

2020

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Recommended Citation

Ermat, SANAEV; Po'lat, TURSUNKHODJAEV; Nodira, AYHODJAEVA; and Orif, UMAROV (2020) "METHOD FOR USING SOYA GRAIN JUICE IN PRODUCTION OF PASTA PRODUCTS," *CHEMISTRY AND CHEMICAL ENGINEERING*: Vol. 18 , Article 16.

Available at: <https://uzjournals.edu.uz/cce/vol18/iss2/16>

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METHOD FOR USING SOYA GRAIN JUICE IN PRODUCTION OF PASTA PRODUCTS

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Considering the protein need for human nutrition, the use of protein-rich grains plays an important role in the production of pasta. The study used soy protein as one of the protein sources, which serves as an effective source of energy in the physical and mental activities of humans. In the form of nutritious juice from soybeans, a protein concentration of 4.67% was obtained, and the resulting soy juice, rich in proteins, was used as an unconventional raw material for the production of pasta. Concentrations and methods were identified that made it possible to achieve technological and economic efficiency.

Keywords: pasta, soy juice, protein, positive ion activated water, energy value

СПОСОБ ИСПОЛЬЗОВАНИЯ СОЕВОГО ЗЕРНОВОГО СОКА ПРИ ПРОИЗВОДСТВЕ МАКАРОННЫХ ИЗДЕЛИЙ

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Учитывая потребность в белке для питания человека, использование богатых белком зерен играет важную роль в производстве макаронных изделий. В этом исследовании мы попытались использовать соевый белок в качестве одного из источников белка, который служит эффективным источником энергии в физической и умственной деятельности человека. В форме питательного сока из соевых бобов была получена концентрация белка 4,67%, а полученный соевый сок, богатый белками, использовался в качестве нетрадиционного сырья для производства макаронных изделий. В результате была достигнута технологическая и экономическая эффективность, на основе которой были эффективны выбранные концентрации и методы. Мы считаем, что эффективное использование соевого белка имеет важное значение в макаронной промышленности для обогащения продукта и улучшения его потребительских свойств.

Ключевые слова: макароны, соевый сок, белок, положительная ионная активированная вода, энергетическая ценность

MAKARON MAHSULATLARI ISHLAB CHIQRISHDA SOYA DONI SHARBATIDAN FOYDALANISH USULLARI

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Insonning ovqatlanishi uchun oqsilga bo'lgan ehtiyojni hisobga olgan holda, oqsilga boy donlardan foydalanish makaron ishlab chiqarishda muhim rol o'ynaydi. Tadqiqot odamlarning jismoniy va aqliy faoliyatida samarali energiya manbai bo'lib xizmat qiladigan oqsil manbalaridan biri sifatida soya oqsilidan foydalangan. Soya donlaridan to'yimli sharbat shaklida 4,67% oqsil konsentratsiyasi olingan va natijada oqsillarga boy bo'lgan soya sharbati makaron ishlab chiqarish uchun noan'anaviy xom ashyo sifatida ishlatilgan. Texnologik va iqtisodiy samaradorlikka erishishga imkon beradigan konsentratsiyalar va usullar aniqlandi.

Kalit so'zlar: makaron, soya sharbati, oqsil, musbat ionli aktiv suv, energitik qiymati

Prezident Shavkat Mirziyoevning 2020 yilning 24 yanvar kuni parlamentga murojotnomasida axolini sifatli va arzon oziq-ovqat maxsulotlari bilan taminlash uchun, qishloq xo'jaligi maxsulotlarini qayta ishlash darajasini joriy yilda kamida ikki barobarga oshirilishi kerakligi ta'kidlandi. Qishloq xo'jaligi ekinlarining ko'p qismini tashkil etuvchi don maxsulotlari tarkibida inson organizmi uchun qimmatli bo'lgan birqancha organik moddalar mavjud [1-2]. Xususan, unda ko'p miqdorda quruq moddalar mavjud bo'lib, u yetilgan don masasining 85% ni tashkil qiladi. Donning asosini oqsil va uglevodlar tashkil etadi. Donli ekinlarining doni tarkibida 10-15%, dukkakli ekinlar donida esa 28-30 % yuqori sifatli oqillar mavjud. Oqsil va uglevodlardan tashqari don va undan olingan maxsulotlar vitamin va mineral moddalarning muxim manbai hisoblanadi. Turli mamlakatlarda insonning kundalik oziq-ovqat ratsionida don maxsulotlarining ulushi 20% dan 80% gacha bo'lgan ko'rsatgichni tashkil etadi. Jahonda makaron mahsulotlarining ommabopligi va ularga bo'lgan talabning ortishi tufayli makaron sanoati tez rivojlandi. Bu esa uzoq davom etuvchi va ko'p ener-

