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PROVOCĂRI ȘI TENDINȚE ÎN DEZVOLTAREA PRODUSELOR FĂRĂ GLUTEN

MONOGRAFIE

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Monografia „Provocări și tendințe în dezvoltarea produselor fără gluten” este o lucrare, care focalizează, într-un întreg, cele mai recente cercetări, tehnologii și strategii pentru dezvoltarea produselor fără gluten și, respectiv, pentru asigurarea securității alimentare a persoanelor cu afecțiuni asociate consumului de gluten. Monografia reprezintă fructul unor activități, provocări și colaborări sinergice ale autorilor, desfășurate și fortificate în cadrul proiectelor: grant postdoctoral nr. 21.00208.51.07.06/PD Contribuții privind eradicarea nutrițională a maladiilor asociate consumului de gluten și proiectul de stat nr.20.80009.5107.10 Nutriție personalizată și tehnologii inteligente pentru bunăstarea mea, acordate de MEC&ANCD și desfășurate în cadrul Universității Tehnice a Moldovei.

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C U P R I N S

PREFAȚĂ

Semnalate tot mai frecvent ca o problemă majoră de sănătate publică, tulburările asociate consumului de gluten au polarizat atenția cercetătorilor din diverse domenii. Numărul în creștere al persoanelor afectate, terapia nutrițională ca unic tratament de urmat cu rigoare pentru toată viața, dar și noile abordări în asigurarea securității nutriționale a celor ce sunt constrânși să urmeze un regim fără gluten, continuă să constituie adevărate provocări pentru oamenii de știință și specialiștii din domeniul alimentar.

Asigurarea securității alimentare în Republica Moldova a persoanelor cu tulburări asociate consumului de gluten rămâne o sarcină dificilă, cu dinamisme infinite, greu de gestionat în capacitatea sa subtilă de a interveni asupra sănătății publice.

Monografia reprezintă fructul unor activități, provocări și colaborări sinergice ale autorilor, desfășurate și fortificate în cadrul proiectelor: grant postdoctoral nr. 21.00208.51.07.06/PD Contribuții privind eradicarea nutrițională a maladiilor asociate consumului de gluten și proiectul de stat nr.20.80009.5107.10 Nutriție personalizată și tehnologii inteligente pentru bunăstarea mea, acordate de MEC&ANCD, dar cu contribuția și suportul nemijlocit al specialiștilor Facultății Tehnologia Alimentelor, Universitatea Tehnică a Moldovei și al specialiștilor de la universitățile de peste hotare. Grație acestor colaborări, printr-o serie infinită de relecturi, analize, verificări, acualizări și revizuiri riguroase, am reușit astăzi să conturăm și să partajăm rezultatele și reflecțiunile, experiențele și viziunile noastre.

În lucrare au fost elucidate particularitățile, provocările și carențele nutriționale ale regimului fără gluten, dar și deficiențele nutriționale ale persoanelor care urmează o dietă fără gluten; factorii de influență și tendințele pieței globale a produselor fără gluten; importanța glutenului pentru industria panificației și impactul diferitor agenți și mecanisme care stau la baza formării glutenului. A fost realizată o analiză profundă și desfășurată asupra tendințelor în proiectarea produselor fără gluten, axate atât pe formulări, cât și pe tehnologii. Au fost reflectate rezultatele valorificării ideii privind dezvoltarea maielei cu floră spontană din făină de soriz și posibilitatea aplicării acesteia în fabricarea produselor tradiționale artizanale - a cozonacilor. Iar un subiect totalmente deosebit de cele abordate anterior îl constituie folosirea ierburilor spontane comestibile din Republica Moldova pentru asigurarea unui sistem alimentar durabil și sporirea securității nutriționale a persoanelor cu maladii asociate consumului de gluten.

Prezenta monografie, este, cu siguranță, un instrument indispensabil în soluționarea problemelor vizate mai sus, capabil să trezească și să satisfacă curiozitatea intelectuală a profesioniștilor din domeniul științei alimentare, a dieteticienilor, nutriționiștilor și a tinerilor cercetători și să reproiecteze ceea ce, la prima vedere, pare a fi o limitare, într-un stimul pentru creativitate.

