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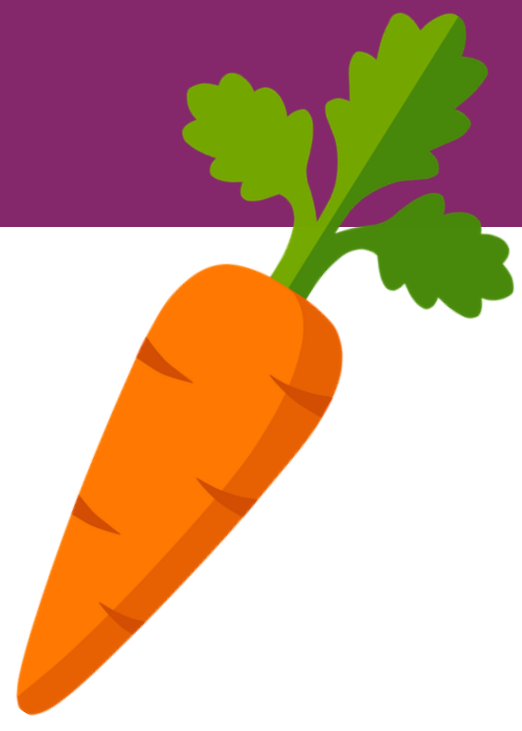
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SENSORY AVAILABILITY AND PERCEPTION OF TABLE SALT ADDED DURING OR AFTER THE COOKING PROCESS: A CASE STUDY WITH COOKED CARROTS



Raphaël Monod^{1,2}, Sylvie Clerjon^{2,3}, Chantal Septier¹, Bérénice Houinsou-Houssou¹,
Hervé This⁴, Christian Salles¹, Thierry Thomas-Danguin¹

¹ Centre des Sciences du Goût et de l'Alimentation, INRAE, CNRS, Institut Agro, Université Bourgogne Franche-Comté, Dijon, France

² INRAE, QuaPA, St Genes Champanelle, France

³ INRAE, PROBE research infrastructure, AgroResonance facility, St Genes Champanelle, France

⁴ The International Centre for Molecular Gastronomy AgroParisTech INRAE, Paris, France



Introduction

Discretionary salt (DS) contributes significantly to salt intake and its use might increase in the future. Finding domestic practices that can enhance DS perception is important to lower salt intake.

To determine whether domestic cooking practices can be adapted to maintain saltiness perception while reducing salt content, we set up a study on carrots cooked in a water bath. **DS was added either during or after cooking. Three types of salt were used** (fine sea salt, Fleur de Sel and 170 µm micronized salt) **at two levels** (regular and reduced).

Hypothesis: Salting after cooking induces a higher saltiness perception due to a higher availability of salt crystals. Salt crystals structure and granulometry can modulate perception for DS added after cooking.

Materials and methods

Experimental design and parameters:

- 3 types of salt



- 2 concentration levels : equivalent to **10 g/L in the cooking water ('Regular' level)** and to **5 g/L in the cooking water ('Reduced' level)**
- 2 salting procedures : **during (in water, see step 2 below)** or **after cooking (poured on the carrots, see step 3 below)**

Sensory analysis

- Intensity ratings (sweetness, saltiness, sourness, bitterness and global aroma)
- Continuous Just About Right rating



