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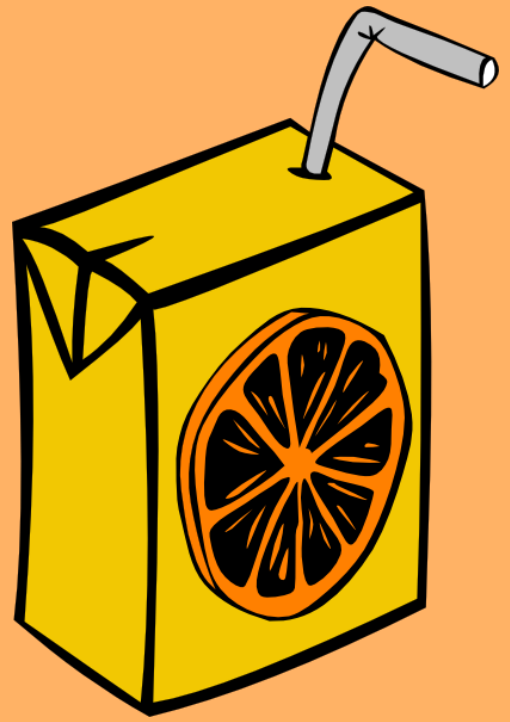

Effect of Resistant Maltodextrin on Bioactive Compounds of Orange Pasteurized Juice

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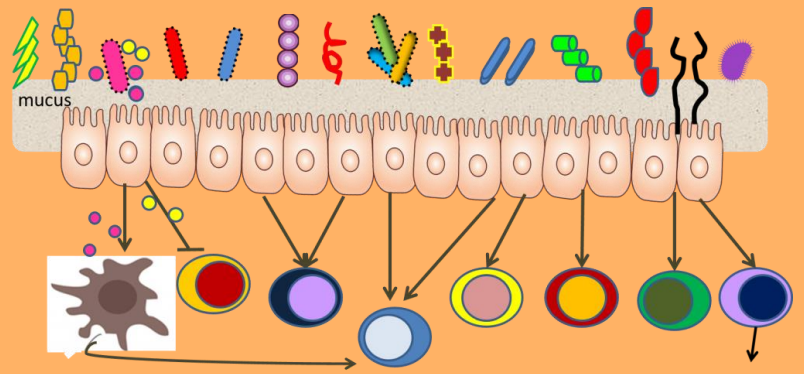
What is Resistant Maltodextrin (RMD)?

Water-soluble fiber
Could be fermented in the colon
Potential functional and prebiotic effects



Why do we use Orange Pasteurized Juice?

Orange Juice is the most demanded fruit juice
Pasteurization is the most common methond to prolong shelf-life
Heat treatments cause losses of bioactive compounds

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Scarce information is available on what effects RMD displays in food matrices. Therefore, we wanted…

To evaluate the effect of RMD addition on the Bioactive Compounds of Orange Pasteurized Juice.

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How we did it?

Sample preparation and pasteurization

- Orange juice with pulp, OJP
- Orange juice without pulp, OJWP
- Increasing RMD concentrations (2.5, 5 and 7.5%)
- Pasteurization process (85ºC, 10 s)

Analytical determinations

- ºBrix, acidity and pH
- Total phenols (Folin-Ciocalteu, spectrophotometry)
- Total carotenoids (extraction with hexane/acetone/etanol, spectrophotometry)
- Ascorbic acid and vitamin C (HPLC)
- Antioxidant capacity (DPPH, spectrophotometry)

Statistical analysis

- ANOVA
- Correlation analysis (Pearson's coefficient)

How we did it?

Variations of each bioactive compound for all orange juice samples with increasing RMD concentrations (2.5, 5 and 7.5%) with respect the control samples were calculated according to the following equation:

$$\Delta M_i^{RMD\%} = \frac{\left(M_i^{RMD\%} - M_i^{Control}\right)}{M_i^{Control}} \times 100$$

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What were our results?

