Address: 14, Gyurjyan Str., Yerevan 0056, Republik of Armenia
Phone: (374 10) 65 41 80
Fax: (374 10) 65 41 83
E-mail: biotech@netsys.am; arm_biotech@yahoo.com
URL: www.biotech.am

CJSC
Scientific Research Institute of Biotechnology

CATALOG

2008
YEREVAN

Dear Colleagues and Partners

The **Institute of Biotechnology** is the leading research centre in the biotechnological sphere in Armenia. Throughout years the Institute has been successfully engaged in the development of amino acid production technologies as well as those of enzymes and other biologically active compounds.

We would like to offer our expertise to meet the specific needs and requirements of your Company in the most beneficial way possible.

We are open to fruitful cooperation within the framework of beneficial agreements and projects.

I believe that favorable and creative relations between our organizations will contribute to and promote further scientific achievements and progress.

Sincerely,
Professor Ashot Saghiyan
Director, Corresponding Member of NAS RA

Financial support by
ISTC Commercialization Support Program #Ci–073

Edition 200

Editorial Board

Professor **Saghiyan A.S.**
Director, Corresponding Member of NAS RA

Geolchanyan A.V. *PhD*
Avetisova G.E. *PhD*
Makarova L.L.
Tajiryan H. Kh. *PhD*

2001. EUROPEAN "DESCARTES PRIZE"

Awarded to the International Team of chemists including Prof. A.Saghiyan, supervised the Armenian group for the achievements in one of the important, fundamental and applied areas in organic catalysis-asymmetric synthesis

2002. "AWARD OF FRIENDSHIP" "TIEN-SHAN" PRIZE

Awarded to Prof. A. Saghiyan by the Government of the Chinese People's Republic for the contribution to the biotechnology & chemistry development & for successes achieved in the field of scientific cooperation

2003. "INTERNATIONAL QUALITY STAR AWARD"

Awarded to the Institute by Business Initiative Directions for Leadership, Innovation, Technology & Corporate Management in the Gold Category

2004. PRESIDENT'S PRIZE

Awarded for achievements in the field of life sciences

2006. PRIME-MINISTER' DIPLOMA

Awarded to Prof. A. Saghiyan in honor of the 35-anniversary of the Institute of Biotechnology and for contribution to the biotechnology development

CJSC Scientific Research Institute of Biotechnology was founded in 1971 under the governmental program of the USSR as a branch of VNII Genetika and later became the Head organization of All-Union Ministry of Medical and Microbiological Industry aimed at producing high-purity amino acids for medicine & food industry. Nowadays the Institute is the leading biotechnological research center in Armenia.

INSTITUTE ACHIEVEMENTS

- 76 Certificates of Authorship (USSR)
- 29 Patents of Armenia
- 38 International Patents
- 4 International Conferences

AGREEMENTS

- Branch of China Xinjiang-Armenia Bioengineering & Development Center
- "DEGUSSA AG" Company
- "ACROS ORGANICS" Fisher Scientific Worldwid Company

INTERNATIONAL GRANTS

INTAS (1996)
INCO-Copernicus IC15-CT96-0722 (1997-1998)
ISTC # A-356 (2000-2003)
A-683 (2002-2005)
A-794 (2003)
2780 (2004-2007)
A-1247 (2005-2008)
#CI–073 (2007-2008)
CRDF
AB2-2301-YE-02 (2002-2004)
AAT-4-44229-01 (2006-2008)
Eurasia Foundation Y01-6008 (2000-2001)
ANSEF (2003, 2004, 2006, 2007, 2008)
NATO Programme For Security Through Science SfP 982164 (2007-2009)

MAIN SCIENTIFIC DIRECTIONS

- GENETICS, GENETIC ENGINEERING & SELECTION OF MICROORGANISMS
- MICROBIOLOGICAL SYNTHESIS OF BIOLOGICALLY ACTIVE COMPOUNDS
- CHEMICAL SYNTHESIS OF BIOLOGICALLY ACTIVE SUBSTANCES (amino acids, peptides, etc.)
- ASYMMETRIC SYNTHESIS OF NONPROTEIN AMINO ACIDS
- BIOCATALYSIS & ENZYMATIC SYNTHESIS
- EXTRACTION OF BIOLOGICALLY ACTIVE SUBSTANCES FROM NATURAL RAW MATERIAL
- AGRICULTURAL BIOTECHNOLOGY

SCIENTIFIC PRODUCTION

- Strain-producers of L-proline, L-arginine, L-valine, L-alanine, L-ornithine and L-histidine; Production technologies;
- Microbiological and enzymatic production of D-amino acids (D-alanine, D-aspartic acid, D-proline, D-methionine and D-leucine);
- Small-scale universal production technologies of nonprotein L- and D-amino acids;
- Technologies for enzymatic preparations production;
- Biologicals for agriculture: new insecticides, plant growth stimulators, biofertilizers and antibacterial preparations for veterinary.

