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# 1 **Wheat dough imitating artificial dough system based on hydrocolloids and** 2 **glass beads**

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## 8 **Abstract**

9 Viscoelastic wheat dough properties are a function of processing time, raw material fluctuations,  
10 (baking-) process conditions and enzyme/yeast activity. Consequently, varying dough properties  
11 complicate analysing mechanisms of structure determining reactions. Therefore, the replacement of  
12 wheat dough by an artificial dough system offers a simplified and standardized system, allowing  
13 better analysis of mechanistic interdependences in dough systems. To imitate wheat dough, natural  
14 and synthetic hydrocolloids were combined with filler particles. These systems were analysed in  
15 terms of their ability to mimic wheat dough by using fundamental rheological tests. In total, 106  
16 artificial dough systems were tested and their functional properties compared to that of wheat  
17 dough. Particularly, a blend of HPC and PVP showed consistent viscoelastic properties. The flow index  
18 of the storage module is identical for the artificial system ( $n' = 0.21 \pm 0.01$ ) and wheat dough ( $n' =$   
19  $0.21 \pm 0.02$ ). Finally, a dough imitating artificial polymer system was developed. It offers the  
20 advantages of simplification due to a limitation to the essential network elements and  
21 standardization, based on avoided enzyme activity and constant material properties.

22 **Key Words:** Artificial dough, fundamental rheology, polymer blends, hydroxypropylcellulose,  
23 Polyvinylpyrrolidone, dough structure

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