ºBrix, acidity and pH

Control samples complied with AIJN orange juice guidelines.
No adulteration or deviation occurred during the orange juice extractions.
RMD addition led to an increase in total soluble solids and less citric acid content (because of orange juice replacement). Small changes in pH were found.

Sample	ºBrix	Acidity	pH
OJP0	11.38 (0.03)^{a}	0.773 (0.04)^{h}	3.683 (0.006)^{a}
OJP2.5	13.58 (0.02)^{c}	0.747 (0.002)^{g}	3.677 (0.006)^{a}
OJP5	15.75 (0.04)^{e}	0.725 (0.002)^{f}	3.69 (0.02)^{a}
OJP7.5	17.99 (0.04)^{g}	0.711 (0.002)^{e}	3.71 (0.02)^{a}
OJWP0	11.47 (0.08)^{b}	0.691 (0.002)^{d}	3.80 (0.03)^{b}
OJWP2.5	13.72 (0.03)^{d}	0.670 (0.003)^{c}	3.90 (0.04)^{b}
OJWP5	15.9 (0.05)^{f}	0.6530 (0.0005)^{b}	3.827 (0.006)^{b}
OJWP7.5	18.09 (0.02)^{h}	0.636 (0.002)^{a}	3.823 (0.006)^{c}

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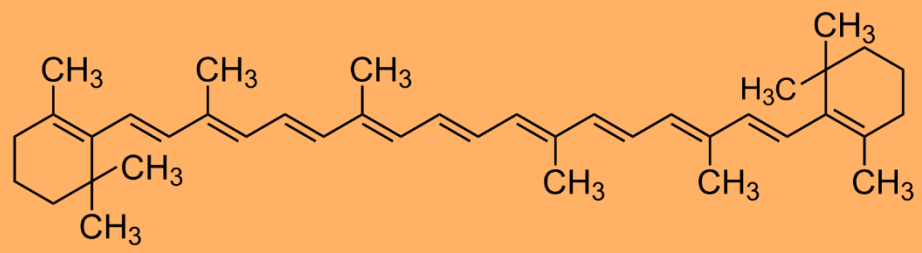
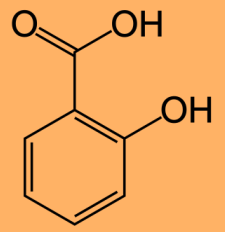
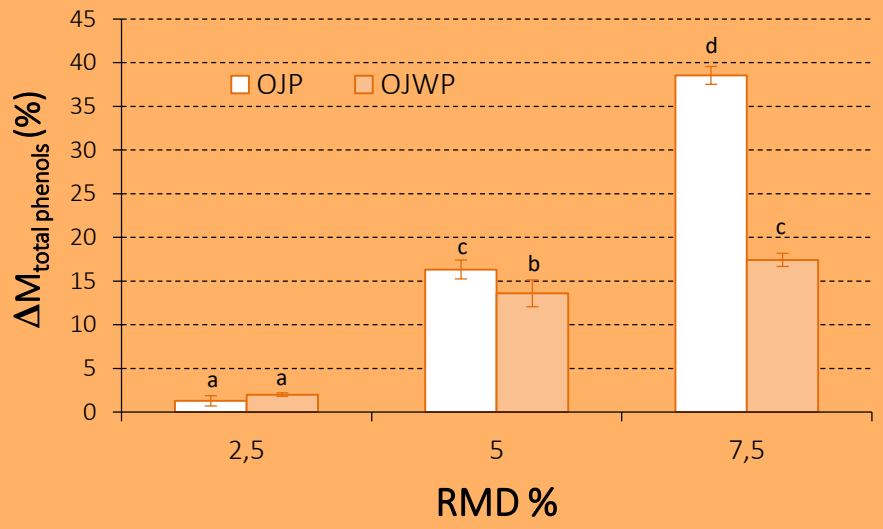