INTRODUCERE

Tulburările asociate consumului de gluten apar tot mai frecvent, devenind o problemă majoră de sănătate publică [1,2]. Considerate o colecție de afecțiuni mediate imun și clasificate în trei grupe principale, în dependență de mecanismul lor patologic – autoimune, alergii și non-autoimune & non alergice –, acestea continuă să perturbeze sănătatea publică. Cea mai gravă și mai răspândită dintre aceste afecțiuni este maladia celiacă. Se dezvoltă ca urmare a combinației factorilor de mediu (gluten) și a celor autoantigeni (enzima tisulară transglutaminaza-tTG). Drept urmare, se dezvoltă procese inflamatorii ale intestinului subțire, urmate de aplatizarea vilozităților intestinale și, ulterior, de reducerea suprafeței intestinale de absorbție și de malnutriție [3]. Se cunosc peste 200 de simptome ale MC. Există un raport de 8:1 de simptome non-intestinale versus intestinale, iar 60% de copii și 41% de adulți pot fi asimptomatici. Actualmente, ratele îmbolnăvirilor au crescut până la punctul în care, acum, maladia în cauză este considerată, la nivel mondial, o problemă majoră de sănătate publică [4]. Persoanele cu MC sunt supuse unui risc de deces de 6 ori mai mare din cauza limfomului non-Hodgin, de 3,1 ori - din cauza bolii hepatice, de 2,6 ori mai mare din cauza riscului de pneumonie și de 4 ori mai mare din cauza riscului de cancer la intestinul subțire [5]. Singurul tratament pentru boala celiacă unanim acceptat de comunitatea medicală, este terapia nutrițională, care constă într-o dietă riguroasă fără gluten. Aderarea la un regim fără gluten determină o normalizare treptată a mucoasei intestinale, dispariția anticorpilor prezenți în faza acută (anticorpi anti-trans-glutaminază) și a oricăror simptome prezente înainte de diagnostic.

Studiile în domeniu au arătat că rata de aderență la un DFG variază de la 44 la 90% la pacienții cu MC [6,7]. Prevalența în creștere a tulburărilor asociate consumului de gluten, sporirea preocupărilor tot mai mari pentru sănătate și bunăstare în rândul consumatorilor, confluența de mărturii ale celebrităților și ale altor persoane publice despre beneficiile evitării consumului de gluten, marketingul agresiv al producătorilor orientat spre consumator – toate acestea stimulează cererea de produse fără gluten. Piața globală a produselor fără gluten a fost evaluată la 6,3 miliarde USD în 2022 [8], dar se estimează că va ajunge la 11,8 miliarde USD până în 2030 și la Rata de Creștere Anuală Compusă (CAGR) de 9,5% în perioada 2023-2030. Segmentul produselor de panificație fără gluten reprezintă cea mai mare pondere a veniturilor, constituind circa 57% din vânzările globale de alimente fără gluten în 2022 [9,10].

În același timp, proiectarea produselor de panificație fără gluten ramâne a fi o provocare – atât din punct de vedere nutrițional, dar, în special, tehnologic. Produsele de panificație FG diferă semnificativ de produsele standard din făină de grâu, prezentând, de obicei, caracteristici inferioare. Lipsa unei matrici proteice rezistente, capabile să se extindă și să rețină gaze condiționează formarea aluaturilor slabe, cu permeabilitate ridicată la dioxid de carbon și dificultăți mari de menținere a structurii, care conduce la reducerea volumului la coacere [11]. Absența glutenului afectează calitatea aluatului, și anume: reduce coeziunea, elasticitatea și capacitatea de reținere a gazelor, iar pâinea fără gluten se caracterizează prin volum scăzut, textura friabilă și întărire rapidă, în comparație cu pâinea clasică de grâu [12,13]. Ca urmare a includerii în rețete a amidonului și timpului redus de amestecare și fermentare, produsele de panificație FG au textură slabă și culoare palidă, cu gust nepronunțat [14].