NOTES

ENZYME PREPARATIONS

Product Number	Product	Strain	Activity
EP-1	α-amylase	*Bacillus subtilis*	150 – 180 u/ml
EP-2	Glucoamylase	*Aspergillus awamori*	200 – 240 u/ml
EP-3	Bactorenin	*Bacillus mesentericus*	8000 u/ml

SCIENTIFIC COOPERATION

USA
- Institute for Molecular Medicine, CA
- Massachusetts Institute of Technology Cambridge
- Lawrence Livermore National Laboratory, Livermore, CA
- University of Arizona, Tucson, AZ
- Fraunhofer Center for Molecular Biotechnology, Newark, DE
- Altus Biologics Inc, Cambridge, MA
- University of Southern California, LA, CA
- University of Nebraska Medical Center, Omaha, NE

UNITED KINGDOM
- University of Birmingham,
- University of Wales, Bangor
- University of Oxford
- King's College, University of London

FRANCE
- University of Nantes
- Henry Poincaré University, Nancy
- Université de Paris-Sud, Paris
- Centre de Recherche du Service de Santé des Armées, Grenoble

SPAIN
- University of Leon, Leon

GERMANY
- Degussa AG, Hanau
- Phisikalisch-Technische Bundesanstalt, Berlin
- Max-Planck-Gesselschaft AG, Berlin

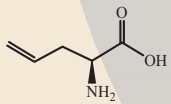
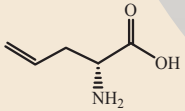
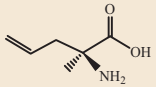
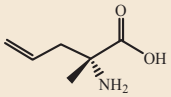
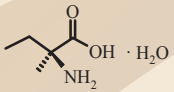
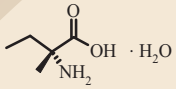
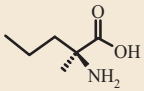
CANADA
- University of British Columbia, B.C., Vancouver
- Univetsity of Toronto

MEXICO
- Instituto de Investigaciones Biomedikas UNAM, Mexico

BELGIUM
- ACROS Organics B. V. B. A. Fisher Scientific Worldwide Company, Geel

CHINA
- Institute of Biotechnology Xinjiang Academy of Agricultural Sciences
- University of Nanch

NON PROTEIN AMINO ACIDS

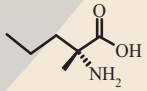
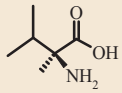
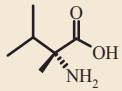
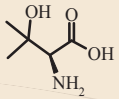
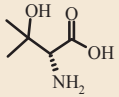
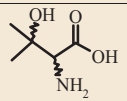
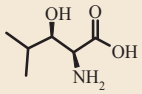
Product Number	Structure	Product Name & Specification
NPAA-01		***(S)*-(-)-2-Amino-4-pentenoic acid** **L-ALLYLGLYCINE** $C_5H_9NO_2$ FW 115.13 Mp 253-255 °C (dec.) $[\alpha]_D^{20}$ = -38.17° (c=4.0; H_2O) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 99% (GLC, HPLC)
NPAA-02		***(R)*-(+)-2-Amino-4-pentenoic acid** **D-ALLYLGLYCINE** $C_5H_9NO_2$ FW 115.13 Mp 253-255 °C (dec.) $[\alpha]_D^{20}$ = +38.17° (c=4.0; H_2O) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 99% (GLC, HPLC)
NPAA-03		***(S)*-(-)-2-Amino-2-methyl-4-pentenoic acid** **L-α-ALLYLALANINE** $C_6H_{11}NO_2$ FW 129.16 Mp 230-233 °C (dec.) $[\alpha]_D^{20}$ = -14.4° (c=1.3; 1N HCl) Chemical purity > 98 % (TLC, NMR) Enantiomeric purity > 99% (GLC, HPLC)
NPAA-04		***(R)*-(+)-2-Amino-2-methyl-4-pentenoic acid** **D-α-ALLYLALANINE** $C_6H_{11}NO_2$ FW 129.16 Mp 230-233 °C (dec.) $[\alpha]_D^{20}$ = +14.4° (c=1.3; 1N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 99% (GLC, HPLC)
NPAA-05		***(S)*-(+)-2-Amino-2-methylbutanoic acid, monohydrate** **L-ISOVALINE, MONOHYDRATE** $C_5H_{11}NO_2 \cdot H_2O$ FW 135.16 Mp 293-295 °C (dec.) $[\alpha]_D^{20}$ = +9.55° (c=5.0; H_2O) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 99% (GLC, HPLC)
NPAA-06		***(R)*-(-)-2-Amino-2-methylbutanoic acid, monohydrate** **D-ISOVALINE, MONOHYDRATE** $C_5H_{11}NO_2 \cdot H_2O$ FW 135.16 Mp 293-295 °C (dec.) $[\alpha]_D^{20}$ = -9.55° (c=5.0; H_2O) Chemical purity >98% (TLC, NMR) Enantiomeric purity > 99% (GLC, HPLC)
NPAA-07		***(S)*-(+)-2-amino-2-methylpentanoic acid** **L-α-PROPYLALANINE** $C_6H_{13}NO_2$ FW 131.18 Mp 231-233 °C $[\alpha]_{578}^{20}$= + 19.75° (c = 1.0; H_2O) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98% (GLC, HPLC)