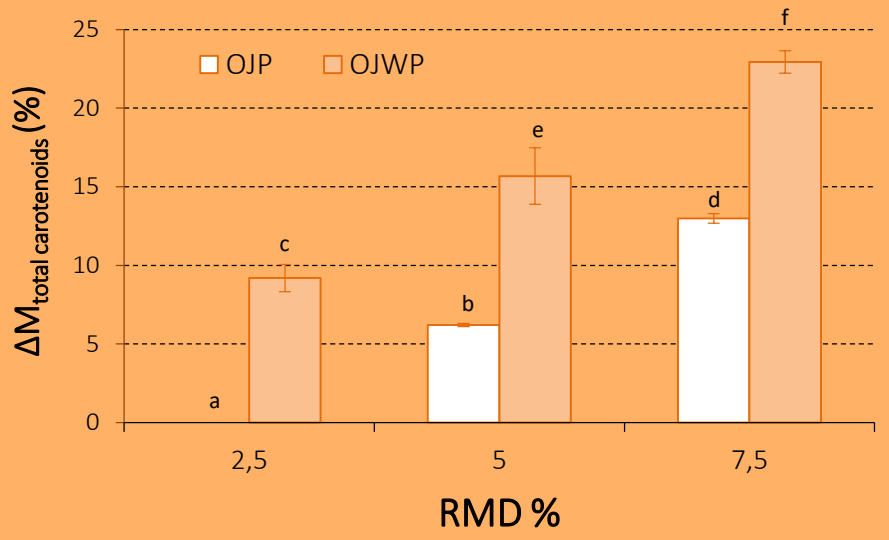


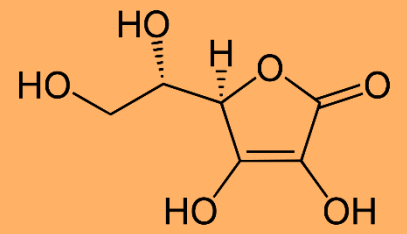
What were our results?

Total phenols and total carotenoids

OJP samples marked higher phenolic increase while OJWP samples presented higher carotenoids variations. These variations were higher when higher RMD concentrations were applied.



