

MEVALI PASTILALAR TAYYORLASH TEXNOLOGIYASI

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Annotatsiya: *Maqolada pastilani inson organizmi uchun foydali komponentlar bilan boyitish va ushbu qandolat mahsuloti retsepturasiga biologik qimmatli moddalarni kiritish muhimligi asoslab berilgan. Tayyor mahsulot ishlab chiqarish texnologik sxemasi tanlangan. Xom ashyo va tayyor mahsulotning mikrobiologik, sanitariya-kimyoviy tahlillar natijalari keltirilgan.*

Maqsad: *Yuqori oziqaviy va biologik qiymatga ega bo'lgan o'simlik xom ashyosi asosida qandolat mahsulotlari tayyorlash jarayonlarini tadqiq etish, pastila mahsulotlar assortimentini kengaytirish.*

Natijalar: *Pastilani mikrobiologik ko'rsatkichlarini o'rganish maqsadida laboratoriya sharoitida sinov-namunalari tayyorlandi. Ushbu namunalarning saqlash muddatini belgilash maqsadida sanitariya va mikrobiologik tahlildan o'tkazildi. Pastilalarning saqlash muddatini aniqlash uchun 210 kun davomida mikrobiologik ko'rsatkichlar dinamikasi kuzatuvlari o'tkazildi va saqlash muddati 180 kun deb belgilandi. Shu bilan birga, uni saqlash uchun maqbul sharoitlar Pastila qandolat mahsulotlari GOST 6441-2014 talablariga mosi keldi va saqlash harorati $(18 \pm 3)^{\circ}C$ va havoning nisbiy namligi (75% dan ko'p bo'lmagan) tashkil etdi.*

Xulosa: *Jahon qandolat bozoridagi vaziyat ishlab chiqarish hajmini oshirish, mahsulot turlarini kengaytirish, xom ashyo sifatini yaxshilash, uning tannarxini pasaytirish va qandolat mahsulotlari iste'molini oshirish bo'yicha barqaror tendentsiyani ko'rsatmoqda, bu esa farovonlik va aholi turmush darajasining oshishini ko'rsatishi mumkin. Antioksidantlik xususiyatiga ega bo'lgan o'simlik qo'shimchasi hisobiga tayyor mahsulotning biologik qiymati ortadi va saqlash muddatini uzaytirishga erishish mumkin. Tadqiqot natijalariga ko'ra, yuqorida keltirilgan retsept asosida tayyorlangan mevali pastilalarni eneretik qiymati hisoblab childi.*

Kalit so'zlar: *profilaktika, pastila, assortiment, funksional mahsulot, boyitilgan mahsulotlar, retseptura, mikrobiologik ko'rsatkichlar.*

KIRISH

Dunyoda qandolat mahsulotlari keng tarqalgan bo'lib, ular orasida pastila mahsulotlari alohida o'rinni egallaydi va ushbu mahsulotlar assortimentini kengaytirish, ya'ni mahsulotlarning kaloriyasini kamaytirish, shuningdek, ularning energiya va ozuqaviy qiymatini oshirish usullarini ishlab chiqish yoki takomillashtirish muhimdir [1;2;3].

Pastila - meva va rezavorlar pyuresidan tayyorlangan pastila mahsulotlari bo'lib, tarkibida pektin, essensial mikro va mikroelementlar va boshqa biologik faol moddalar mavjud bo'lib, jigar, oshqozon-ichak trakti va yurak-qon tomir faoliyatini yaxshilaydi. Pastilalar

konsistensiyasini shakllantiruvchi dirildoq hosil qiluvchi birikmalar quyidagi turlarga bo'linadi: meva pyuresi ko'pirtiriladigan yelimli, ko'pikli va mayda g'ovakli konsistensiyani mustahkamlash uchun unga maxsus agar-shakar-patokali sirop; yelimsiz - meva pyuresi va ko'pirtirilgan oqsillardan tayyorlanadi.

