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EFFECTS OF ANCIENT WHEAT SOURDOUGH ADDITION ON BREAD RHEOLOGICAL AND TEXTURAL PROPERTIES

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Ancient varieties of wheat were neglected for some time, due to the advantages of modern varieties such as high yield with improved technological characteristics. The term modern wheat refers to wheat varieties which has been subjected to numerous changes in order to achieve previously mentioned characteristics. However, consumer's awareness of the importance of nutritional quality ingredients in food, as well as potential health benefits, has contributed to the revival of the use of ancient varieties. Furthermore, implementation of processes such as sourdough fermentation can improve dough and products characteristics. Sourdough fermentation is one of the most common processes used by artisan bakeries. The use of sourdough contributes to the rheological properties, influences the texture (hardness, adhesiveness, cohesiveness, chewiness, gumminess), shape, specific volume, colour, and moisture retention of products. Furthermore, there are some studies focusing on the improvement of microbiological, nutritional and functional characteristics of sourdough bread obtained with the flour of some ancient wheat species. Since the textural properties of food are closely related to its rheological properties, achieving good properties and improving dough rheological properties are important for obtaining good quality product which is reflected especially at sensory characteristics of products.

The sourdough was obtained from spontaneously fermented emmer, khorasan, spelt and wheat flour. After achieving mature sourdough, the bread was prepared for further investigation. Rheological measurements of dough samples were monitored for 6 hours fermentation, while textural properties (textural profile analysis – TPA) and specific volume were investigated on obtained bread samples.

The samples exhibited different trends in rheological parameters. Dough extensibility has increased during fermentation in samples with ancient wheat varieties, except in khorasan where during first few hours dough extensibility has been increasing and after 4 hours the extensibility has been decreased. However, the dough extensibility of modern wheat has decreased during first hours and after 4 hours has significantly increased. The specific volume of wheat sourdough sample has been significantly lower compared to other three ancient wheat samples. According to TPA tests, ancient wheat varieties had lower hardness and chewiness values, compared to modern wheat-based sourdough.

Due to different characteristics of flour and presence of different microbiota, rheological behaviour of samples showed different trends. However, after examination of textural and volume characteristics of bread samples it can be concluded that ancient wheats had higher potential for creating products with better quality. Further research should be conducted, in terms of nutritional and functional properties, in order to improve and additionally confirm above-mentioned statement.

Key words*: sourdough, rheology, ancient wheat*

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UTICAJ DODATKA KISELOG TESTA DREVNIH ŽITA NA REOLOŠKE I TEKSTURNE OSOBINE HLEBA

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Drevne sorte pšenice su neko vreme bile zanemarene, prvenstveno zbog prednosti savremenih sorti kao što su visok prinos sa poboljšanim tehnološkim karakteristikama. Pod pojmom moderna pšenica podrazumevaju se sorte pšenice koje su podvrgnute brojnim promenama u cilju postizanja prethodno navedenih karakteristika. Međutim, svest potrošača o značaju nutritivnog kvaliteta sastojaka u hrani, kao i potencijalnim zdravstvenim prednostima, doprinelo je oživljavanju upotrebe drevnih sorti pšenice. Pored toga, primena procesa kao što je fermentacija kiselih testa može poboljšati karakteristike testa i proizvoda. Fermentacija kiselih testa je jedan od najčešćih procesa koji koriste zanatske pekare. Upotreba kiselog testa doprinosi reološkim svojstvima, utiče na teksturu (tvrdoću, lepljivost, kohezivnost, žvakanje, gustoću), oblik, specifičnu zapreminu, boju i zadržavanje vlage proizvoda. Naime, postoje studije koje se fokusiraju na poboljšanje mikrobioloških, nutritivnih i funkcionalnih karakteristika hleba od kiselog testa dobijenog od brašna drevnih vrsta pšenice. Budući da su teksturna svojstva hrane usko povezana sa njenim reološkim svojstvima, postizanje dobrih svojstava i poboljšanje reoloških svojstava testa su važni za dobijanje proizvoda dobrog kvaliteta, što se posebno odražava na senzorne karakteristike proizvoda.
Kiselo testo je dobijeno spontanom fermentacijom brašna dikokuma, kamuta, spelte i pšenice. Nakon postizanja stadijuma zrelog kiselog testa, hleb je pripremljen i naknadno ispitivan. Reološka merenja testa su praćena tokom 6 sati fermentacije, dok su na dobijenim uzorcima hleba ispitivana teksturna svojstva (analiza teksturnog profila – TPA) i specifična zapremina.
Uzorci su pokazali različite trendove u reološkim parametrima. Rastegljivost testa se povećavala tokom fermentacije u uzorcima od drevnih sorti pšenice, osim kod kamuta gde je u prvih nekoliko sati rastegljivost testa bila povećana, a nakon 4 sata se smanjivala. Za razliku od njih, testo od moderne sorte pšenice je pokazalo smanjenje rastegljivosti u prvim satima, a posle 4 sata se značajno povećalo. Specifična zapremina uzorka kiselog testa na bazi pšeničnog brašna je značajno niža u poređenju sa ostala tri uzorka drevnih sorti pšenice. Prema TPA testovima, stare sorte pšenice imaju niže vrednosti tvrdoće i žvakljivosti u poređenju sa hlebom dobijenim od kiselog testa na bazi moderne sorte pšenice.
Zbog različitih karakteristika brašna i prisustva različite mikrobiote, reološko ponašanje uzoraka je pokazalo različite trendove. Međutim, nakon ispitivanja teksturnih i zapreminskih karakteristika uzoraka hleba može se zaključiti da drevne sorte pšenice imaju velik potencijal za kreiranje proizvoda boljeg kvaliteta. Potrebno je sprovesti dalja istraživanja u pogledu nutritivnih i funkcionalnih svojstava, kako bi se unapredile i dodatno potvrdile gore navedene konstatacije.
Ključne reči: *kiselo testo, reologija, drevne sorte pšenice*

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