

## LISTADO DE SECUENCIAS

<110> Universidad del estado de Carolina del Norte  
Philip Morris Products SA

<120> REDUCCIÓN DE NITROSAMINAS ESPECÍFICAS DEL TABACO MEDIANTE LA ALTERACIÓN DE LA VÍA DE ASIMILACIÓN DE NITRATO

<130> P4597PC00

<150> EP 14194798.6

<151> 2014-11-25

<150> EP 14186705.1

<151> 2014-09-26

<160> 28

<170> PatentIn versión 3.5

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35 40 45
Thr Ile Tyr Leu Asp Tyr Ser Ser Ser Glu Asp Asp Asp Asp Asp
50 55 60
Glu Lys Asn Glu Tyr Leu Gln Met Ile Lys Lys Gly Asn Ser Glu Leu
65 70 75 80
Glu Pro Ser Val His Asp Thr Arg Asp Glu Gly Thr Ala Asp Asn Trp
85 90 95
Ile Glu Arg Asn Phe Ser Met Ile Arg Leu Thr Gly Lys His Pro Phe
100 105 110
Asn Ser Glu Pro Pro Leu Asn Arg Leu Met His His Gly Phe Ile Thr
115 120 125
Pro Val Pro Leu His Tyr Val Arg Asn His Gly Pro Val Pro Lys Gly
130 135 140
Thr Trp Asp Asp Trp Thr Val Glu Val Thr Gly Leu Val Lys Arg Pro
145 150 155 160
Met Lys Phe Thr Met Asp Gln Leu Val Asn Glu Phe Pro Cys Arg Glu
165 170 175
Leu Pro Val Thr Leu Val Cys Ala Gly Asn Arg Arg Lys Glu Gln Asn
180 185 190
Met Val Lys Gln Thr Ile Gly Phe Asn Trp Gly Ala Ala Ala Val Ser
195 200 205
Thr Thr Ile Trp Arg Gly Val Pro Leu Arg Ala Leu Leu Lys Arg Cys
210 215 220
Gly Val Phe Ser Lys Asn Lys Gly Ala Leu Asn Val Cys Phe Glu Gly
225 230 235 240
Ala Asp Val Leu Pro Gly Gly Gly Gly Ser Lys Tyr Gly Thr Ser Ile
245 250 255
Lys Lys Glu Phe Ala Met Asp Pro Ala Arg Asp Ile Ile Val Ala Tyr
260 265 270
Met Gln Asn Gly Glu Lys Leu Ala Pro Asp His Gly Phe Pro Val Arg