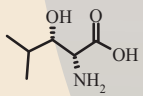
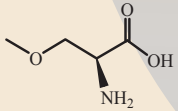
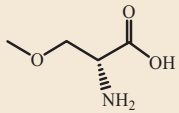
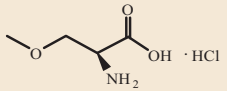
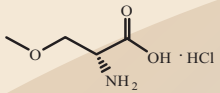
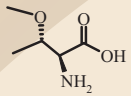
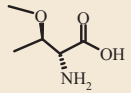
BIOLOGICAL PREPARATIONS FOR AGRICULTURE

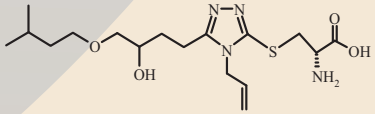
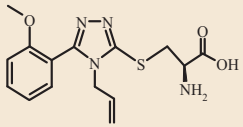
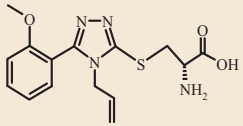
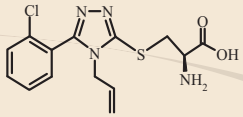
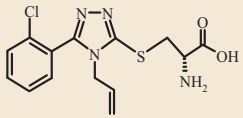
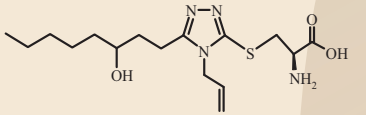
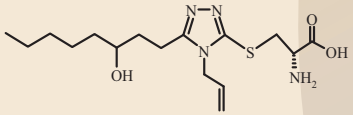
Product Number	Preparation	Strain	Product
BPA-1	Insecticide	*Bacillus thuringiensis subsp. galleriae BTGK1-70*	BTG
BPA-2	Plant growth stimulator	*Bacillus thuringiensis subsp. galleriae BTGK1-70*	BT-melanin water-soluble
BPA-3	Biofertilizer	*Azotobacter chroococcum*	Azotovit-1
BPA-4	Biofertilizer	*Azotobacter chroococcum*	Azozeovit -1
BPA-5	Antibacterial preparation for veterinary	*Lactobacillus acidophilus 1991*	ABP-1
BPA-6	Antibacterial preparation for veterinary	*Kluyveromyces lactis 412*	ABP-2

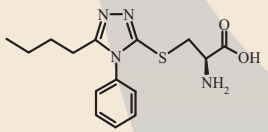
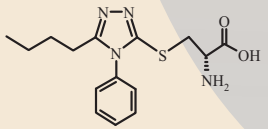
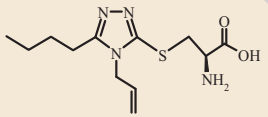
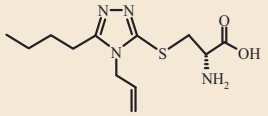
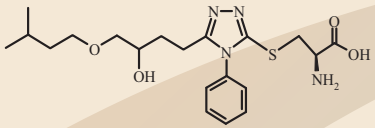
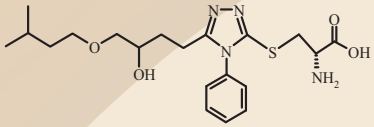
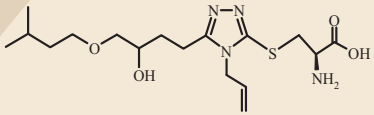
PROTEIN L-AMINO ACIDS STRAIN-PRODUCERS & PRODUCTION TECHNOLOGIES

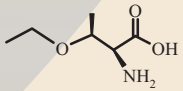
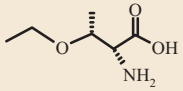
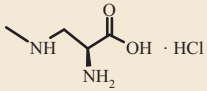
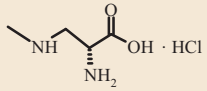
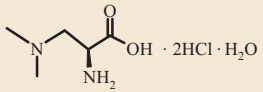
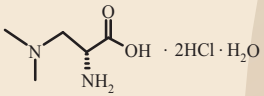
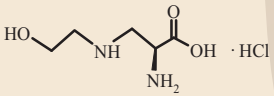
Product Number	Amino acids	Strain producer
PAA-1	*L-ORNITHINE*	*Corynebacterium glutamicum* CF-106
PAA-2	*L-HISTIDINE*	*Brevibacterium flavum* LGS 4
PAA-3	*L-PROLINE*	*Brevibacterium flavum* AP 117
PAA-4	*L-ARGININE*	*Escherichia coli* LGE 28
PAA-5	*L-VALINE*	*Brevibacterium flavum* AA53
PAA-6	*L-ALANINE*	*Brevibacterium flavum* A5

