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ZARDOB SUVI ASOSDA NON ISHLAB CHIQARISH VA BOYITISH

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Annotasiya. Sutni qayta ishlash korxonalari chiqindisi xisoblangan zardob suvi non va non maxsulotlarini biotexnologik usulda boyitish uchun qiymati yuqori bo‘lgan muhim xonashyo xisoblanadi. zardob suvi tarkibidagi sut kislotali bakteriyalar non maxsulotlarini tayyorlash jarayonida maxsulotni *Lactobacterium* va *Bifidobacterium* kabi foydali mikroorganizmlar bilan boyitib, non va non maxsulotlarining sifati, to‘yimlilik va kaloriyasini oshiradi.

Kalit so‘zlar. Zardob suvi, *lactobacterium*, *Bifidobacterium*, ahitqi, suv, sut

Annotation. Whey, a waste product of milk processing plants, is an important and valuable ingredient for the biotechnological enrichment of bread and bakery products. Lactic acid bacteria contained in whey enrich the product with beneficial microorganisms such as *Lactobacterium* and *Bifidobacterium* during the preparation of bakery products, increasing the quality, nutritional value, and calorie content of bread and bakery products.

Keywords: whey water, *lactobacterium*, *Bifidobacterium*, yeast, watermilk

Аннотация: Whey, a waste product of milk processing plants, is an important and valuable ingredient for the biotechnological enrichment of bread and bakery products. Lactic acid bacteria contained in whey enrich the product with beneficial microorganisms such as *Lactobacterium* and *Bifidobacterium* during the preparation of bakery products, increasing the quality, nutritional value, and calorie content of bread and bakery products.

Ключевые слова: сывороточная вода, *lactobacterium*, *Bifidobacterium*, дрожж, вода, молоко.

Kirish. Yildan - yilga ortib borayotgan aholini sifatli hamda to‘yimli non va non mahsulotlari bilan ta‘minlash dunyo mamlakatlari oldida turgan muhim vazifalardan biri hisoblanadi. Sh ma’noda donli ekin maydonlarini kengaytirish va bug’doy hamda boshqa donli ekinlardan yuqori hosil olish asosiy masalalardan biri hisoblanadi. 2025 yilda mamlakatimizda 9.0 mln. 300 ming tonnadan ortiq bug’doy yig’ishtrib olindi va ularning asosiy qismi aholini non va non mahsulotlari bilan ta‘minlashda qaratiladi.

Adabiyotlar tahlili. Har yili dunyo bo‘ylab qariyb 700 million tonna bug’doy ishlab chiqariladi [1]. Inson iste’moli uchun zarur bo‘lgan bug’doy asosan nonga qayta ishlanadi, bu butun dunyo bo‘ylab har yili 9 milliard kg non iste’mol qilinishiga olib keladi [2]. Bug’doy donini maydalash intensivligi, xamirni tayyorlash turi, pishirish jarayoni va xamirni tayyorlashda ishlatiladigan ingredientlar nonning xususiyatlariga kuchli ta’sir qiladi [3, 4]. Sut ingredientlari ozuqaviy, organoleptik va foydali ta’sirga ega bo‘lganligi sababli pishirish sanoatida keng qo‘llaniladi [5]. 2021 yil non mahsulotlarining ba’zi funktsional xususiyatlari

o‘rganilgan [6]. Ushbu ingredientlar orasida, zardob, u to‘liq va biologik mavjud aminokislotalarning boy manbai bo‘lgan sut oqsilining taxminan 20% ni tashkil qiladi [7]. Ushbu aminokislotalar orasida lizin juda muhim darajani ifodalaydi: 9,1 g / 100 g WP. Kleykovina bo‘lmagan nonga oqsil qo‘shilishi ta‘mi, hajmi va rangini sezilarli darajada o‘zgartiradi [8, 9, 10]. tomonidan o‘tkazilgan tadqiqot shuni ko‘rsatadiki, pechene uchun oqsil qo‘shilishi ikkinchisining ozuqaviy sifatini yaxshilaydi, lekin hissiy va jismoniy sifatga sezilarli ta‘sir qiladi.

