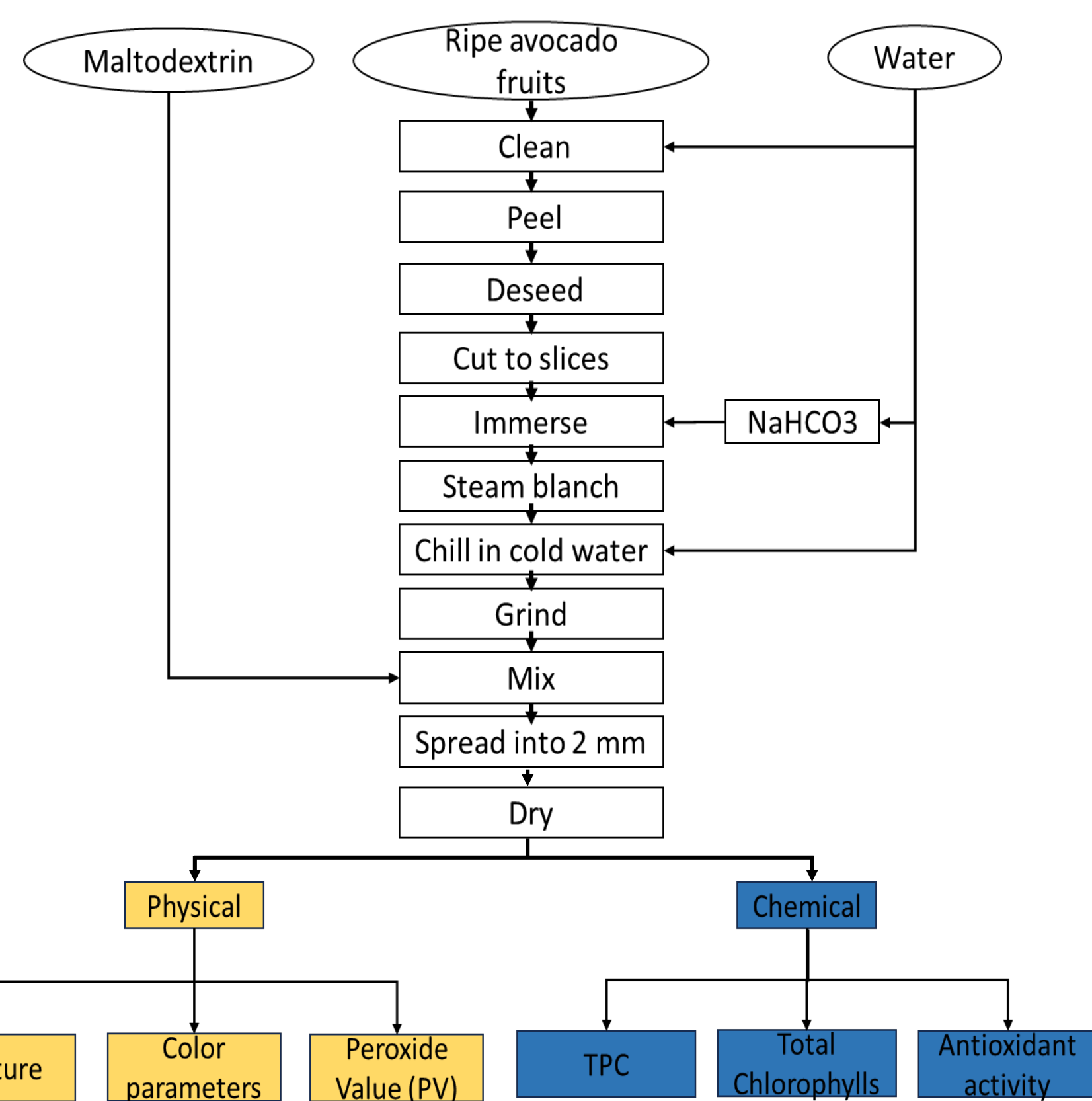


Figure 3. Photographs of (a) avocado pulp, (b) avocado pulp on Mylar films before drying, and (c) all powdered avocado pulp powder obtained by infrared drying at different temperatures. [4]

MATERIALS AND METHODS



CONCLUSIONS

In this study, the effects of different temperatures and formulations on the quality of IR dried avocado pulp were identified and examined. This study shows that maltodextrin concentration and IR temperature are important technical parameters in IR drying of avocado pulp. It was found that maltodextrin and IR temperature, as well as their interaction, have significant impacts on the quality of powdered avocado pulp, excepting L* value, which was insignificantly affected by the interaction between maltodextrin and IR temperature. The results indicate that during IR drying of avocado pulp, lipid oxidation appeared to be limited in this investigation, leading to PV not being detected in all dried samples. This could help to improve the quality of dried products. Polyphenol and chlorophyll oxidation occurred during IR drying of avocado pulp, causing the loss of antioxidant activity and natural pigments as well as discoloration, which produces browning pigments in products. Polyphenol degradation under POD activity occurred primarily in the beginning of the drying process, when the moisture content of material was still high. The degradation of chlorophyll has been correlated with the oxidation of phenolic compounds via POD, which provokes the destruction of polyphenols. In this study, higher loss in dried product quality was the result of drying avocado pulp at a high temperature or for a long time. Maltodextrin significantly retained the quality of avocado pulp during IR drying by acting as a covering substance. This study found that drying avocados supplemented with 9% maltodextrin at 70 °C produced the highest quality of dried avocado powder. Specifically, at this drying condition, total polyphenols, total chlorophylls, and antioxidant activity were retained at about 95.1, 95.2, and 94.4%, respectively. According to the findings, infrared drying could be considered a suitable drying method for developing new products with high quality from fruits and vegetables. [4]

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