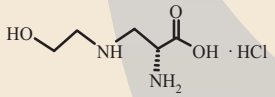
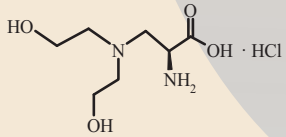
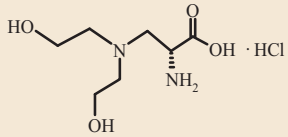
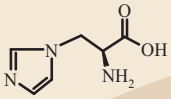
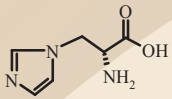
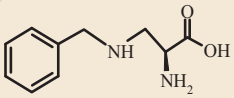
NPAA-08		***(R)*-(-)-2-amino-2-methylpentanoic acid** **D-α-PROPYLALANINE** $C_6H_{13}NO_2$ FW 131.18 Mp 231-233 °C $[\alpha]_{578}^{20}$= - 19.75° (c = 1.0; H_2O) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98% (GLC, HPLC)
NPAA-09		***(S)*-(-)-2-amino-2,3-dimethylbutanoic acid** **L-α-ISOPROPYLALANINE** $C_6H_{13}NO_2$ FW 131.18 Mp 232-234 °C $[\alpha]_{578}^{20}$= -1.15°(c = 0.91; H_2O) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98.5% (GLC, HPLC)
NPAA-10		***(R)*-(+)-2-amino-2,3-dimethylbutanoic acid]** **D-α-ISOPROPYLALANINE** $C_6H_{13}NO_2$ FW 131.18 Mp 232-234°C $[\alpha]_{578}^{20}$= +1.15°(c =0.91; H_2O) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98.5% (GLC, HPLC)
NPAA-11		***(S)*-(+)-2-Amino-3-hydroxy-3-methylbutanoic acid** **L-HYDROXYVALINE** $C_5H_{11}NO_3$ FW 133.15 Mp 201-203 °C $[\alpha]_D^{20}$= + 11.1° (c=0.64; 6N HCl) Chemical puriry > 98% (TLC, NMR) Enantiomeric purity > 98.5% (GLC, HPLC)
NPAA-12		***(R)*-(-)-2-Amino-3-hydroxy-3-methylbutanoic acid** **D-HYDROXYVALINE** $C_5H_{11}NO_3$ FW 133.15 Mp 201-203 °C $[\alpha]_D^{20}$ = - 11.1° (c=0.64; 6N HCl) Chemical puriry > 98% (TLC, NMR) Enantiomeric purity > 98.5% (GLC, HPLC)
NPAA-13		***(R,S)*-2-Amino-3-hydroxy-3-methylbutanoic acid** **D,L-HYDROXYVALINE** $C_5H_{11}NO_3$ FW 133.15 Mp 201-203°C $[\alpha]_D^{20}$ Not applicable Chemical puriry > 98% (TLC, NMR)
NPAA-14		***(2S,3R)*-(+)-2-Amino-3-hydroxy-4-methylpentanoic acid** **L-β-HYDROXYLEUCINE** $C_6H_{13}NO_3$ FW 147.17 Mp 205-208°C (dec.) $[\alpha]_D^{20}$= +19.15° (c=2.0; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 99% (GLC, HPLC)