70 naïve participants

57 % female

Mean age 40 yo



Warm carrots: 4 to 5 g per sample
Served at 40 °C



Acquisition by Fizz Biosystems



Step 2: Cooking during 25 min



Step 4: Preparation of carrot samples



Step 3: Cutting of the carrots and storing in a gastronomic container



Step 5: Tasting

Results

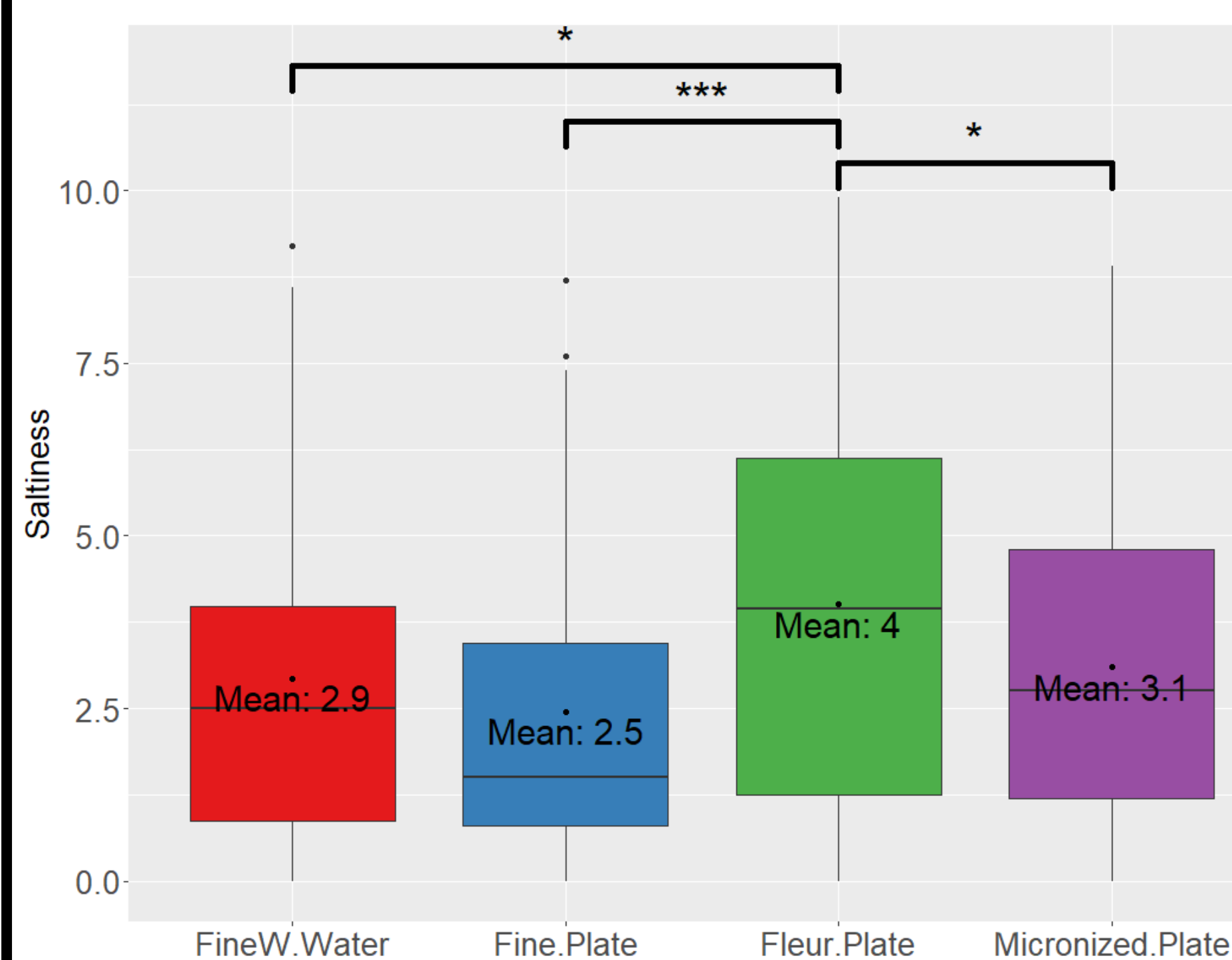


Fig.1: Saltiness intensity results ('Regular' level)

Carrots are considered **saltier** when Fleur de Sel is added after cooking at the 'Regular' level ← (fig.1)

Carrots are considered **saltier** when Fine Salt and Fleur de Sel are added after cooking at the 'Reduced' level compared to carrots salted during cooking (fig.2)

Salt type and salting procedure:

- Fine sea salt.added during cooking
- Fine sea salt.added after cooking
- Fleur de sel.added after cooking
- Micronized salt.added after cooking
- Unsalted carrots