Tadqiqot metodologiyasi. Mikrobiologik tadqiqot ishlari umum qabul qilingan usullar orqali olib borildi.

Natijalar va ularning tahlili. Non va non mahsulotlarning sifati va ta‘mi unga qo‘shiladigan va boyitiladigan qo‘shimcha mahsulotlar bilan chambarchas bog‘liq. Sut mahsulotlarini qayta ishlash korxonalarining chiqindilari xisoblangan zardob suvi non va non mahsulotlarini boyitishda qiymati yuqori bo‘lgan muhim xomashyo xisoblanadi. Olib borilgan tajribalar shuni ko‘rsatadi-ki (1-jadval), sut korxonalarining chiqindisi zardob suvi non va non mahsulotlarini boyitishda kata ahamiyatga ega ekan.

1-jadval

Zardob suvi bilan boyitilgan un va mikroorganizmlar

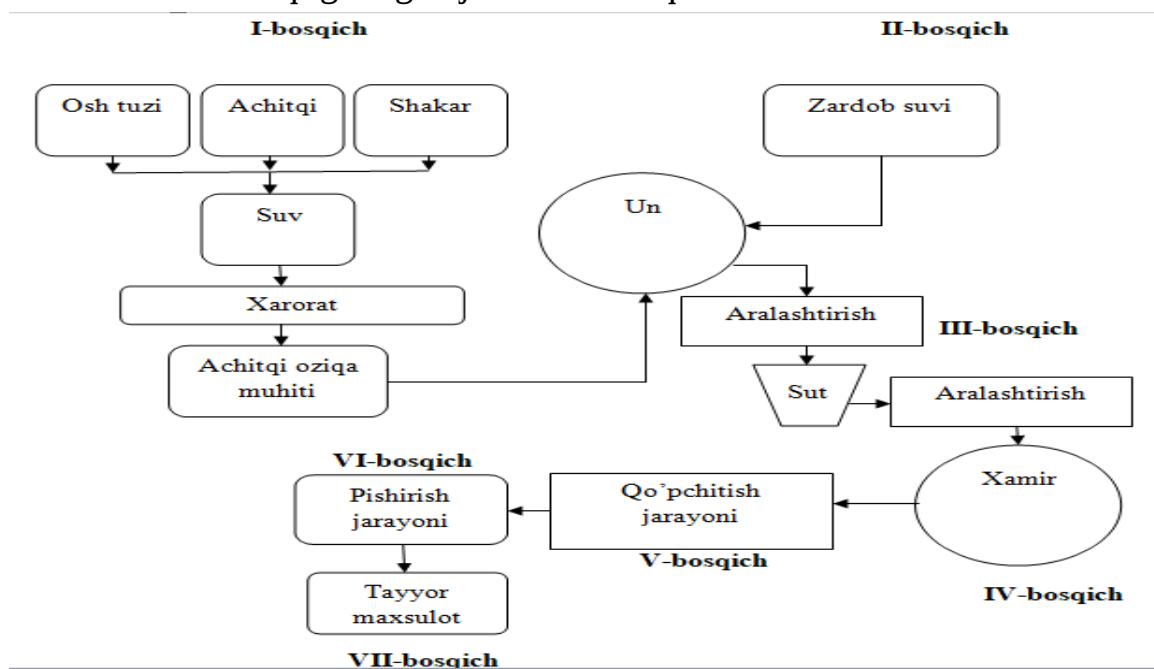
№	Variant tarkibi	Achitqi soni, mln. koe/ml	Lactobacterium soni, mln. koe/ml	Bifidobacterium soni, mln. koe/ml
1	Oddiy suv (un, tuz, shakar achitqi)	8,7	-	-
2	Zardob suvi (un, tuz, shakar, achitqi)	12,4	9,8	10,3
3	Zardob suvi (un, tuz, shakar, achitqi, osimlik moyi)	13,7	14,6	18,1
4	Zardob suvi (un, tuz, shakar, achitqi, osimlik moyi, sut)	17,9	23,2	27,0