Pastila tayyorlash texnologiyasini takomillashtirishning dolzarbligi, o'rganilayotgan, ya'ni qandolat mahsulotlariga mamlakatimiz aholisi orasida talab katta ekanligi bilan belgilanadi. Shuningdek, profilaktika maqsadida inson oraganizmini virusli va yuqumli kasalliklarga qarshi kurashishini kuchaytirishdir [4].

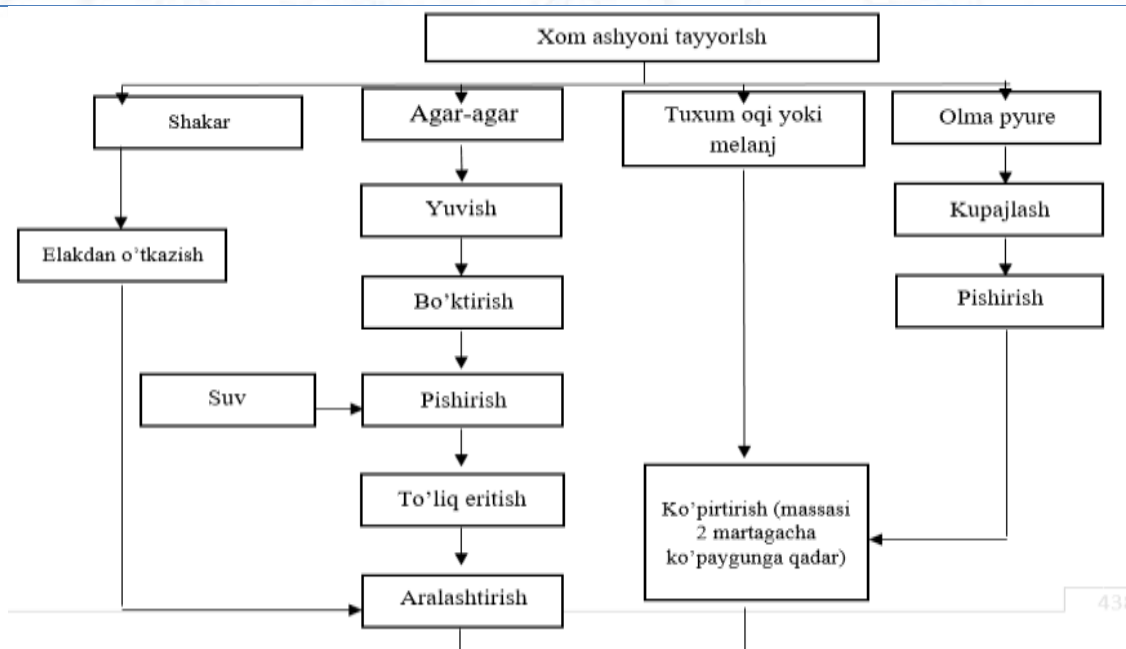
Hozirgi kunda aholining rasioni reseptura tarkibi bo'yicha turlicha va murakkab bo'lgan oziq-ovqat mahsulotlaridan iborat. Shunga muvofiq, oziq-ovqat sanoatining yangi yo'nalishi - oziq-ovqat mahsulotlarini loyihalashtirish rivojlanmoqda. Oziq-ovqat mahsulotlarini loyihalashtirish deganda, iste'molchilar talabini to'la qondira oladigan, me'yorlashtirilgan ovqatlanish talablari va tamoyillariga javob beruvchi, zaruriy oziqa xossalar to'plamiga ega bo'lgan, murakkab ko'p komponentli oziq-ovqat mahsulotlari ishlab chiqarish jarayonlari tushiniladi [5;6].

Usullar. Murakkab polikomponentli tarkibga ega bo'lgan yangi oziq-ovqat mahsulotlarini loyihalashtirish bir qator muammolarni yechish imkonini beradi [7]:

- inson organizmini zaruriy to'plamdagi fiziologik foydali nutriyentlar bilan ta'minlaydi;
- fiziologik ta'sirdagi mahsulotlarning inson organizmiga reseptura tarkibiga aralashmalar va turli biologik faol moddalar, mikro- va makroelementlar bilan boyitish imkoniyatini hisobga olgan holda mazkur yo'nalishni shakllantirish;
- tayyor mahsulotning havfsizligi, sifat ko'rsatgichlari, iste'mol xossalarini modellashtirish va bashorat qilish.