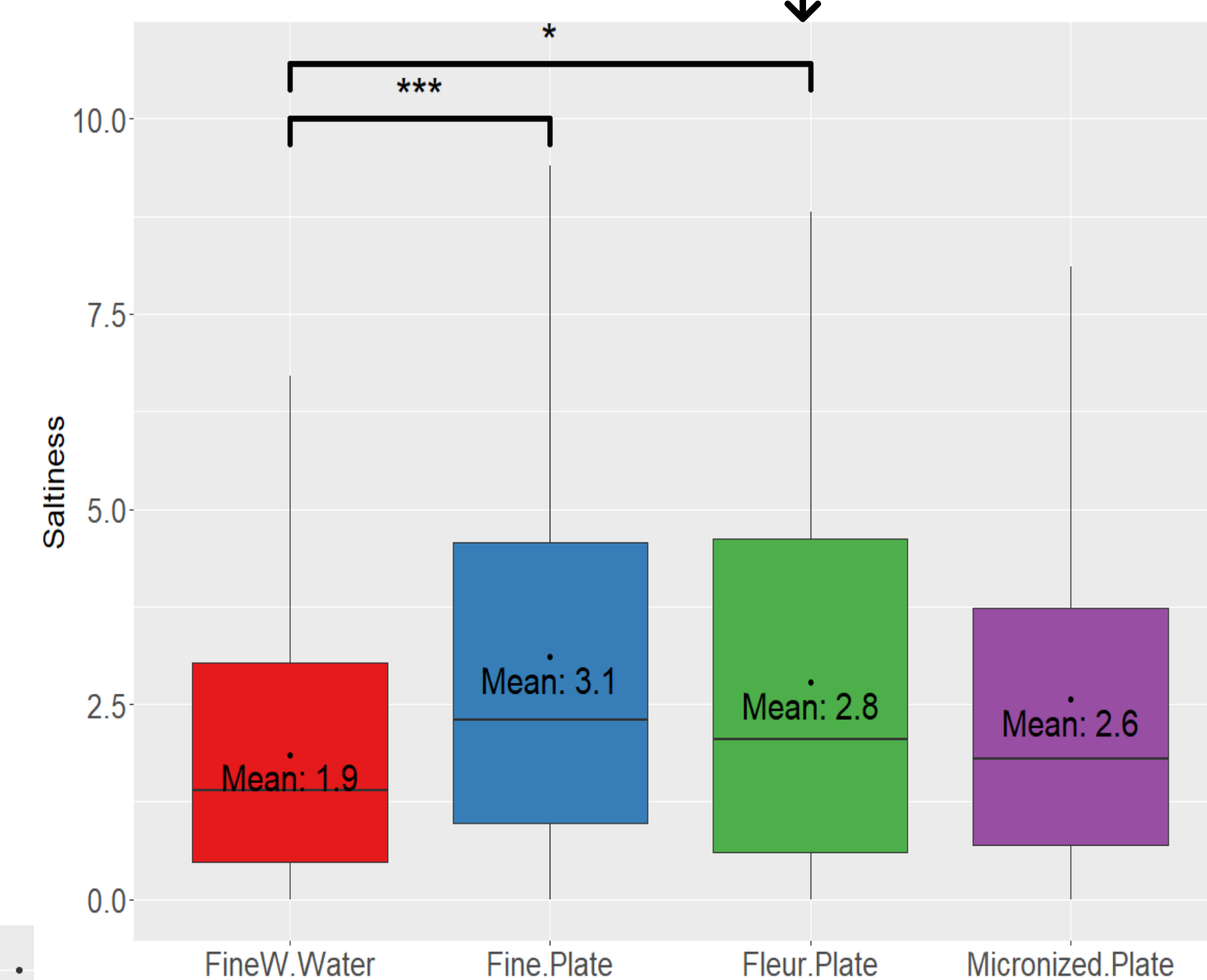


Fig.2: Saltiness intensity results ('Reduced' level)

