PIRROLIZIDIN ALKALOIDLARINING OCHILISH TARIXI

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Annotatsiya: Alkaloidlar asosan aminokislotalardan kelib chiqqan quyi molekulali azot saqlovchi birikmalarning xilma-xil guruhidir. Biokimyoviy tadqiqotlar shuni ko‘rsatdiki, nesin asosining biosintezi birlamchi metabolizm orqali putressin va spermidin bilan bog‘langan bo‘lib, bu ikkalasi ham faqatgina arginindan hosil bo‘ladi.

Kalit so‘zlar: Pirrolizidin, alkaloid, nesin kislotasi, nesin asosi.

Аннотация: Алкалоиды представляют собой разнообразную группу низкомолекулярных азотфиксирующих соединений, происходящих в основном из аминокислот. Биохимические исследования показали, что биосинтез основания Несина связан с путрессином и спермидином посредством первичного метаболизма, которые образуются только из аргинина**.**

Ключевые слова: Пирролизидин, алкалоид, несиновая кислота, несиновое основание.

Annotation: Alkaloids are a diverse group of low-molecular nitrogen-retaining compounds, mainly derived from amino acids. Biochemical studies have shown that the biosynthesis of nesin base is linked by primary metabolism to putressin and spermidine, both of which are formed solely from arginine**.**

Keywords: pyrrolizidine, alkaloid, nesinic acid, nesin base.

Kirish

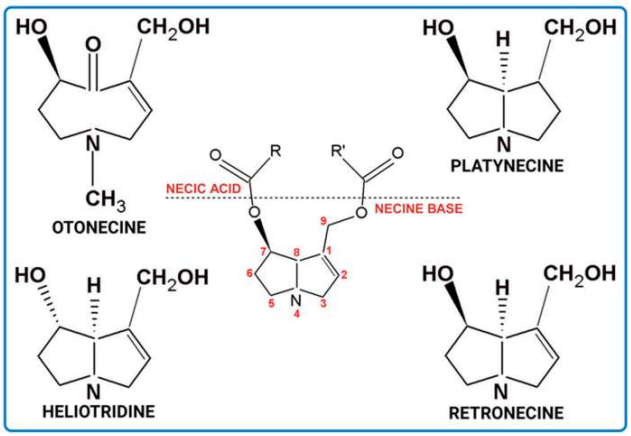
Alkaloidlari farmakologik, biologik va gemotaksonomik jihatdan juda muhim qiziqish uyg‘otadigan moddalar hisoblanadi. Ushbu ikkilamchi metabolitlar turli xil o‘simliklardan ajratib olingan, ayniqsa [1].

Ingliz olimi Hartmann ta’kidlashicha, pirrolizidin alkaloidlari ko‘prikchasimon azot atomiga ega bo‘lgan ikkita birikkan besh a’zoli halqadan tashkil topgan 1-metilpirrolizidinning hosilalari hisoblanadi [2]. O‘simliklarda PAlarining aksariyati N-oksidlar ko‘rinishida uchraydi. Pirrolizidin alkaloidlari (PA) 13 tagacha oilaga mansub 300 ta o‘simlik turlarida aniqlangan. PAlar zaharli tabiiy moddalar sinfi sifatida katta qiziqish uyg‘otgan, shuningdek, tarkibida PA

ISSN 3030-3907

mavjud bo‘lgan o‘simliklar dunyodagi gullayotgan o‘simliklarning 3% ini tashkil etishi taxmin qilinadi [3].

Adabiyotlar tahlili. Pirrolizidin alkaloidlari ikki asosiy kimyoviy shaklda uchraydi: aminlar (1,2-degidropirrolizidin alkaloidlari) va tegishli N-oksidlar. Ular asosan, nesin asosi va kamida bitta nesin kislotasidan tashkil topgan murakkab efirlar deb qaraladi. Murakkab efirlarning tuzilishi asosida PAlari to‘rtta asosiy guruhni tashkil etadi (1-rasm).



Nesin asosi bitta azot atomi bilan bog‘langan ikkita besh a’zoli halqadan tashkil topgan. Nesin asoslari 4 xil tip retronetsin, geliotridin, otonetsin va platinetsin guruhlariga bo‘linadi. Yuqoridagi tiplar halqaning davriyligi va qo‘shbog‘ning to‘yinishi bilan farqlanadi va bu holat ularning zaharliligini belgilab beradi [4-5] (1-jadval).

