

1.2785_Sequenzprotokoll
SEQUENCE LISTING

<110> Forschungszentrum Jülich GmbH

<120> Pyruvatcarboxylase und für die Pyruvatcarboxylase kodierende DNA,
Plasmid enthaltend die DNA, sowie Mikroorganismus zur Produktion
und Verfahren zur Herstellung von Produkten, deren Biosynthese
Oxalacetat als Vorstufe beinhaltet und Chromosom

<130> PT1.2785 PCT

<160> 8

<170> PatentIn version 3.5

<210> 1

<211> 3423

<212> DNA

<213> Corynebacterium glutamicum

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1.2785_Sequenzprotokoll

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1.2785_Sequenzprotokoll

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1.2785_Sequenzprotokoll

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 <213> Corynebacterium glutamicum

<400> 3

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 Glu Thr Gly Ala Ala Thr Val Ala Ile Tyr Pro Arg Glu Asp Arg Gly
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 Ser Phe His Arg Ser Phe Ala Ser Glu Ala Val Arg Ile Gly Thr Glu
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 Gly Ser Pro Val Lys Ala Tyr Leu Asp Ile Asp Glu Ile Ile Gly Ala
 65 70 75 80
 Ala Lys Lys Val Lys Ala Asp Ala Ile Tyr Pro Gly Tyr Gly Phe Leu
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 Ser Glu Asn Ala Gln Leu Ala Arg Glu Cys Ala Glu Asn Gly Ile Thr
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 Phe Ile Gly Pro Thr Pro Glu Val Leu Asp Leu Thr Gly Asp Lys Ser
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 Ser Thr Pro Ser Lys Asn Ile Asp Glu Ile Val Lys Ser Ala Glu Gly
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 Gln Thr Tyr Pro Ile Phe Val Lys Ala Val Ala Gly Gly Gly Gly Arg
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 Gly Met Arg Phe Val Ala Ser Pro Asp Glu Leu Arg Lys Leu Ala Thr
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 Glu Ala Ser Arg Glu Ala Glu Ala Ala Phe Gly Asp Gly Ala Val Tyr
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 Val Glu Arg Ala Val Ile Asn Pro Gln His Ile Glu Val Gln Ile Leu
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 Gly Asp His Thr Gly Glu Val Val His Leu Tyr Glu Arg Asp Cys Ser
 225 230 235 240
 Leu Gln Arg Arg His Gln Lys Val Val Glu Ile Ala Pro Ala Gln His
 245 250 255
 Leu Asp Pro Glu Leu Arg Asp Arg Ile Cys Ala Asp Ala Val Lys Phe
 260 265 270
 Cys Arg Ser Ile Gly Tyr Gln Gly Ala Gly Thr Val Glu Phe Leu Val
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1.2785_Sequenzprotokoll

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Val Glu His Thr Val Thr Glu Glu Val Thr Glu Val Asp Leu Val Lys
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Ala Gln Met Arg Leu Ala Ala Gly Ala Thr Leu Lys Glu Leu Gly Leu
 325 330 335

Thr Gln Asp Lys Ile Lys Ala His Gly Ala Ala Leu Gln Cys Arg Ile
 340 345 350

Thr Thr Glu Asp Pro Asn Asn Gly Phe Arg Pro Asp Thr Gly Thr Ile
 355 360 365

Thr Ala Tyr Arg Ser Pro Gly Gly Ala Gly Val Arg Leu Asp Gly Ala
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Ala Gln Leu Gly Gly Glu Ile Thr Ala His Phe Asp Ser Met Leu Val
 385 390 395 400