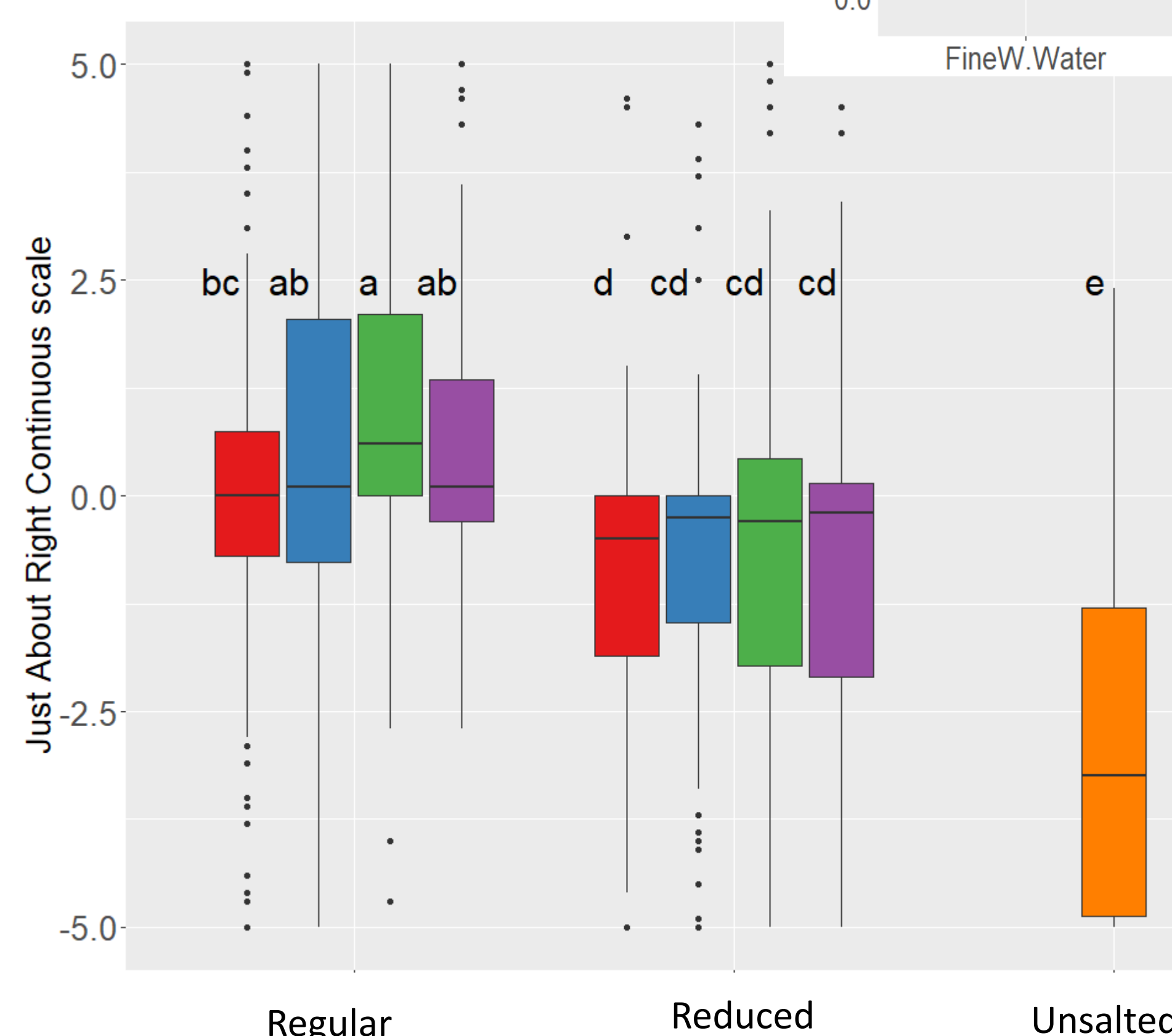


Fig.3: JAR results

Carrots salted at the minus 50% 'Reduced' level after cooking are considered as salty enough as carrots salted during cooking at the 'Regular' level ← (fig.3)

Discussion

Salting after cooking (here pouring salt on cooked carrots) is an interesting way of maintaining saltiness perception while reducing the sodium content compared to salting during cooking, namely in the cooking water.

A 50 % reduction seems to be achievable when salting is performed after cooking. Further sodium quantification by Ion Chromatography are being performed to confirm the reduction level.

Salting after cooking probably induces a heterogeneous distribution of salt crystals that may be more available for taste receptors at the beginning of chewing. A higher saltiness perception would then result from this heterogeneity. Further experiments are needed and NMR analysis are under way to check such hypotheses.



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