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      275              280              285
Met Ile Ile Pro Gly Phe Ile Gly Gly Arg Met Val Lys Trp Ile Lys
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 305              310              315
Asp Asn Arg Val Leu Pro Pro His Val Asp Ala Glu Leu Ala Asn Thr
 325              330              335
Glu Ala Trp Trp Tyr Lys Pro Glu Tyr Ile Ile Asn Glu Leu Asn Ile
 340              345              350
Asn Ser Val Ile Thr Thr Pro Cys His Glu Glu Ile Leu Pro Ile Asn
 355              360              365
Ala Trp Thr Thr Gln Arg Pro Tyr Thr Leu Arg Gly Tyr Ser Tyr Ser
 370              375              380
Gly Gly Gly Lys Lys Val Thr Arg Val Glu Val Thr Leu Asp Gly Gly
 385              390              395
Glu Thr Trp Gln Val Ser Thr Leu Asp His Pro Glu Lys Pro Thr Lys
 405              410              415
Tyr Gly Lys Tyr Trp Cys Trp Cys Phe Trp Ser Leu Glu Val Glu Val
 420              425              430
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 435              440              445
Thr Leu Asn Thr Gln Pro Glu Lys Leu Ile Trp Asn Val Met Gly Met
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Met Asn Asn Cys Trp Phe Arg Val Lys Met Asn Val Cys Lys Pro His
 465              470              475
Lys Gly Glu Ile Gly Ile Val Phe Glu His Pro Thr Gln Pro Gly Asn
 485              490              495
Gln Ser Gly Gly Trp Met Ala Lys Glu Arg His Leu Glu Ile Ser Ala
 500              505              510
Glu Ala Pro Gln Thr Leu Lys Lys Ser Ile Asp Thr Pro Phe Met Asn
 515              520              525
Thr Ala Ser Lys Met Tyr Ser Met Ser Glu Val Arg Lys His Ser Ser
 530              535              540
Ala Asp Ser Ala Trp Ile Ile Val His Gly His Ile Tyr Asp Ala Thr
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Arg Phe Leu Lys Asp His Pro Gly Gly Thr Asp Ser Ile Leu Ile Asn
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Ala Gly Thr Asp Cys Thr Glu Glu Phe Asp Ala Ile His Ser Asp Lys
 580              585              590
Ala Lys Lys Leu Leu Glu Asp Phe Arg Ile Gly Glu Leu Ile Thr Thr
 595              600              605
Gly Tyr Thr Ser Asp Ser Pro Gly Asn Ser Val His Gly Ser Ser Ser
 610              615              620
Phe Ser Ser Phe Leu Ala Pro Ile Lys Glu Leu Val Pro Ala Gln Arg
 625              630              635
Ser Val Ala Leu Ile Pro Arg Glu Lys Ile Pro Cys Lys Leu Ile Asp
 645              650              655
Lys Gln Ser Ile Ser His Asp Val Arg Lys Phe Arg Phe Ala Leu Pro
 660              665              670
Ser Glu Asp Gln Val Leu Gly Leu Pro Val Gly Lys His Ile Phe Leu
 675              680              685
Cys Ala Val Ile Asp Asp Lys Leu Cys Met Arg Ala Tyr Thr Pro Thr
 690              695              700
Ser Thr Ile Asp Glu Val Gly Tyr Phe Glu Leu Val Val Lys Ile Tyr
 705              710              715
Phe Lys Gly Ile His Pro Lys Phe Pro Asn Gly Gly Gln Met Ser Gln
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Tyr Leu Asp Ser Met Pro Leu Gly Ser Phe Leu Asp Val Lys Gly Pro
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Leu Gly His Ile Glu Tyr Gln Gly Lys Gly Asn Phe Leu Val His Gly
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 770              775              780
Ile Thr Pro Val Tyr Gln Val Met Gln Ala Ile Leu Lys Asp Pro Glu
 785              790              795
Asp Asp Thr Glu Met Tyr Val Val Tyr Ala Asn Arg Thr Glu Asp Asp
 805              810              815
Ile Leu Leu Lys Glu Glu Leu Asp Ser Trp Ala Glu Lys Ile Pro Glu
 820              825              830
Arg Val Lys Val Trp Tyr Val Val Gln Asp Ser Ile Lys Glu Gly Trp
 835              840              845
Lys Tyr Ser Ile Gly Phe Ile Thr Glu Ala Ile Leu Arg Glu His Ile
 850              855              860
Pro Glu Pro Ser His Thr Thr Leu Ala Leu Ala Cys Gly Pro Pro Pro
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attgaacgca acttttccat gattcgtctc accggaaaagc atccatttaa ctccgaacca    180
cggttgaacc ggctcatgca ccacggcttt atcacaccgg tccacttcoa ttacgttcgt    240
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gtgaagcgct cttatgaaatt cacaatggac cagttgggta acgaattccc ttgtagagaa 360
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accattgggt tcaactgggg cgccgctgccc gtttcaacaa cgatatggcg cggggtaccc 480
ctccgcgctt tgctaaaacg gtgcggtggt tttagcaaga ataaaggggc gcttaatggt 540
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35 40 45
Arg Leu Thr Gly Lys His Pro Phe Asn Ser Glu Pro Pro Leu Asn Arg
50 55 60
Leu Met His His Gly Phe Ile Thr Pro Val Pro Leu His Tyr Val Arg
65 70 75 80
Asn His Gly Pro Val Pro Lys Gly Thr Trp Asp Asp Trp Thr Val Glu
85 90 95
Val Thr Gly Leu Val Lys Arg Pro Met Lys Phe Thr Met Asp Gln Leu
100 105 110
Val Asn Glu Phe Pro Cys Arg Glu Leu Pro Val Thr Leu Val Cys Ala
115 120 125
Gly Asn Arg Arg Lys Glu Gln Asn Met Val Lys Gln Thr Ile Gly Phe
130 135 140
Asn Trp Gly Ala Ala Val Ser Thr Thr Ile Trp Arg Gly Val Pro
145 150 155 160
Leu Arg Ala Leu Leu Lys Arg Cys Gly Val Phe Ser Lys Asn Lys Gly
165 170 175
Ala Leu Asn Val Cys Phe Glu Gly Ala Asp Val Leu Pro Gly Gly Gly
180 185 190
Gly Ser Lys Tyr Gly Thr Ser Ile Lys Lys Glu Phe Ala Met Asp Pro
195 200 205
Ala Arg Asp Ile Ile Val Ala Tyr Met Gln Asn Gly Glu Lys Leu Ala
210 215 220
Pro Asp His Gly Phe Pro Val Arg Met Ile Ile Pro Gly Phe Ile Gly
225 230 235 240
Gly Arg Met Val Lys Trp Ile Lys Arg Ile Ile Val Thr Thr Gln Glu
245 250 255
Ser Asp Ser Tyr Tyr His Phe Lys Asp Asn Arg Val Leu Pro Pro His
260 265 270
Val Asp Ala Glu Leu Ala Asn Thr Glu Ala Trp Trp Tyr Lys Pro Glu
275 280 285
Tyr Ile Ile Asn Glu Leu Asn Ile Asn Ser Val Ile Thr Thr Pro Cys
290 295 300
His Glu Glu Ile Leu Pro Ile Asn Ala Trp Thr Thr Gln Arg Pro Tyr
305 310 315 320
Thr Leu Arg Gly Tyr Ser Tyr Ser Gly Gly Gly Lys Lys Val Thr Arg
325 330 335
Val Glu Val Thr Leu Asp Gly Gly Glu Thr Trp Gln Val Ser Thr Leu
340 345 350
Asp His Pro Glu Lys Pro Thr Lys Tyr Gly Lys Tyr Trp Cys Trp Cys
355 360 365