Ko'p komponentli oziqaviy tizimni loyihalashtirishdagi asosiy masalalardan biri - funksional xossaga ega bo'lgan qandolat mahsulotlarining yangi turlarini ishlab chiqishda reseptura tarkibi nisbatlari va optimal to'plamlarini ta'minlab berish hisoblanadi [8;9].

Yuqoridagilarni hisobga olib, biologik qiymati yuqori bo'lgan meva va sabzavot pastilalari ishlab chiqarishning texnologik sxemasini taklif etamiz. Tayyor mahsulotlar inson organizmida vitamin, mineral va bosqa zaruriy makro- va mikronutriyentlar etishmasligini ta'minlashga yo'naltirilgan [10]. **1-sxema. Pastila tayyorlash texnologiyasining texnologik sxemasi.**



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Tadqiqot ob'ektlari sifatida yangi va quritilgan mahalliy o'simlik xom ashyollari namunalari: olma, g'aynoli (olxo'ri) va o'rik, lavlagi, uzum, bexi, sabzi, lavlagi, shuningdek, dorivor o'simliklar tanlab olindi. Ushbu ilmiy tadqiqot ishida biz ma'lum bir kimyoviy tarkibli va funksional yo'naltirilgan yangi turdagi pastilalar retseptlarini modellashtirdik va ishlab chiqdik. Retseptura tarkibida yangi terilgan va quritilgan mevalar, shuningdek, maxalliy dorivor o'simliklardan iborat. Bunday desert mahsulotlar asosan 60 dan 80% meva massasidan tashkil topgan mahsulotdir. Tayyor mahsulot tarkibidagi biologik faol moddalarning yo'qotilishini kamaytiradigan samarali texnologik usullardan foydalangan holda yangi turdagi mevali pastilalar olishning kam chiqindili innovatsion texnologiyalari ishlab chiqildi [11;12].

1-jadval

Meva pastila retsepti

No	Meva pastila komponentlari	Miqdori
1	Olma pyure	60
2	Gaynoli pyure yoki qoqi	20
3	Patoka	10
4	Agar	5,5
5	O'simlik qo'shimchasi	4,5

Organoleptik ko'rsatkichlar bo'yicha pastilalar 2-jadvalda keltirilgan talablarga javob berishi kerak [13].

2-jadval

Laboratoriya sharoitida tayyorlangan mevali pastilaning organoleptik ko'rsatkichlari

Ko'rsatkichlarning nomlanishi	Izoh
Ta'm va xid	Ishlatilgan asosiy va qo'simcha xom ashyolarga xos, shirinlik darajasi meyorida, begona ta'mlarsiz. Xidi xushbo'y, tarkibidagi xom ashyolarga xos. Begona ta'm va hidga yo'l qo'yilmaydi
Rangi	Ishlatilgan xom ashyoning rangiga xos. To'q rangli yoki och yorqin rang bo'lishiga

	ruxsat beriladi
Konsistensiya	Maydalangan meva va qo'shimcha komponentlar zarrachalari zich holatda bo'lib, yengil parchalanishga ruxsat beriladi. Ezg'ilab bosilganda bir oz yumshoq holatda bo'ladi
Tashqi ko'rinishi	To'rtburchaklar yoki yumaloq, silliq sirtli, qalinligi bir xil, buzilmagan, qirralari sinmagan, qadoqlash va tashish vaqtida o'z shaklini saqlab turadi

Natijalar. Pastilani mikrobiologik ko'rsatkichlarini o'rganish maqsadida laboratoriya sharoitida sinov-namunalari tayyorlandi. Ushbu namunalarning saqlash muddatini belgilash maqsadida sanitariya va mikrobiologik tahlildan o'tkazildi.