Prin urmare, în această lucrare ne-am propus să focalizăm, într-un întreg, cele mai recente cercetări, tehnologii și strategii pentru dezvoltarea produselor fără gluten și asigurarea securității alimentare a persoanelor cu afecțiuni asociate consumului de gluten. Studiul este structurat în opt capitole, după cum urmează:

În primul capitol, întitulat ***Regimul fără gluten. Carențe nutriționale și provocări***, sunt descrise cele mai cunoscute maladii provocate de consumul de gluten, prevalența acestora la nivel global, precum și rolul glutenului în patogeneza bolii. Deoarece, în cazul persoanelor diagnosticate cu maladii asociate consumului de gluten, singurul tratament, unanim acceptat de comunitatea medicală, este terapia nutrițională, care constă într-o dietă riguroasă fără gluten [7,15], cercetările au fost orientate spre două obiective: realizarea primului obiectiv a presupus evaluarea impactului asupra statutului nutrițional al persoanelor ce au adoptat un regim fără gluten, care a arătat niveluri diverse de malabsorbție, o stare nutrițională precară [16,17], manifestată, cel mai frecvent, prin deficiență de fier, de vitamina B12 și de acid folic [18,19]. Pentru realizarea celui de-al doilea obiectiv, cercetările au fost concentrate pe identificarea calității nutriționale a produselor fără gluten. Majoritatea produselor fără gluten sunt limitate în nutrimente și pot prezenta riscuri, dacă nu sunt detectate la timp și tratate corespunzător [15]. Unele studii au arătat că produsele fără gluten au un aport scăzut de calorii și proteine, deficiențe de fibre alimentare, vitamine (D, K, riboflavină, niacină, acid folic, cobalamină) și de unele minerale (Fe, Ca, Mg, Zn) [20,21]. Adesea, aceste produse, probabil, datorită particularităților tehnologice, conțin cantități excesive de lipide, acizi grași hidrogenați, fosfor etc.

În capitolul doi, ***Piața produselor fără gluten***, sunt argumentați factorii de influență asupra pieței globale a produselor fără gluten, printre cei mai cunoscuți menționându-se numărul tot mai mare de pacienți celiaci, creșterea solicitărilor de utilizare a produselor fără gluten, datorat preocupărilor crescânde legate de sănătate și bunăstare în rândul consumatorilor [22,23]. Analiștii financiari și economiștii sunt de părere că cea mai mare parte a economiei globale s-ar afla într-o recesiune, care se va agrava începând cu anul curent (2023). Evoluțiile recente în tehnologiile de microîncapsulare, diagnosticul timpuriu în creștere al bolilor celiace și al altor alergii alimentare, strategiile agresive de marketing din partea producătorilor, creșterea promoțiilor guvernamentale și a campaniilor de conștientizare a tulburărilor asociate consumului de gluten, adoptarea etichetării frontale, disponibilitatea în creștere a produselor sunt tendințele care vor propulsa dezvoltarea și vor extinde domeniul de aplicare a pieței globale a produselor fără gluten [24,25].

În capitolul trei, ***Glutenul și importanța lui în industria panificației***, sunt expuse rezultatele studiilor cu referire la proprietatea inedită a glutenului de a forma, în soluție apoasă, legături între gliadină și glutenină, care duc la formarea unui reticul proteic tridimensional, ce conferă elasticitate și rezistență la întinderea aluatului [26] și care justifică rolul primar al glutenului în industria de panificație. Au fost descrise fracțiunile proteice ale cerealelor, în special, ale celor generatoare de gluten, au fost specificate legăturile cruciale pentru formarea glutenului, impactul agenților redox [27,28] și oxidativi [28–30], modificările interacțiunilor hidrofobe între proteinele glutenului în timpul formării aluatului, precum și modificările structurale la încalzire [31–33] etc.

Capitolul patru, ***Tendințe în proiectarea produselor de panificație fără gluten, axate pe formulări***, este rezultatul unui studiu focalizat pe una dintre direcțiile de proiectare a produselor fără gluten, și anume proiectarea bazată pe formulări și componente echilibrate, care ar contribui la mimarea matricei de gluten [34]. Majoritatea formulărilor utilizate includ amidon, făină din cereale și pseudocereale fără gluten, hidrocoloizi și proteine, enzime și emulgatori etc. În baza unei analize de sinteză, au fost descrise componentele, utilizate cel mai recent și mai frecvent în formularea produselor fără gluten și asocierile dintre ele. Sunt descrise caracteristicile generale și compoziția chimică a făinurilor fără gluten, cu un accent mai pronunțat asupra făinii din soriz (Sorghum Oryzoidum) ca cereală locală de perspectivă pentru Republica Moldova. De asemenea, sunt descrise făinurile din pseudocereale și leguminoase, proprietățile funcționale ale făinurilor fără gluten și importanța lor pentru proiectarea de noi produse [35,36].