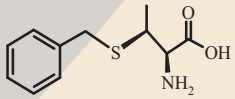
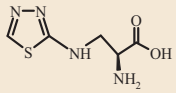
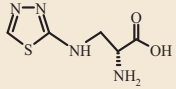
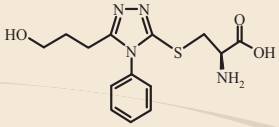
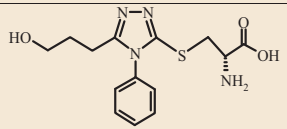
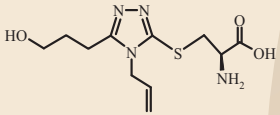
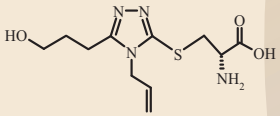
NPAA-15		***(2R,3S)*-(-)-2-Amino-3-hydroxy-4-methylpentanoic acid** **D-β-HYDROXYLEUCINE** $C_6H_{13}NO_3$ FW 147.17 Mp 205-208 °C (dec.) $[\alpha]_D^{20}$ = -19.15° (c=2.0; 6N HCl) Chemical purity >98% (TLC, NMR) Enantiomeric purity > 99% (GLC, HPLC)
NPAA-16		***(S)*-(+)-2-Amino-3-methoxypropanoic acid** **L-O-METHYLSERINE** $C_4H_9NO_3$ FW 119.12 Mp 214-215 °C (dec.) $[\alpha]_D^{20}$ = +13.85° (c=1.0; 6N HCl) Chemical puriry > 98% (TLC, NMR) Enantiomeric purity > 98% (GLC, HPLC)
NPAA-17		***(R)*-(-)-2-Amino-3-methoxypropanoic acid** **D-O-METHYLSERINE** $C_4H_9NO_3$ FW 119.12 Mp 214-215 °C (dec.) $[\alpha]_D^{20}$ = -13.85° (c=1.0; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98% (GLC, HPLC)
NPAA-18		***(S)*-(+)-2-Amino-3-methoxypropanoic acid, hydrochloride** **L-O-METHYLSERINE · HCl** $C_4H_{10}NO_3Cl$ FW 155,58 Mp 214-215 °C $[\alpha]_D^{20}$ = +10.4° (c=1.0; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 99% (GLC, HPLC)
NPAA-19		**(*R*)-(-)-2-Amino-3-methoxypropanoic acid, hydrochloride** **D-O-METHYLSERINE · HCl** $C_4H_{10}NO_3Cl$ FW 155.58 Mp 214-215 °C $[\alpha]_D^{20}$ = -10.4° (c=1.0; 6N HCl) Chemical puriry > 98% (TLC, NMR) Enantiomeric purity > 99% (GLC, HPLC)
NPAA-20		***(2S,3S)*-(+)-2-Amino-3-methoxybutanoic acid** **L-*allo*-O-METHYLTHREONINE** $C_5H_{11}NO_3$ FW 133.15 Mp 230-233 °C (dec.) $[\alpha]_D^{20}$ = +26.6° (c=0.5; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98% (HPLC)
NPAA-21		***(2R,3R)*-(-)-2-Amino-3-methoxybutanoic acid** **D-*allo*-O-METHYLTHREONINE** $C_5H_{11}NO_3$ FW 133.15 Mp 230-233 °C (dec.) $[\alpha]_D^{20}$ = -26.6° (c=0.5; 6N HCl) Chemical purity >98% (TLC, NMR) Enantiomeric purity >98% (HPLC)

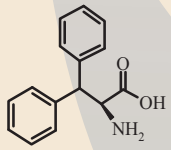
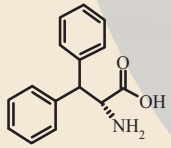
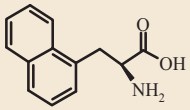
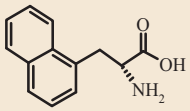
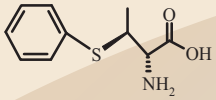
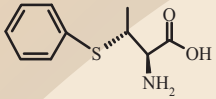
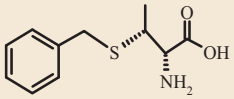
NPAA-75		**D-S-5-(3'-HYDROXY-4'-ISOAMYLOXYBUTYL)-4-ALLYL-1,2,4-TRIAZOL-3-YL-CYSTEINE** $C_{17}H_{30}N_4O_4S$ FW 386.51 Mp 183-184 °C $[\alpha]_D^{20}$ = +4.5° (c=0.1; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98% (HPLC)
NPAA-76		**L-S-5-(2'-METHOXYPHENYL)-4-ALLYL-1,2,4-TRIAZOL-3-YL-CYSTEINE** $C_{15}H_{18}N_4O_3S$ FW 334.39 Mp 210-212 °C $[\alpha]_D^{20}$ = -5.0° (c=0.1; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98% (HPLC)
NPAA-77		**D-S-5-(2'-METHOXYPHENYL)-4-ALLYL-1,2,4-TRIAZOL-3-YL-CYSTEINE** $C_{15}H_{18}N_4O_3S$ FW 334.39 Mp 210-212 °C $[\alpha]_D^{20}$ = +5.0° (c=0.1; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98% (HPLC)
NPAA-78		**L-S-5-(2'-CHLOROPHENYL)-4-ALLYL-1,2,4-TRIAZOL-3-YL-CYSTEINE** $C_{14}H_{15}N_4O_2SCl$ FW 338.81 Mp 215-217 °C $[\alpha]_D^{20}$ = -2.0° (c=0.5; 1N HCl) Chemical purity > 98% (TLC, NMR) Optical purity > 98% (HPLC)
NPAA-79		**D-S-5-(2'-CHLOROPHENYL)-4-ALLYL-1,2,4-TRIAZOL-3-YL-CYSTEINE** $C_{14}H_{15}N_4O_2SCl$ FW 338.81 Mp 215-217 °C $[\alpha]_D^{20}$ = +2.0° (c=0.5; 1N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98% (HPLC)
NPAA-80		**L-S-5-(3'-HYDROXYOCTYL)-4-ALLYL-1,2,4-TRIAZOL-3-YL-CYSTEINE** $C_{16}H_{28}N_4O_3S$ FW 356.48 Mp 180-181 °C $[\alpha]_D^{20}$ = -4.0° (c=0.1; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98% (HPLC)
NPAA-81		**D-S-5-(3'-HYDROXYOCTYL)-4-ALLYL-1,2,4-TRIAZOL-3-YL-CYSTEINE** $C_{16}H_{28}N_4O_3S$ FW 356.48 Mp 180-181 °C $[\alpha]_D^{20}$ = +4.0° (c=0.1; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98% (HPLC)