Oddiy suvga qorilgan un va unga qoshimsha tuz, shakar va achitqi qo‘shilganda xamirning bo‘rtishi nisbatan boshqa variantlarga solishtirganda ancha past natija ko‘rsatdi va bu esa unga qoshilgan achitqi xamda qoshimcha mahsulotlar bilan chambarchas bog‘liqlidi, va achitqining titrli bilan bog‘liqdir.



1-rasm. Sut zardobi bilan boyitilgan non mahsuloti

Unni sut korxonasining chiqindisi xisoblangan zardob suvi (ZS) xamda tuz, shakar va achitqi bilan boyitganda esa xamirning qop'pchish jarayoni achitqi titri 12,4 mln. koe/ml, zardob suvida esa Lactobacteriumning xujayra titri 9,8 koe/ml va Bifidobacteriumning xujayra titri esa 10,8 mln. koe/ml xisobiga nazorat varianiga nisbatan yuqori bo'lishi kuzatildi. Nonva non maxsulotlarini tayyorlash uchun sutni qayta ishlash korxonasining chiqindi suvi xisoblangan zardob suvini (ZS) bilan xamda tuz, shakar, achitqi va o'simlik moyi bilan boyitilgn variantimizda xamirning bo'rtishi tezlashib, achitqining titri 13,7 mln. koe/ml, Lactobacteriumning xujayra titri esa 14,6 mln. koe/ml va Bifidobacteriumning xujayra titri esa 18,1 mln. koe/ml ni tashkil qilganligi tajribalarda aniqlandi.



2-rasm. Zardob suvi asosida non tayyorlash texnologiyasi

Zardob suvi (ZS) bilan unni boyitib qo'shimcha ravishda tuz, shakar, o'simlik moyi, achitqi xamda sut qo'shilgan variantda achitqining titri 17,9 mln. koe/ml, Lactobacteriumning xujayra titri esa 23,2, mln. koe/ml va Bifidobacteriumning xujayra titri esa 27,0 mln. koe/ml ni tashkil qilganligi tajribalarda aniqlandi. Olib borilgan tajribalardasutni qayta ishlash korxonasining chiqindisi zardob suvi (ZS) bilan non va non maxsulotlarini tayyorlash korxonalarida oddiy suvning o'rniga ishlatiladigan bo'lsa, zardob suvining tarkibidagi inson uchun foydali bo'lgan Lactobacterium va Bifidobacterium avlodi mikroorganizmlarining foydali xususiyatlari evaziga non ba non maxsulotlari tabiiyboytilitadi va bu mikroorganizmlarning ko'payishiga yahada qulay muxit yaratiladi. Chunki unni boyitish uchun tuz, shakar, achitqi, sut va o'simlik (xayvon yo'gi) moyi foydali mikroorganizmlarning xamir ichida ko'payoshiga oziqa muhit bo'lib xizmat qiladi, 2-rasm.

Xulosa. Olib borilgan tajribalar mobaynida sutni qayta ishlash korxonasining oqova chiqindi suvi xisoblangan zardob suva (ZS) non va non mahsulotlarini tayyorlash jarayonida foydalanish imkoniyati yuqoriligi aks ettirildi. Bunin asosiy sabablaridan biri sifatida zardob

suvi tarkididagi Lactobacterium va Bifidobacterium avlodiga mansub mikroorganizmlar xamda unni oytish uchun foydalanilayotgan tuz, sut, shaka, o‘simlik moyi yoki xayvon yo‘gi xamda achitqini keltirib o‘tish joiz.

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