Lys Met Thr Cys Arg Gly Ser Asp Phe Glu Thr Ala Val Ala Arg Ala
 405 410 415

Gln Arg Ala Leu Ala Glu Phe Thr Val Ser Gly Val Ala Thr Asn Ile
 420 425 430

Gly Phe Leu Arg Ala Leu Leu Arg Glu Glu Asp Phe Thr Ser Lys Arg
 435 440 445

Ile Ala Thr Gly Phe Ile Ala Asp His Pro His Leu Leu Gln Ala Pro
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Pro Ala Asp Asp Glu Gln Gly Arg Ile Leu Asp Tyr Leu Ala Asp Val
 465 470 475 480

Thr Val Asn Lys Pro His Gly Val Arg Pro Lys Asp Val Ala Ala Pro
 485 490 495

Ile Asp Lys Leu Pro Asn Ile Lys Asp Leu Pro Leu Pro Arg Gly Ser
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Arg Asp Arg Leu Lys Gln Leu Gly Pro Ala Ala Phe Ala Arg Asp Leu
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Arg Glu Gln Asp Ala Leu Ala Val Thr Asp Thr Thr Phe Arg Asp Ala
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His Gln Ser Leu Leu Ala Thr Arg Val Arg Ser Phe Ala Leu Lys Pro
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Asp Pro Trp Asp Arg Leu Asp Glu Leu Arg Glu Ala Met Pro Asn Val
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Asn Ile Gln Met Leu Leu Arg Gly Arg Asn Thr Val Gly Tyr Thr Pro
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Tyr Pro Asp Ser Val Cys Arg Ala Phe Val Lys Glu Ala Ala Ser Ser
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Gly Val Asp Ile Phe Arg Ile Phe Asp Ala Leu Asn Asp Val Ser Gln
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Met Arg Pro Ala Ile Asp Ala Val Leu Glu Thr Asn Thr Ala Val Ala
660 665 670

