

## **Interest of choline chloride for salt reduction in bread**

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Cereal products, and in particular bread, are the main source of salt in human diet. However, salt is a critical ingredient in bread making, and its reduction can have a negative impact on bread quality. Choline Chloride (CC) is a quaternary ammonium salt that has a cation of choline with a chloride anion. It is able to act as a substitute for salt. Nutritionally, CC is an essential nutrient of vital biological importance. This study aims on the one hand to develop a bread recipe reduced in salts (by -50%) and partly substituted by CC. On the other, it aims to study the acceptability for consumers of this double innovation, combining the addition and withdrawal of a nutrient.

The effect of CC on bread properties was studied during baking, cooling and storage of bread. CC is involved in each of these manufacturing steps, and improves the properties of a salt reduced bread. The staling study highlighted the positive effect of CC on bread texture and on the retrogradation of starch. The CC added to the recipe seemed to not only slowdown the firming over time, but also to reduce the hardness of 3N and 2N compared to 0% NaCl and 100% NaCl bread. Indeed, the CC restricts the recrystallisation of amylopectin due to less availability of water in the matrice, and decreases the staling kinetics of the bread. Sensory test showed that CC tends to increase the saltiness in salt-reduced bread.

The acceptance of reduced-salt and CC-enriched bread was investigated in three focus groups, mixing blind tests, information input and spontaneous evocations. Three groups of eaters likely to accept the tested product have been identified: health-oriented young people, young parents who want to educate children to engage in a healthy lifestyle, and people broadly sensitive to nutritional information. Consumers with a "pleasure and taste" oriented profile were more sceptical of the new bread formula because of greater attachment to traditional bread.

In conclusion, CC is a relevant alternative to salt that combines technological and sensory benefits; its success will depend on the consideration of issues related to social acceptability.