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Phe Trp Ser Leu Glu Val Glu Val Leu Asp Leu Leu Ser Ala Lys Glu
370 375 380
Ile Ala Val Arg Ala Trp Asp Glu Thr Leu Asn Thr Gln Pro Glu Lys
385 390 395 400
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405 410 415
Lys Met Asn Val Cys Lys Pro His Lys Gly Glu Ile Gly Ile Val Phe
420 425 430
Glu His Pro Thr Gln Pro Gly Asn Gln Ser Gly Gly Trp Met Ala Lys
435 440 445
Glu Arg His Leu Glu Ile Ser Ala Glu Ala Pro Gln Thr Leu Lys Lys
450 455 460
Ser Ile Ser Thr Pro Phe Met Asn Thr Ala Ser Lys Met Tyr Ser Met
465 470 475 480
Ser Glu Val Arg Lys His Ser Ser Ala Asp Ser Ala Trp Ile Ile Val
485 490 495
His Gly His Ile Tyr Asp Ala Thr Arg Phe Leu Lys Asp His Pro Gly
500 505 510
Gly Thr Asp Ser Ile Leu Ile Asn Ala Gly Thr Asp Cys Thr Glu Glu
515 520 525
Phe Asp Ala Ile His Ser Asp Lys Ala Lys Lys Leu Leu Glu Asp Phe
530 535 540
Arg Ile Gly Glu Leu Ile Thr Thr Gly Tyr Thr Ser Asp Ser Pro Gly
545 550 555 560
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565 570 575
Lys Glu Leu Val Pro Ala Gln Arg Ser Val Ala Leu Ile Pro Arg Glu
580 585 590
Lys Ile Pro Cys Lys Leu Ile Asp Lys Gln Ser Ile Ser His Asp Val
595 600 605
Arg Lys Phe Arg Phe Ala Leu Pro Ser Glu Asp Gln Val Leu Gly Leu
610 615 620
Pro Val Gly Lys His Ile Phe Leu Cys Ala Val Ile Asp Asp Lys Leu
625 630 635 640
Cys Met Arg Ala Tyr Thr Pro Thr Ser Thr Ile Asp Glu Val Gly Tyr
645 650 655
Phe Glu Leu Val Val Lys Ile Tyr Phe Lys Gly Ile His Pro Lys Phe
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Pro Asn Gly Gly Gln Met Ser Gln Tyr Leu Asp Ser Met Pro Leu Gly
675 680 685
Ser Phe Leu Asp Val Lys Gly Pro Leu Gly His Ile Glu Tyr Gln Gly
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Ala Met Ile Ala Gly Gly Thr Gly Ile Thr Pro Val Tyr Gln Val Met
725 730 735
Gln Ala Ile Leu Lys Asp Pro Glu Asp Asp Thr Glu Met Tyr Val Val
740 745 750
Tyr Ala Asn Arg Thr Glu Asp Asp Ile Leu Leu Lys Glu Glu Leu Asp
755 760 765
Ser Trp Ala Glu Lys Ile Pro Glu Arg Val Lys Val Trp Tyr Val Val
770 775 780
Gln Asp Ser Ile Lys Glu Gly Trp Lys Tyr Ser Ile Gly Phe Ile Thr
785 790 795 800
Glu Ala Ile Leu Arg Glu His Ile Pro Glu Pro Ser His Thr Thr Leu
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1 5 10
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1          5          10
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1          5          10
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1          5          10

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