Health and nutrition aspects of bread and the global trends

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Role of Bread in Human Nutrition

- Create out of local grains eatable and affordable food
- Increase nutrition level in daily uptake
- Energy intake
- Feed the people
- Create lust for life
- ...
Health and Nutrition aspects

- Grains (as bread raw material) have a high content of amino acids by nature
- The content of vitamins, mineral nutrients (Fe+Ca+Zn+Mg), proteins and secondary metabolite make it a daily needed food
- Increase fibre uptake
  - increase digestive activity
  - lowering the risk of obesity
  - lowering the risk of high blood pressure
  - lowering the risk of coronary disease
Vitamins in Bread

Many vitamins occur naturally in whole grain bread

- Riboflavin, vitamin B₂, is needed for red blood cell production
- Thiamin, vitamin B₁, is the key to nervous system and muscle function
- Vitamin E, an antioxidant that protects cells from free radicals
- Vitamin D, for building strong bones
- Niacin, vitamin B₃, control cholesterol and triglyceride levels in the blood
- Folate, folic acid, to synthesize and repair DNA
- Pyridoxine, vitamin B₆, for the production of red blood cells and for nerve function
Vitamin B Distribution in wheat kernels

Vitamin B$_1$

Vitamin B$_2$

Vitamin B$_6$

A higher bran content increases the amount of vitamins, mineral content and fibre content
### Vitamin B content in Breads (Germany)

<table>
<thead>
<tr>
<th>Food</th>
<th>Vitamin B&lt;sub&gt;1&lt;/sub&gt;</th>
<th>Part of daily need [%]</th>
<th>Vitamin B&lt;sub&gt;2&lt;/sub&gt;</th>
<th>Part of daily need [%]</th>
<th>Vitamin B&lt;sub&gt;6&lt;/sub&gt;</th>
<th>Part of daily need [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rye bread</td>
<td>0,18</td>
<td>23,0</td>
<td>0,12</td>
<td>13,5</td>
<td>0,2</td>
<td>18,0</td>
</tr>
<tr>
<td>Rye mix bread</td>
<td>0,18</td>
<td>23,0</td>
<td>0,08</td>
<td>9,0</td>
<td>0,12</td>
<td>10,8</td>
</tr>
<tr>
<td>Whole grain Rye bread</td>
<td>0,18</td>
<td>23,0</td>
<td>0,15</td>
<td>16,9</td>
<td>0,3</td>
<td>27,0</td>
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<tr>
<td>Wheat Bread</td>
<td>0,09</td>
<td>11,5</td>
<td>0,06</td>
<td>6,8</td>
<td>0,02</td>
<td>1,8</td>
</tr>
<tr>
<td>Wheat mix bread</td>
<td>0,14</td>
<td>18,0</td>
<td>0,07</td>
<td>7,9</td>
<td>0,09</td>
<td>8,1</td>
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<tr>
<td>Whole-grain wheat bread</td>
<td>0,23</td>
<td>29,6</td>
<td>0,15</td>
<td>16,9</td>
<td>0,08</td>
<td>7,2</td>
</tr>
</tbody>
</table>
The increase of nutrient level

Europe
  – e.g. use of iodised salt, iron fortification in wheat flour (UK)
  – Vitaminization allowed, but not done in daily production

United States
  – Food and Drug Administration (FDA) developed a bread-enrichment program to help stop the spread of illnesses linked to nutrient deficiencies

WHO
  – Zinc – Iron – Folic Acid – Vit B₁₂ - Vit A - Flour Fortification in maize and wheat to stop nutrient deficiencies
Wheat flour fortification

The countries in blue have legislation for mandatory wheat flour fortification with Zinc – Iron – Folic Acid – Vit B12- Vit A (differs by country)
Stabilization of vitamins

Most vitamins are reduced by:

- Temperature shifts
  (best handling between 5 - 10°C)
- A higher $a_w$-Level increases oxidation
- Oxygen and light lead to oxidation

=> But most B vitamins are stable against low pH value
Production of Bread

Preparation of ingredients (measuring, sieving, tempering, dissolving)

Pre dough - sourdough

Dough preparation (Mixing, Kneading, Development)

Resting time

Work off (shape, weight)

Proofing

Baking

- Vitamins reduced
- Minerals and vitamins are ready for digestion
- Brake down of phytic acid
- Vitamins reduced
- Minerals and vitamins are ready for digestion
- Vitamins reduced
Why not add more vitamins?

– Some nutrients are added to make up for nutrients lost during processing, such as iron and other minerals
– Most vitamins are not thermo stable
– Many vitamins beside the B vitamins do not like acidification
– Huge amounts would be necessary to reach a benefit
Ingredients in Bread Production for increasing the nutrient level

- Whole-grain flour
- Wheat germ
- Yeasts
- Oilseeds
- Vegetables
- Fruits
- Vegetable Oil
- Salt
- Sourdough
- Pseudocereals
- Herbs
- Oat
- ...

![Image of bread](image_url)
Conclusion: Vitamin added Breads

- The addition of vitamin concentrates will be too expensive and not accepted by the customer
- Some vitamins are destroyed during the different production steps
- Nutrition level has to be increased from natural origin
- The use of e.g. yeast and wheat germ is a good possibility
- What is reached by natural ingredients will be accepted from the customer
Changes of organic Bread products in the future

– Customers like organic products
– Price difference is still a barrier
– Customers expect ingredients to be organic in the future
– ’Organic‘ has different definitions in the world
– In the future organic will be expected as standard and nothing special any more
What do customers expect from bread in the future?

- Eatable and affordable food
- Increase nutrition level in daily uptake
- Low energy intake
- Create lust for life
- ...

Thank you for your attention!