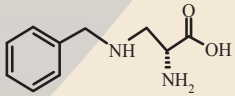
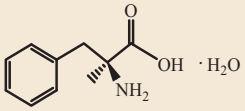
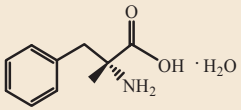
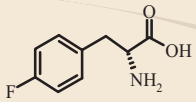
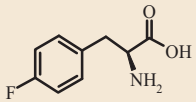
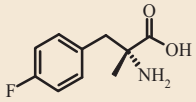
NPAA-68		**L-S-5-PROPYL-4-PHENYL-1,2,4-TRIAZOL-3-YL-CYSTEINE** $C_{14}H_{18}N_4O_2S$ FW 306.38 Mp 213-216 °C $[\alpha]_D^{20}$ = -24.0° (c=0.1; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98% (HPLC)
NPAA-69		**D-*S*-5-PROPYL-4-PHENYL-1,2,4-TRIAZOL-3-YL-CYSTEINE** $C_{14}H_{18}N_4O_2S$ FW 306.38 Mp 213-216 °C $[\alpha]_D^{20}$ = +24.0° (c=0.1; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98% (HPLC)
NPAA-70		**L-S-5-PROPYL-4-ALLYL-1,2,4-TRIAZOL-3-YL-CYSTEINE** $C_{11}H_{18}N_4O_2S$ FW 270.35 Mp 190-192 °C $[\alpha]_D^{20}$ = -5.0° (c=0.1; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98% (HPLC)
NPAA-71		**D-S-5-PROPYL-4-ALLYL-1,2,4-TRIAZOL-3-YL-CYSTEINE** $C_{11}H_{18}N_4O_2S$ FW 270.35 Mp 190-192 °C $[\alpha]_D^{20}$ = +5.0° (c=0.1; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98% (HPLC)
NPAA-72		**L-S-5-(3'-HYDROXY-4'-ISOAMYLOXY-BUTYL)-4-PHENYL-1,2,4-TRIAZOL-3-YL-CYSTEINE** $C_{20}H_{30}N_4O_4S$ FW 422.54 Mp 163-165 °C $[\alpha]_D^{20}$ = -17.0° (c=0.1; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98% (HPLC)
NPAA-73		**D-S-5-(3'-HYDROXY-4'-ISOAMYLOXY-BUTYL)-4-PHENYL-1,2,4-TRIAZOL-3-YL-CYSTEINE** $C_{20}H_{30}N_4O_4S$ FW 422.54 Mp 163-165 °C $[\alpha]_D^{20}$ = +17.0° (c=0.1; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98% (HPLC)
NPAA-74		**L-S-5-(3'-HYDROXY-4'-ISOAMYLOXY-BUTYL)-4-ALLYL-1,2,4-TRIAZOL-3-YL-CYSTEINE** $C_{17}H_{30}N_4O_4S$ FW 386.51 Mp 183-184 °C $[\alpha]_D^{20}$ = -4.5° (c=0.1; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98% (HPLC)