Glu Val Ala Met Ala Tyr Ser Gly Asp Leu Ser Asp Pro Asn Glu Lys
675 680 685

Leu Tyr Thr Leu Asp Tyr Tyr Leu Lys Met Ala Glu Glu Ile Val Lys
690 695 700

Ser Gly Ala His Ile Leu Ala Ile Lys Asp Met Ala Gly Leu Leu Arg
705 710 715 720

Pro Ala Ala Val Thr Lys Leu Val Thr Ala Leu Arg Arg Glu Phe Asp
725 730 735

Leu Pro Val His Val His Thr His Asp Thr Ala Gly Gly Gln Leu Ala
740 745 750

Thr Tyr Phe Ala Ala Ala Gln Ala Gly Ala Asp Ala Val Asp Gly Ala
755 760 765

Ser Ala Pro Leu Ser Gly Thr Thr Ser Gln Pro Ser Leu Ser Ala Ile
770 775 780

Val Ala Ala Phe Ala His Thr Arg Arg Asp Thr Gly Leu Ser Leu Glu
785 790 795 800

Ala Val Ser Asp Leu Glu Pro Tyr Trp Glu Ala Val Arg Gly Leu Tyr
805 810 815

Leu Pro Phe Glu Ser Gly Thr Pro Gly Pro Thr Gly Arg Val Tyr Arg
820 825 830

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 Ala Leu Gly Leu Ala Asp Arg Phe Glu Leu Ile Glu Asp Asn Tyr Ala
 850 855 860
 Ala Val Asn Glu Met Leu Gly Arg Pro Thr Lys Val Thr Pro Ser Ser
 865 870 875 880
 Lys Val Val Gly Asp Leu Ala Leu His Leu Val Gly Ala Gly Val Asp
 885 890 895
 Pro Ala Asp Phe Ala Ala Asp Pro Gln Lys Tyr Asp Ile Pro Asp Ser
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 Val Ile Ala Phe Leu Arg Gly Glu Leu Gly Asn Pro Pro Gly Gly Trp
 915 920 925
 Pro Glu Pro Leu Arg Thr Arg Ala Leu Glu Gly Arg Ser Glu Gly Lys
 930 935 940
 Ala Pro Leu Thr Glu Val Pro Glu Glu Glu Gln Ala His Leu Asp Ala
 945 950 955 960
 Asp Asp Ser Lys Glu Arg Arg Asn Ser Leu Asn Arg Leu Leu Phe Pro
 965 970 975
 Lys Pro Thr Glu Glu Phe Leu Glu His Arg Arg Arg Phe Gly Asn Thr
 980 985 990
 Ser Ala Leu Asp Asp Arg Glu Phe Phe Tyr Gly Leu Val Glu Gly Arg
 995 1000 1005
 Glu Thr Leu Ile Arg Leu Pro Asp Val Arg Thr Pro Leu Leu Val
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 Arg Leu Asp Ala Ile Ser Glu Pro Asp Asp Lys Gly Met Arg Asn
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 Val Val Ala Asn Val Asn Gly Gln Ile Arg Pro Met Arg Val Arg
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 Asp Arg Ser Val Glu Ser Val Thr Ala Thr Ala Glu Lys Ala Asp
 1055 1060 1065
 Ser Ser Asn Lys Gly His Val Ala Ala Pro Phe Ala Gly Val Val
 1070 1075 1080
 Thr Val Thr Val Ala Glu Gly Asp Glu Val Lys Ala Gly Asp Ala
 1085 1090 1095

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Ser Val Asp Gly Lys Ile Asp Arg Val Val Val Pro Ala Ala Thr
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Lys Val Glu Gly Gly Asp Leu Ile Val Val Val Ser
 1130 1135 1140

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<213> Corynebacterium glutamicum

<400> 4

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 35 40 45

Ser Phe His Arg Ser Phe Ala Ser Glu Ala Val Arg Ile Gly Thr Glu
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Gly Ser Pro Val Lys Ala Tyr Leu Asp Ile Asp Glu Ile Ile Gly Ala
 65 70 75 80

Ala Lys Lys Val Lys Ala Asp Ala Ile Tyr Pro Gly Tyr Gly Phe Leu
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Ser Glu Asn Ala Gln Leu Ala Arg Glu Cys Ala Glu Asn Gly Ile Thr
 100 105 110

Phe Ile Gly Pro Thr Pro Glu Val Leu Asp Leu Thr Gly Asp Lys Ser
 115 120 125

Arg Ala Val Thr Ala Ala Lys Lys Ala Gly Leu Pro Val Leu Ala Glu
 130 135 140

Ser Thr Pro Ser Lys Asn Ile Asp Glu Ile Val Lys Ser Ala Glu Gly
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Gln Thr Tyr Pro Ile Phe Val Lys Ala Val Ala Gly Gly Gly Gly Arg
 165 170 175

Gly Met Arg Phe Val Ala Ser Pro Asp Glu Leu Arg Lys Leu Ala Thr
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Glu Ala Ser Arg Glu Ala Glu Ala Ala Phe Gly Asp Gly Ala Val Tyr
 Seite 9

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195

200

205

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Gly Asp His Thr Gly Glu Val Val His Leu Tyr Glu Arg Asp Cys Ser
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Leu Gln Arg Arg His Gln Lys Val Val Glu Ile Ala Pro Ala Gln His
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Leu Asp Pro Glu Leu Arg Asp Arg Ile Cys Ala Asp Ala Val Lys Phe
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Cys Arg Ser Ile Gly Tyr Gln Gly Ala Gly Thr Val Glu Phe Leu Val
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Asp Glu Lys Gly Asn His Val Phe Ile Glu Met Asn Pro Arg Ile Gln
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Val Glu His Thr Val Thr Glu Glu Val Thr Glu Val Asp Leu Val Lys
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Ile Ala Thr Gly Phe Ile Ala Asp His Pro His Leu Leu Gln Ala Pro
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Pro Ala Asp Asp Glu Gln Gly Arg Ile Leu Asp Tyr Leu Ala Asp Val