Oziq-ovqat mahsulotlarining saqlash muddatini aniqlash oziq-ovqat mahsulotining buzilish jarayonini eksperimental sinovdan o'tkazishni o'z ichiga oladi, bu uning yaroqlilik muddatini tugashiga to'g'ri keladigan vaqtni aniqlash bilan yakunlanadi [14;15]. Oziq-ovqat mahsulotlarining saqlash muddatini asoslash jarayonining negizi me'yoriy yoki texnik hujjatlarda belgilangan haroratlarda saqlash mobaynida mahsulot namunalari organoleptik xususiyatlarini baholab, mikrobiologik, sanitariya-kimyoviy tadqiqotlar o'tkazishdir. Pastlani to'liq sanitariya-epidemiologik baholashda ishlatilgan xom ashyo va tayyor mahsulotlarni mikroorganizmlarning nazorat qilinadigan barcha guruhlari uchun mikrobiologik tahlili o'tkazildi. Pastilalarni saqlash jarayonida quyidagilar bo'yicha mikrobiologik tadqiqotlar o'tkazildi va tayyor mahsulot tarkibidagi QMAFAnM va achitqi (zamburu') lar miqdori aniqlandi. Pastilalarning saqlash muddatini aniqlash uchun 210 kun davomida mikrobiologik ko'rsatkichlar dinamikasi kuzatuvlari o'tkazildi va saqlash muddati 180 kun deb belgilandi. Shu bilan birga, uni saqlash uchun maqbul sharoitlar Pastila qandolat mahsulotlari GOST 6441-2014 talablariga mosi keldi va saqlash harorati (18 ± 3)° C va havoning nisbiy namligi (75% dan ko'p bo'lmagan) tashkil etdi. Olingan natijalar 3-jadvalda keltirilgan.

3-jadval

Tayyor mahsulotning mikrobiologik ko'rsatkichlari

Ko'rsatkichlar	Mevali pastilalar	SanQvaM 6441-2014 ga ko'ra yo'l qo'yilish chegarasi, mg/kg -dan ko'p emas
Patogenlar shu jumladan, salmonellalar 100 g mahsulotda	Mavjud emas	Yo'l qo'yilmaydi
BGKP (100 g -da)	Mavjud emas	Yo'l qo'yilmaydi
Achitqilar KOE/g -dan ko'p emas	Mavjud emas	100
Zamburug'lar KOE/g -dan ko'p emas	Mavjud emas	100

Discussions. Yuqorida keltirilgan mevali pastila ishlab chiqarish texnologik sxemasiga asosan laboratoriya sharoitida tayyorlangan meva pastilalari SanQvaM talablariga javob beradi deb baholandi. Shuningdek, mahsulot 210 kun davomida saqlanib, har 30 sutkada saqlanayotgan meva pastilalardan namunalari olinib mikrobiologik ko'rsatkichlari tekshirib borildi va 180 kun davomida mahsulotda mikroorganizmlarning rivojlanishi va bijg'ish holatlari kuzatilmadi.

Xulosa. Shunday qilib, jahon qandolat bozoridagi vaziyat ishlab chiqarish hajmini oshirish, mahsulot turlarini kengaytirish, xom ashyo sifatini yaxshilash, uning tannarxini pasaytirish va qandolat mahsulotlari iste'molini oshirish bo'yicha barqaror tendentsiyani

ko'rsatmoqda, bu esa farovonlik va aholi turmush darajasining oshishini ko'rsatishi mumkin. Antioksidantlik xususiyatiga ega bo'lgan o'simlik qo'shimchasi hisobiga tayyor mahsulotning biologik qiymati ortadi va saqlash muddatini uzaytirishga erishish mumkin. Tadqiqot natijalariga ko'ra, yuqorida keltirilgan retsept asosida tayyorlangan mevali pastilalarni energetik qiymati hisoblab childi.

Yuqori oziqaviy va biologik qiymatga ega bo'lgan o'simlik xom ashyosi asosida tayyorlangan qandolat mahsulotlari ishlab chiqish va ulardan ommaviy foydalanish – aholi ratsionida kamyob bo'lgan oziqaviy moddalar yetishmaslik muammosining yechimi uchun istiqbolli yo'nalish bo'lib, bunday mahsulotlar assortimentini kengaytirish muhimdir.

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