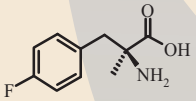
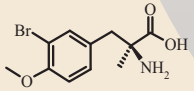
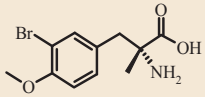
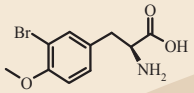
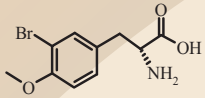
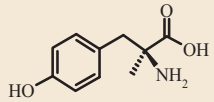
NPAA-22		***(2S,3S)*-(+)-2-Amino-3-ethoxybutanoic acid** **L-*allo*-O-ETHYLTHREONINE** $C_6H_{13}NO_3$ FW 147.14 Mp 215-217 °C $[\alpha]_D^{20}$ = +22.4° (c=1.1; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 99% (GLC, HPLC)
NPAA-23		***(2R,3R)*-(-)-2-Amino-3-ethoxybutanoic acid** **D-*allo*-O-ETHYLTHREONINE** $C_6H_{13}NO_3$ FW 147.14 Mp 215-217 °C $[\alpha]_D^{20}$ = -22.4° (c=1.1; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 99% (GLC, HPLC)
NPAA-24		***(S)*-(+)-2-Amino-3-(methylamino)propanoic acid, hydrochloride** **L-β-(N-METHYLAMINO)ALANINE · HCl** $C_4H_{11}N_2O_2Cl$ FW 154.64 Mp 182-184 °C $[\alpha]_D^{20}$ = +26.2° (c=1.0; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 86% (GLC)
NPAA-25		***(R)*-(-)-2-Amino-3-(methylamino)propanoic acid, hydrochloride** **D-β-(N-METHYLAMINO)ALANINE · HCl** $C_4H_{11}N_2O_2Cl$ FW 154.64 Mp 182-184 °C $[\alpha]_D^{20}$ = -26.20° (c=1.0; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 86% (GLC)
NPAA-26		***(S)*-(+)-2-Amino-3-(dimethylamino)propanoic acid, dihydrochloride, monohydrate** **L-β-(N,N-DIMETHYLAMINO)ALANINE · 2HCl · H_2O** $C_5H_{18}N_2O_3Cl_2$ FW 223.10 Mp 143-145 °C $[\alpha]_D^{20}$ = +16.6° (c=1.0; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 85% (GLC)
NPAA-27		***(R)*-(-)-2-Amino-3-(dimethylamino)propanoic acid, dihydrochloride, monohydrate** **D-β-(N,N-DIMETHYLAMINO)ALANINE · 2HCl · H_2O** $C_5H_{18}N_2O_3Cl_2$ FW 223.10 Mp 143-145 °C $[\alpha]_D^{20}$ = -16.6° (c=1.0; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 85% (GLC)
NPAA-28		***(S)*-(-)-2-Amino-3-(ethanolamino)propanoic acid, hydrochloride** **L-β-(N-ETHANOLAMINO)ALANINE · HCl** $C_5H_{13}N_2O_3Cl$ FW 184.62 Mp 123-125 °C $[\alpha]_D^{20}$ = -19.08° (c=1.0; 6N HCl) Chemical puriry > 98% (TLC, NMR) Enantiomeric purity > 86% (GLC)

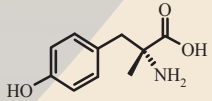
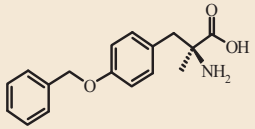
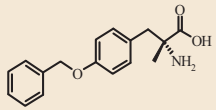
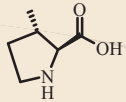
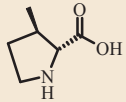
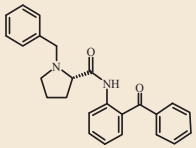
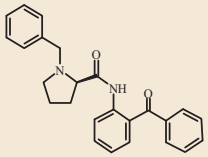
NPAA-29		***(R)*-(+)-2-Amino-3-(ethanolamino)propanoic acid, hydrochloride** **D-β-(N-ETHANOLAMINO)ALANINE · HCl** $C_5H_{13}N_2O_3Cl$ FW 184.62 Mp 123-125 °C $[\alpha]_D^{20}$ = +19.08° (c=1.0; 6N HCl) Chemical puriry > 98% (TLC, NMR) Enantiomeric purity > 86% (GLC)
NPAA-30		***(S)*-(+)-2-Amino-3-(diethanolamino)propanoic acid, hydrochloride** **L-β-(N,N-DIETHANOLAMINO)ALANINE · HCl** $C_7H_{17}N_2O_4Cl$ FW 228.67 Mp 145-147 °C $[\alpha]_D^{20}$ = +28.79° (c=1.0; 6N HCl) Chemical purity >98% (TLC, NMR) Enantiomeric purity > 95% (GLC)
NPAA-31		***(R)*-(-)-2-Amino-3-(diethanolamino)propanoic acid, hydrochloride** **D-β-(N,N-DIETHANOLAMINO)ALANINE · HCl** $C_7H_{17}N_2O_4Cl$ FW 228.67 Mp 145-147 °C $[\alpha]_D^{20}$ = - 28.79° (c=1.0; 6N HCl) Chemical purity >98% (TLC, NMR) Enantiomeric purity > 95% (GLC, HPLC)
NPAA-32		***(S)*-(-)-2-Amino-3-(imidazol-1-yl)propanoic acid** **L-β-IMIDAZOLYLALANINE** $C_6H_9N_3O_2$ FW 155.13 Mp 178-180 °C $[\alpha]_D^{20}$ = -2.2° (c=10.0; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98.5% (GLC, HPLC)
NPAA-33		***(R)*-(+)-2-Amino-3-(imidazol-1-yl)propanoic acid** **D-β-IMIDAZOLYLALANINE** $C_6H_9N_3O_2$ FW 155.13 Mp 178-180 °C $[\alpha]_D^{20}$ = +2.2° (c=10.0; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98.5% (GLC, HPLC)
NPAA-34		***(S)*-(+)-2-Amino-3-(benzylamino)propanoic acid** **L-β-(N-BENZYLAMINO)ALANINE** $C_{10}H_{14}N_2O_2$ FW 194.21 Mp 192-194 °C $[\alpha]_D^{20}$ = +29.67° (c=1.0; 6N HCl) Chemical puriry > 98% (TLC, NMR) Enantiomeric purity > 98% (GLC, HPLC)

