

Utilising alternative cereals in product development

- Cereals are the most widely consumed foods in the world's diet, in both industrialized and developing countries.
- This study covers the possibility of involving more alternative wheat species; providing a summary of the studies that were published, especially related to products such as bread, pasta and biscuits.

Aims and Objective

- Reviewing the most recent studies that can form the foundation for future applied research to promote methods of alternative cereal utilization to make a substantial contribution to the human diet.
- Gaining a better understanding of the advantages and disadvantages of alternative cereals' application in food products.
- Making future collaborations with experts interested in alternative and sustainable food systems.

Nutritional studies

- 19 and 26 anthocyanins were identified in blue and purple wheat
- The total content of anthocyanins was 9.26 and 13.23 mg/kg
- There is a decrease in anthocyanin content during the baking process
- Anthocyanin-rich biscuits made from wholemeal purple wheat and wholemeal conventional wheat flour
- Higher gluten index in purple wheat biscuits
- Similar anthocyanin profile of biscuits and wholemeal flour
- Spelt wheat cultivars had higher contents of soluble dietary fibre and protein (compared to standard wheat or durum wheat)
- Sorghum contains important phenolic and antioxidant compounds
- Sorghum dough has poor rheological properties compared to standard wheat dough
- Technological methods are limited to producing food from Sorghum wheat flour



Materials and Methods

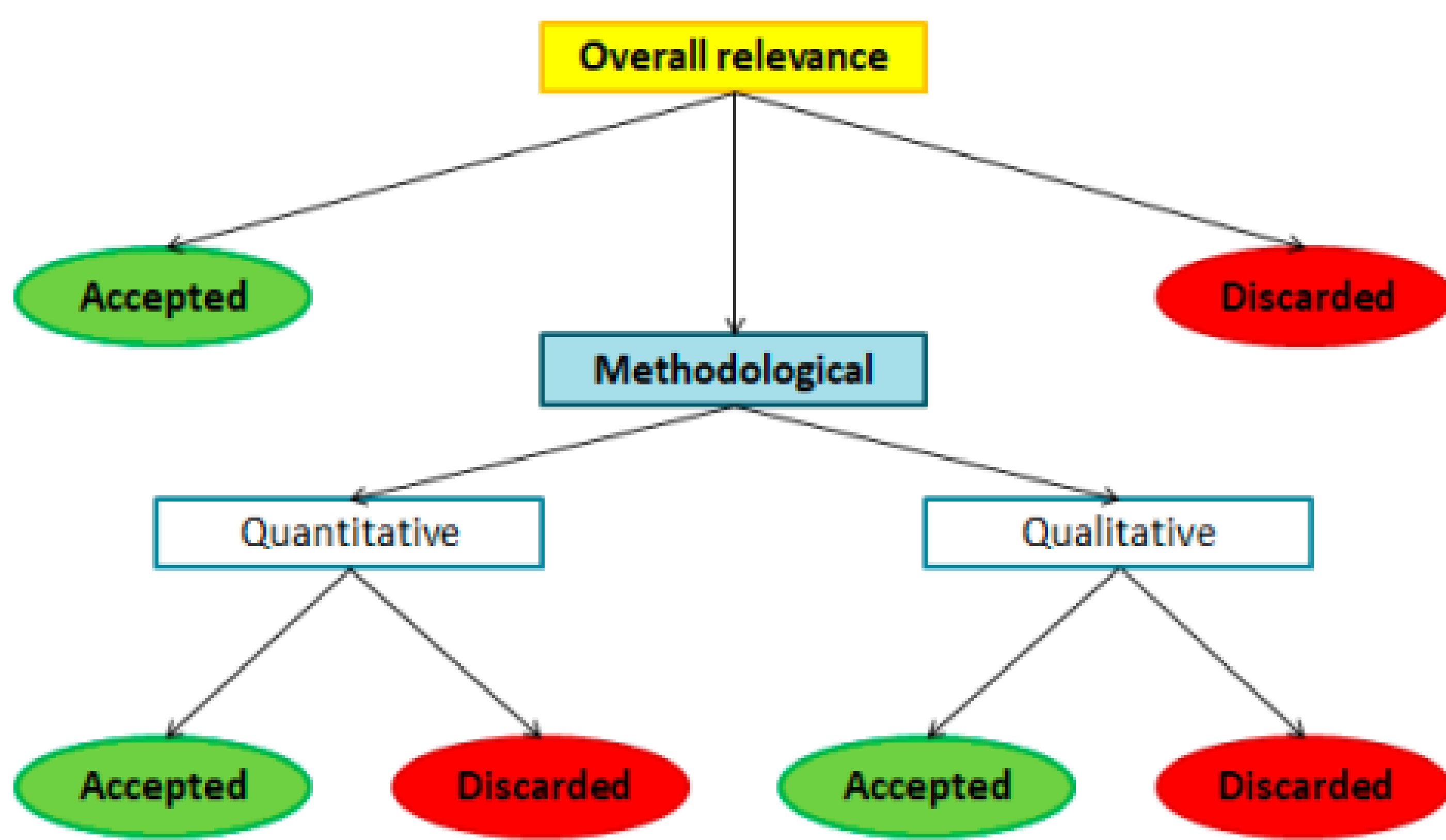
- A scoping review approach was applied in order to provide theoretical framework. The major bibliographic databases were utilized to search for journals and articles, including: Google Scholar, Scopus and Web of Science.
- At the current time there is only limited information available on alternative cereals. Our review analyses and critically evaluates these from a nutritional and sensory point of view.