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740

745

750

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Leu Pro Phe Glu Ser Gly Thr Pro Gly Pro Thr Gly Arg Val Tyr Arg
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His Glu Ile Pro Gly Gly Gln Leu Ser Asn Leu Arg Ala Gln Ala Thr
 835 840 845

Ala Leu Gly Leu Ala Asp Arg Phe Glu Leu Ile Glu Asp Asn Tyr Ala
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Ala Val Asn Glu Met Leu Gly Arg Pro Thr Lys Val Thr Pro Ser Ser
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Lys Val Val Gly Asp Leu Ala Leu His Leu Val Gly Ala Gly Val Asp
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Glu Thr Leu Ser Arg Leu Pro Asp Val Arg Thr Pro Leu Leu Val

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1.2785_Sequenzprotokoll

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Ser Phe His Arg Ser Phe Ala Ser Glu Ala Val Arg Ile Gly Thr Glu	50 55 60
Gly Ser Pro Val Lys Ala Tyr Leu Asp Ile Asp Glu Ile Ile Gly Ala	65 70 75 80
Ala Lys Lys Val Lys Ala Asp Ala Ile Tyr Pro Gly Tyr Gly Phe Leu	85 90 95
Ser Glu Asn Ala Gln Leu Ala Arg Glu Cys Ala Glu Asn Gly Ile Thr	100 105 110
Phe Ile Gly Pro Thr Pro Glu Val Leu Asp Leu Thr Gly Asp Lys Ser	115 120 125
Arg Ala Val Thr Ala Ala Lys Lys Ala Gly Leu Pro Val Leu Ala Glu	130 135 140
Ser Thr Pro Ser Lys Asn Ile Asp Glu Ile Val Lys Ser Ala Glu Gly	145 150 155 160

1.2785_Sequenzprotokoll

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 Val Glu Arg Ala Val Ile Asn Pro Gln His Ile Glu Val Gln Ile Leu
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 Lys Met Thr Cys Arg Gly Ser Asp Phe Glu Thr Ala Val Ala Arg Ala
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 Gln Arg Ala Leu Ala Glu Phe Thr Val Ser Gly Val Ala Thr Asn Ile
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1.2785_Sequenzprotokoll

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 Arg Glu Gln Asp Ala Leu Ala Val Thr Asp Thr Thr Phe Arg Asp Ala
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 His Gln Ser Leu Leu Ala Thr Arg Val Arg Ser Phe Ala Leu Lys Pro
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 Met Arg Pro Ala Ile Asp Ala Val Leu Glu Thr Asn Thr Ala Val Ala
 660 665 670
 Glu Val Ala Met Ala Tyr Ser Gly Asp Leu Ser Asp Pro Asn Glu Lys
 675 680 685
 Leu Tyr Thr Leu Asp Tyr Tyr Leu Lys Met Ala Glu Glu Ile Val Lys
 690 695 700

1.2785_Sequenzprotokoll

Ser Gly Ala His Ile Leu Ala Ile Lys Asp Met Ala Gly Leu Leu Arg
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 740 745 750
 Thr Tyr Phe Ala Ala Ala Gln Ala Gly Ala Asp Ala Val Asp Gly Ala
 755 760 765
 Ser Ala Pro Leu Ser Gly Thr Thr Ser Gln Pro Ser Leu Ser Ala Ile
 770 775 780
 Val Ala Ala Phe Ala His Thr Arg Arg Asp Thr Gly Leu Ser Leu Glu
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 Pro Ala Asp Phe Ala Ala Asp Pro Gln Lys Tyr Asp Ile Pro Asp Ser
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1.2785_Sequenzprotokoll

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Arg Leu Asp Ala Ile Ser Glu Pro Asp Asp Lys Gly Met Arg Asn
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Asp Arg Ser Val Glu Ser Val Thr Ala Thr Ala Glu Lys Ala Asp
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Ser Ser Asn Lys Gly His Val Ala Ala Pro Phe Ala Gly Val Val
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