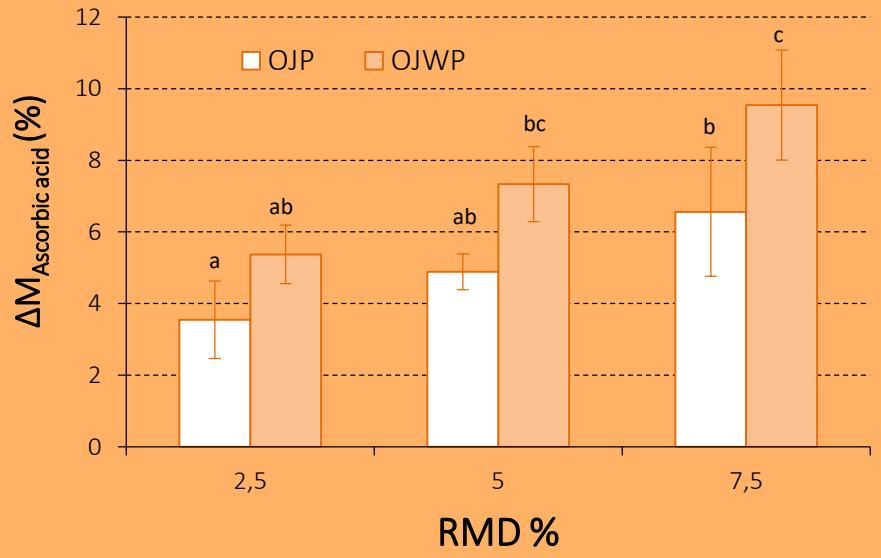


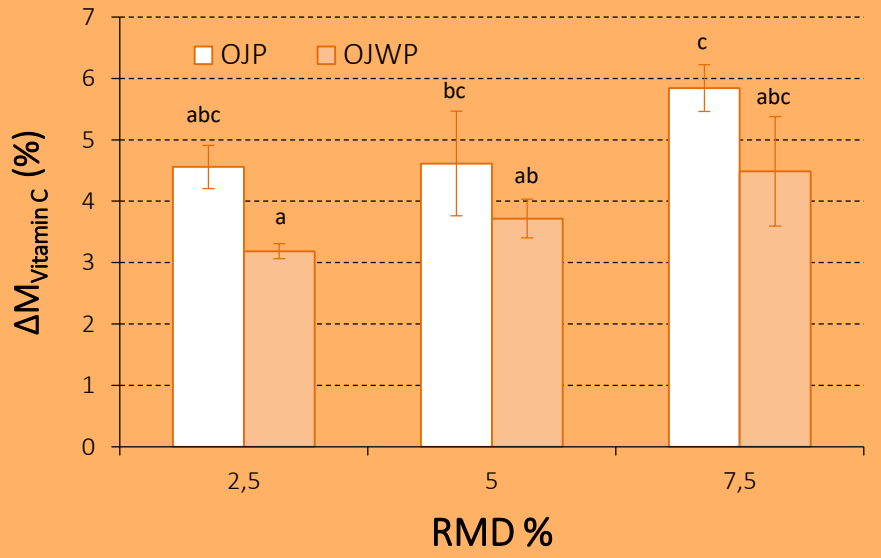


What were our results?

Ascorbic acid and vitamin C

Ascorbic acid variations were more noticeable in OJWP samples.
Orange pulp seems to interact with RMD to increase dehydroascorbic acid protection, as OJP samples obtained slightly higher variations of vitamin C.
The protective effect was more intense when higher RMD concentrations were applied.





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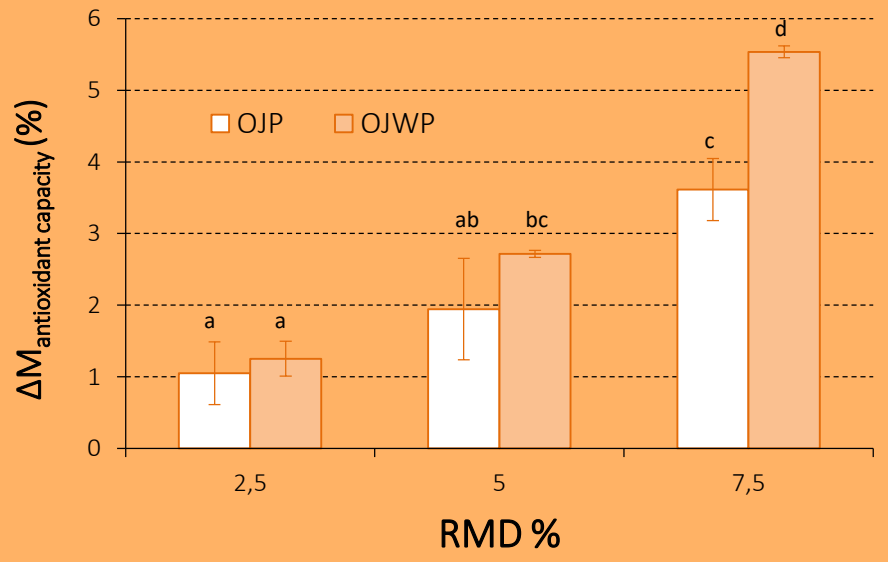
What were our results?

Antioxidant capacity

Higher RMD concentrations before Orange Juice Pasteurization led to higher antioxidant capacity, especially in OJWP samples.



What role did each of the bioactive compounds play in the antioxidant capacity?

Correlation statistical analyses (Pearson's coefficient) were performed to answer this question

Vitamin C and total phenols played a major role in the antioxidant capacity.
There was a significant correlation between ascorbic acid and total carotenoids content, probably because of the stabilizing effect of ascorbic acid on carotenoids.

In summary, our findings were that RMD addition before Orange Juice Pasteurization:

- Led to a protective effect in both total phenols and total carotenoids content.
- Led to a protective effect on the ascorbic acid and vitamin C content.
- Led to higher antioxidant capacity.
- All protective effects were higher when higher RMD concentration was applied.

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