giya talab qiladigan jarayonlarni qisqartirish va mahsulot chiqishini oshirish imkoniyatini beradigan jadal texnologiyalarni joriy qilishga yo'l ochib berdi [3-4]. Adabiyotlarda keltirilgan ma'lumotlarga ko'ra MDH davlatlarida aholi jon boshiga yiliga 7 kg makaron mahsulotlari to'g'ri keladi. Keyingi 10 yilda aholi ovqatlanish ratsionida don va un mahsulotlari ulushining ortganligi tufayli, Respublikamizda iste'mol qilinadigan makaron mahsulotlarining miqdori yiliga axoli jon boshiga 10 kg dan kam emas deb taxmin qilish mumkin. Istemolchilarni oziq-ovqat, ayniqsa ozuqaviy oqsilga boy oziq-ovqat maxsulotlariga bo'lgan ehtiyojlarini qondirish doim muxim masalalardan xisoblangan Bug'doy doni oqsili oziq-ovqat maxsulotlari ishlab chiqarish maqsadlarida foydalanilishi jixatidan, barcha donli ekinlar orasida dunyoda birinchi o'rinda turadi, uning miqdori yiliga 71 million tonna. Ikkinchi o'rinda esa soya oqsili turadi uning miqdori yiliga 62,5 million tonnaga ega, etiborli jixati shundaki bu oqsil miqdoriga erishish uchun jami yetishtiriladigan bugdoy doni massasi-ning 10 foiziga to'g'ri keladigan soya doni kifoya qilishidir [5-6]. Makaron ishlab chiqarish sanoatida

1-Jadval

Oqsilga boy donlarning kimyoviy tarkibi va energitik qiymati tahlillari

O'simlik turi	Kimyoviy tarkibi							Energitik qiymati	
	%			100 mg/g				kkal	kJ
	oqsillar	yog'lar	uglevodlar	kaliy	kaltsiy	magniy	temir		
Loviya sharbati	22,3	1,7	54,5	1100	150	103	12,4	309	1293
Noxot sharbati	23,0	1,2	53,3	873	115	107	9,4	303	1268
Soya sharbati	34,9	17,3	26,5	1607	348	191	11,8	395	1444
Mosh sharbati	24,2	1,5	46,3	672	83	80	11,8	295	1218

2-Jadval

Turli konsentratsiyali soya sharbatining kimyoviy takibi tahlili

Kimyoviy moddalar	Soya donining 3,22 % li konsentratsiyasida	Soya donining 4,67% li konsentratsiyasida	Soya donining 9,09% li konsentratsiyasida
Oqsillar	16,31	24,46	39,51
Uglevodlar	29,61	44,41	59,21
Ozuqa tolasi	8,17	12,25	16,33
Yog'lar	12,59	18,88	25,17
Kkal	243	364	485

3-Jadval

4,67% li konsentratsiyali soya sharbatini makaron reseptiga qo'shilgandagi kimyoviy tarkibi tahlillari

Kimyoviy moddalar	Soya donining 4,67% li konsentratsiyali sharbatida	Oliy navli bug'doy unidan tayyorlangan anaviy makaron reseptida	4,67% li soya sharbati makaron reseptiga qo'shilganda
Oqsillar	24,46	9,71	26,6
Uglevodlar	44,41	76,22	45,5
Ozuqa tolasi	12,25	2,4	14,4
Yog'lar	18,88	1,48	13,5
Kkal	364	336	444

soya oqsilidan yanada to'liq va samarali foydalanish, mahsulot tarkibini boyitish va iste'mol hususiyatlarini oshirish imkonini beradi.

Maqsad va vazifalar

Ishning maqsadi oqsillar va mikroelementlarga boy bo'lgan dukkakli donlardan, oziqaviy boyituvchi qo'shimchalar tayyorlab, makaron mahsulotlari tarkibini boyitish. Makaron mahsulotlarini oqsilga boy o'simlik manbalari bilan boyitilgan xolda ishlab chiqarish, mahsulotni oziqaviy qiymatini ortishiga asos bo'ladi. Bu turdagi makaron mahsulotlarini ishlab chiqarish iste'molchilarni jismoniy va aqliy mexnat faoliyatida energiya manbai bo'lib xizmat qiladi.