Targets to be improved in the future

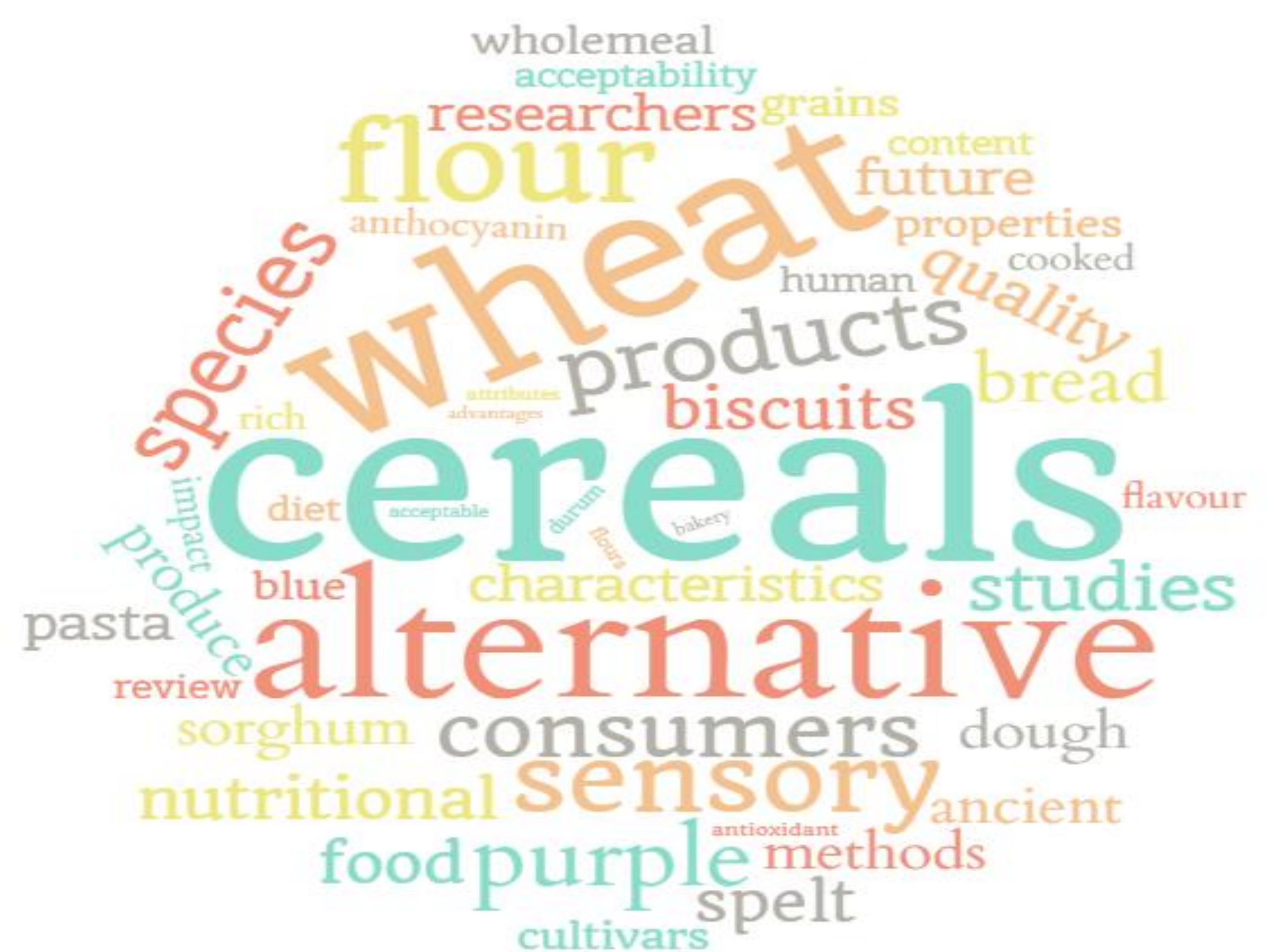
- Alternative cereals have been recently demonstrated to have functional properties, however, human consumption of alternative cereals remains low.
- Presently, the dough characteristics of flours from alternative cereals lack some of the traits required by commercial bakeries and factories to produce.

Sensory studies

- Critical points in product development: to understand the changes in sensory attributes and their impact on the product's consumer acceptability
- If consumers are informed about the type of cereals in the bread prototypes
- It results in a higher preference score for spelt and purple grain samples
- Most important consumer aspects of choosing alternative cereals
- Cereal species, product type, flavour and product-related claims
- Sweet and nutty flavour had a positive impact on consumer acceptance
- Ancient cereals have a characteristic and rich flavour profile compared to mainstream species
- Sensory profiling of cooked grains (ancient species, landraces and old cultivars)
- Ancient species were mostly characterised by oat porridge and bulgur aroma
- Darker coloured grains were also more intense in cocoa and cooked malt flavour



Graphic of the acceptance process of the papers



The selection and acceptance process of references was based on:

- Eligibility Screening
- Methodological Screening: Qualitative
- Methodological Screening: Quantitative
- Relevance Screening

The main reviewed species



Sorghum
Sorghum spp.



Spelt wheat
Triticum aestivum ssp. Spelta



Purple wheat
Triticum aestivum speciality, Triticum sp



Blue wheat

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