Capitolul cinci, ***Tendințe în proiectarea produselor de panificație fără gluten, axate pe tehnologii***, constituie o analiză de sinteză minuțioasă a celor mai actuale tehnologii aplicate cerealelor, făinurilor și amidonurilor, aluatului și produselor finale, pentru a dezvolta produse de panificație fără gluten. Printre aceste tehnologii se numără tratarea termică uscată a făinurilor și amidonurilor, tratarea hidrotermică, tratarea cu plasmă rece, cu ultrasunete, cu microunde, extrudarea, aerarea aluatului, biotehnologii, încălzirea ohmică, coacerea parțială cu cicluri de îngheț, cu microunde etc., toate având scopul să asigure asemănarea maximă cu produsele convenționale, pentru a reduce rezistența consumatorilor finali la produsele fără gluten. Studiul ar putea lărgi limitele privind dezvoltarea, selectarea și utilizarea tehnologiilor pentru proiectarea produselor fără gluten.

În capitolul șase, ***Maia cu floră spontană fără gluten. Posibilități de utilizare***, sunt expuse rezultatele cercetărilor bazate pe tehnologii „bioinspirate”, valorificând sorizul, ca materie primă locală, prin dezvoltarea maielei cu floră spontană. Sunt prezentate rezultalele cercetărilor cu referire la indicii de calitate ai făinii de soriz, metodele de dezvoltare și parametrii tehnologici ai maielei cu floră spontană din făină de soriz. Au fost determinați parametrii fizico-chimici, microbiologici și senzoriali ai maielei cu floră spontană. Rezultatele obținute au arătat că făina de soriz este o materie primă locală promițătoare în dezvoltarea maielei cu floră spontană și ar constitui un domeniu de cercetare în conformitate cu cerintele Uniunii Europene pentru valorificarea beneficiilor nutritionale ale cerealelor, reducerea alergenilor, a compușilor toxici și cresterea sigurantei acestor produse.

În capitolul șapte, ***Impactul maielei cu floră spontană asupra indicilor de calitate ai cozonacului***, maiaua, obținută din făină de soriz, este interpretată ca o materie intermediară dintre aluat și produsul final. Aplicabilitatea maielei cu floră spontană a fost testată în dezvoltarea cozonacului, simbol al sărbătorilor creștine, în care principiul activ al fermentației devine un simbol al transformării spirituale. Crearea cozonacului a inclus două etape tehnologice și un timp total de fermentare de 32 de ore, la temperatura de 26...28°C. Maiaua cu floră spontană din făină de soriz a avut un impact pozitiv asupra indicilor fizico-chimici și microbiologici ai probelor de cozonac, iar digestibilitatea și indicele glicemic al probelor cu maia sunt superioare probelor de cozonac obținute cu drojdie comercială.

În capitolul opt, ***Ierburi spontane comestibile pentru un sistem alimentar durabil (ISC),*** protagoniste sunt ierburile spontane comestibile, grație disponibilității, gustului, dar și conținutului semnificativ de minerale și componente bioactive, care aduc beneficii sănătății umane [37–39]. Unele proprietăți ale ISC, după studii ulterioare, posibil, ar putea fi utilizate și valorificate în proiectarea de noi produse pentru persoanele cu regimuri alimentare speciale (regimuri hipoglicemie, regimuri fără gluten etc.) sau pentru îmbunătățirea acestor diete. Cercetările etnografice au fost folosite pentru a identifica cunoștințele despre utilizarea tradițională a ISC în Republica Moldova. S-a realizat o cercetare cu referire la profilul fitochimic, precum și efectele curative ale ISC identificate, posibilitățile de utilizare culinară la nivel global și local [40]. Cunoașterea și valorificarea ISC ar putea fi, de asemenea, o măsură eficientă de prevenire a dispariției culturii și tradițiilor alimentare locale, contribuind la creșterea gradului de conștientizare a securității alimentare și nutriționale, percepute drept calitate, varietate și acces la alimente, cu un angajament față de consumatori, producători, față de diversitatea culturală și mediul înconjurător.

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