Tadqiqot ob'ektlari va usullari

Yumshoq shishasimon bug'doy donining unidan tayyorlangan makaron mahsulotlarining oziqaviy qiymati, qattiq bug'doy donining yormalaridan tayyorlangan makaron mahsulotlariga nisbatan past ko'rsatgichga ega [7-14]. Maqsadimiz yumshoq bug'doy donlaridan xam yuqori sifatli makaron ishlab chiqarishning amaliy yechimlarini

topish. Oqsillarga, vitaminlarga, makro va mikroelementlarga boy bo'lgan oziqa manbalaridan foydalanib, oziqaviy qiymati yuqori bo'lgan, tez pishadigan va pishirishni talab qilmaydigan makaron mahsulotlari turlarini ishlab chiqarish [15-20]. Inson organizmi energetik quvvatni, oqsil manbalaridan olishini xisobga olsak, oqsilga boy donlarni tarkibini o'rganib ilmiy taxlil qilish va ular asosida funksional parhezboq ovqatlanishga mo'ljallangan, xamda iste'molchilarni jismoniy va aqliy mexnat faoliyatida, energiya manbai bo'lib xizmat qila oladigan, makaron mahsulotlari turlarini ishlab chiqarishni innavatsion usullarini ishlab chiqarish [21-25]. Quyidagi birinchi 1-jadvalda keltirilgan elektroaktivlashtirilgan musbat ionli suvda bo'ktirib olingan sharbatida dukkakli donlarning kimyoviy tarkibini o'rganib taxlil qilamiz.

Jadval taxliliga ko'ra soya, loviya, no'xot, mosh donlarining elektroaktivlashtirilgan musbat ionli suvida bo'ktirib olingan sharbatida, oqsil va mineral moddalar miqdori yuqori ko'rsatgichga va yuqori energetik qiymatiga ega. Makaron mahsulotlari sifatini yaxshilash uchun oziqaviy

4-Jadval

Elektr aktivlashtirilgan suv va oddiy suvning makaron ishlab chiqarish jarayonlarida taqqoslash

Makaron turlari	Ana'naviy ichimlik suvdan fodalanish			Elektroaktivlashtirilgan suvdan foydalanish		
	Xamir qorish, daqiqa	Quritish, daqiqa	Saqlash, kun	Xamir qorish, daqiqa	Quritish, daqiqa	Saqlash, kun
Spagette	20	500	365	15	360	495
Lapsha	22	480	365	13	350	495
Makaron	25	720	365	15	620	495
Rojki	20	240	365	10	180	495
Tezkor lapsha	30	20	180	20	15	210

5-Jadval

4,67% li konsentratsiyali soya sharbatining makaron xamiriga qo'shilishi natijasida, oqsili moddalarining sifati va preslash bosimini o'zgarishi tahlillari

Asosiy xomashyolar	Ananaviy suvda tayorlangan makaron xamirida			4,67% li soya sharbatida tayorlangan makaron xamirida		
	Kleykovina miqdori, %	Kleykovina, IDK bir ligi	Presslash bosimi, kPa	Kleykovina miqdori, %	Kleykovina, IDK birligi	Presslash bosimi, kPa
Oliy navli makaron yormasi	30	50	100	32	55	95
Birinchi navli makaron yormasi	32	65	95	34	62	90
Oliy navli un	28	70	90	30	71	93
Birinchi navli un	30	72	80	32	75	75

aktiv moddalardan foydalanib xomashyo retsepturasi tarkibini boyitdik, bunda ichimlik suviga osh tuzining 5% li eritmasini tayorladik va elektrod ta'sirida elktroaktivlashtirilgan musbat ionli suv xosil qildik, xosil qilingan aktiv suvdan 20 litr olib, 40-50°C xaroratgacha qizdirdik va 1kg miqdorida oqlangan soya donini, 2-4 soat mobaynida bo'ktirib qo'ydik. To'yingan soya dukkaklarini yanchib sharbatini separator yordamida ajratib oldik. Soya sharbati tahlili 2-jadvalda keltirilgan.