1-jadval

Nesin asoslari tiplarining tavsifi

Xususiyatlari	Retronetsin	Geliotridin	Otonesin	Platinesin
Halqaning tuzilishi	bisiklik	bisiklik	monosiklik	bisiklik
To‘yinmagan 1,2-qo‘shbog‘	+	+	+	-
Zaharliligi	+	+	+	-

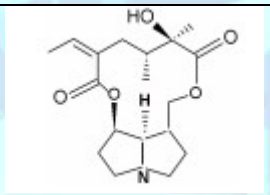
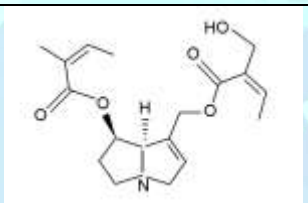
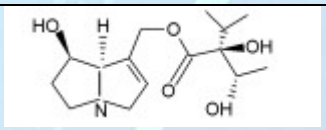
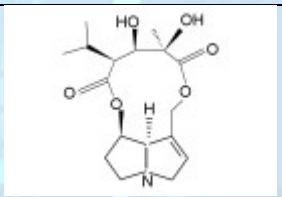
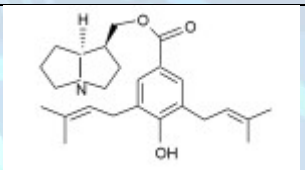
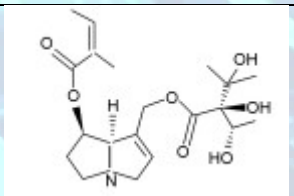
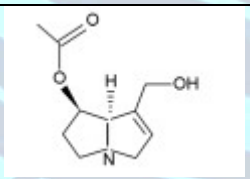
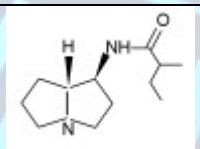
Polshalik olim Kavindi Jayawickreme o‘z tadqiqotlarida keltirishicha, nesin kislotalari mono-, dikarbon alifatik kislota, yoki monokarbon aromatik kislotalar bo‘lishi mumkin [6-7].

Tadqiqot ishining obyekti. Nesin asoslari va nesin kislotalarining o‘zaro birikishi, shuningdek, ularning bog‘lanish shakllari, pirrolizidin alkaloidlarini sakkizta guruh orqali tasniflashga olib kelgan (2-jadval).

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2-jadval

PA turlari. Namunaviy PA tuzilmalarining nomlari tagiga chizilgan

Nesin asosi va nesin kislotasining kombinatsiyasi natijasida PA hosil qilgan turlari	**PA larga misollar**	**PA strukturasi**
senetsionin	senetsionin, platfillin, rosmarinin, nemorensin	
triangularin	triangularin, sarratsin, makrofillin	
lyukopsamin	lyukopsamin, uplanditsin	
monokrotalin	monokrotalin, aucherin	
falaenopsin va ipangulin	nervosin VII, nervosin I, ipangulin B	
triangularin va lyukopsamin	eximidin, geliosupin, skorpioidin	
oddiy	asetillabirin, 7-atsetilretronetsin	
g‘ayritabiiy	madurensin, labunamin, tussilagin	

ISSN 3030-3907

O‘simlik turlarida uchlamchi alkaloidlarga qaraganda N-oksidlar ancha ko‘p miqdorda uchraydi. Ular yuqorida ta’kidlangan alkaloidlardan hosil bo‘ladi, biroq o‘ziga xos xususiyatlarga ega [8]. N-oksidlar suvda yaxshi eriydi va pirrolizidin asosiga nisbatan kamroq zaharli hisoblanadi [9].

Xulosa. Bugungi kungacha ma’lum bo‘lgan ikkilamchi metabolitlar xilma-xil bo‘lib, ularning ichida taxminan 12 000 tasi alkaloidlar hisoblanadi [10-11]. O‘simliklarda alkaloidlar biosintezi ko‘plab katalitik bosqichlarni o‘z ichiga oladi. Ular keng tarqalgan oqsil oilalariga mansub fermentlar tomonidan katalizlanadi. So‘nggi bir necha yil davomida olib borilgan tadqiqotlar yangi alkaloid biosintezlovchi fermentlarning strukturaviy biokimyosi, molekulyar va hujayra biologiyasi hamda biotexnologik qo‘llanilishi xususiyatlarini o‘rganishga qaratilgan. PAlar hasharotlar va umurtqalilarga qarshi kuchli to‘siq vazifasini bajaradi. Ular ikkita molekulyar shaklda mavjud bo‘lishi mumkin: zaharli erkin asos va zaharli bo‘lmagan N-oksid. Ko‘pchilik o‘simliklar PAlarni N-oksidlar ko‘rinishida ishlab chiqaradi va to‘playdi.

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ISSN 3030-3907