Maxsulot sifatini yanada yaxshilash uchun aktiv moddalardan foydalanib xamir tarkibini boyitildi. Soya donining 4,67% li konsinratsiyasini oliy navli bug'doy uniga makaron resepturasi asosida, belgilangan 30% namlikni tashkil qilishi uchun aralashtirilganda, aralashma tarkibini kimyoviy o'zgarishlari quyidagi 3-jadvalda keltirilgan, yuqoridagi jadval natijasiga ko'ra 4,6 % li konsentratsiyali soya sharbatidan foydalanish yuqori samaradorlik ko'rsatgichlarini namoyon qildi, buz bu ko'rsatgichdan foydalanishni tanladik

Natijalar va ularning muhokamasi

Aktiv soya sharbatini "ASHRAF RAMAZAN GROUP" makaron ishlab chiqarish korxonasi sinovdan o'tkazildi. Bunda xamir qorish jarayonida oliy navli yumshoq bug'doy uniga 30% aktiv soya sharbati qo'shildi, natijada xamir strukturasi yaxshilanib, uskunaning siqish bosimi pasaydi. Preslash bosimi pasayishi yarim tayyor makaron maxsulotlarini bir tekisda shakillanishiga, bu esa xo'l makaron shakillarini qisqa vaqtda

qurishiga zamin yaratdi. Soya sharbatidan makaron ishlab chiqarishda foydalanish, maxsulotlarni mustaxkamlik qobiliyatini oshirdi. Elektroaktivlashtirilgan musbat ionlarga to'yingan suvdan makaron xamirini qorishtirish jarayonida foydalanish, ilmiy va iqtisodiy samaradorlikka erishildi. (Bu suv katolit, ishqorli suv, biostimulyator bo'lib juda yumshoq, rangsiz, ph darajasi 9,0 dan 12,0 gacha). Elektr aktivlashtirilgan suv va oddiy suvning makaron xamirini qorish davomiyligi, xo'l makaron maxsulotlarni quritish davomiyligi va tayor maxsulotni saqlash davomiyligiga ta'sirlari quyidagi 4-jadvalda keltirilgan.

Soya donining tarkibini chuqur o'rganib ilmiy taxlillar asosida samarali foydalanish uchun, oziq-ovqat ishlab chiqarish korxonalarini mutaxassislarini, soya mahsulotlarini tayyorlash va qayta ishlash usullari to'g'risida batafsil ma'lumotga ega bo'lishlari kerak, chunki soya sharbatidagi oqsilning tarkibi va funksional xususiyatlari ularga bog'liq. Quyidagi beshinchi jadvalda soya donidan oliggan sharbatining 4,67% li konsentratsiyalarini makaron xamiriga qo'shilishi natijasida, gliadin oqsili miqdori va sifatini o'zgarishi xamda preslash ekstruderining bosimini pasayishi 5-jadvalda keltirilgan.

5-Jadval natijasini taxliliga ko'ra maxsulotni oziqaviy oqsil moddalari, preslash ekstruderida bosimni pasayishi va issiqlik xaroratini pasayishi xisobiga, o'z tarkibini saqlab qoldi, bu bizga makaron maxsulotlarini ishlab chiqarish quvvatlarini oshirishda, oqsillar denaturatsiyasini

oldini olishda, quritish jarayoni vaqtini qisqartirishda, elektroenergiya sarfini kamaytirishda yuqori samara berdi.

Xulosa

Ilmiy ishimizda makaron ishlab chiqarish texnologiyasida noan'aviy xomashyolardan foydalanishning innovatsion uslublarini yoritib berish.

Noan'aviy xomashyo sifatida soya donining sharbati tarkibidagi oqsillarini aktivlashtirilgan musbat ionli suv yordamida ajratib olish usulini tadbiq qilish. Soya oqsiliga bo'lgan iste'mol talabini ortishining asosiy sabablaridan biri bu boshqa oziq ovqat maxsulotlariga qo'shilishi natijasida ularning

tannarxini arzonlashtirishga yordam berishidir. Soya oqsilida inson tanasining kunlik ehtiyojini (o'sishi va bevosita rivojlanishi uchun) ta'minlaydigan barcha kerakli aminokislotalar mavjud. Soya oqsili hayvonot oqsiliga o'xshaganligi uchun go'sht, sut, baliq va tuxum kabi yuqori proteinli ovqatlarning oqsillariga solishtirish mumkin.

Ushbu va boshqa tadqiqotlar ma'lumotlari shuni ko'rsatadiki, oqsilning yagona manbai sifatida ishlatiladigan yoki kunlik iste'mol qilishning muhim qismini tashkil etadigan soya oqsili yuqori ozuqaviy ahamiyatga ega va inson tanasini azot va aminokislotalar bilan ta'minlaydigan yagona proteyin manbai bo'lishi mumkin.

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