NPAA-61		***(2S,3R)*-(+)-2-Amino-3-(benzylthio)butanoic acid** **D-*allo*-S-BENZYL-β-METHYLCYSTEINE** $C_{11}H_{15}NO_2S$ FW 225.31 Mp 174-176 °C $[\alpha]_D^{20}$ = +84.12° (c=0.23; 6N HCl/C_2H_5OH=2/1) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 99 % (GLC, HPLC)
NPAA-62		**L-β-(2'-AMINO-1,2,4-THIODIAZOLYL)-α-ALANINE** $C_5H_8N_4O_2S$ FW 188.21 Mp 207-208 °C $[\alpha]_D^{20}$ = +31.5° (c=1.0; 5.7N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98% (HPLC)
NPAA-63		**D-β-(2'-AMINO-1,2,4-THIODIAZOLYL)-α-ALANINE** $C_5H_8N_4O_2S$ FW 188.21 Mp 207-208 °C $[\alpha]_D^{20}$ = -31.5° (c=1.0; 5.7N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98 % (HPLC)
NPAA-64		**L-S-5-(3'-HYDROXYPROPYL)-4-PHENYL-1,2,4-TRIAZOL-3-YL-CYSTEINE** $C_{14}H_{18}N_4O_3S$ FW 322.38 Mp 220-221 °C $[\alpha]_D^{20}$ = -22.31° (c=1.0; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98% (HPLC)
NPAA-65		**D-S-5-(3'-HYDROXYPROPYL)-4-PHENYL-1,2,4-TRIAZOL-3-YL-CYSTEINE** $C_{14}H_{18}N_4O_3S$ FW 322.38 Mp 220-221 °C $[\alpha]_D^{20}$ = +22.31° (c=1; 6N HCl) Chemical purity > 98% (TLC, NMR) Optical purity > 98 % (HPLC)
NPAA-66		**L-S-5-(3'-HYDROXYPROPYL)-4-ALLYL-1,2,4-TRIAZOL-3-YL-CYSTEINE** $C_{11}H_{18}N_4O_3S$ FW 286.35 Mp 195-196 °C $[\alpha]_D^{20}$ = -5.47° (c=1.0; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98% (HPLC)
NPAA-67		**D-S-5-(3'-HYDROXYPROPYL)-4-ALLYL-1,2,4-TRIAZOL-3-YL-CYSTEINE** $C_{11}H_{18}N_4O_3S$ FW 286.35 Mp 195-196°C $[\alpha]_D^{20}$ = +5.47° (c=1.0; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98% (HPLC)

NPAA-54		***(S)*-(+)-2-Amino-3,3-diphenylpropanoic acid** **L-β,β-DIPHENYLALANINE** $C_{15}H_{15}NO_2$ FW 241.29 Mp 238-240 °C (dec.) $[\alpha]_D^{20}$ = +63.3 ° (c=1.0; MeOH) Chemical puriry > 98% (TLC, NMR) Enantiomeric purity > 98% (GLC, HPLC)
NPAA-55		***(R)*-(-)-2-Amino-3,3-diphenylpropanoic acid]** **D-β,β-DIPHENYLALANINE** $C_{15}H_{15}NO_2$ FW 241.29 Mp 238-240 °C (dec.) $[\alpha]_D^{20}$ = -63.3 ° (c=1.0; MeOH) Chemical puriry > 98% (TLC, NMR) Enantiomeric purity > 98% (GLC)
NPAA-56		***(S)*-(-)-2-Amino-3-(1-naphthyl)propanoic acid** **L-β-(1-NAPHTHYL)ALANINE** $C_{13}H_{13}NO_2$ FW 215.25 Mp 256-258 °C $[\alpha]_D^{20}$ = -11.8 ° (c=0.5; HCl) Chemical puriry > 98% (TLC, NMR) Enantiomeric purity > 98.5% (GLC, HPLC)
NPAA-57		***(R)*-(+)-2-Amino-3-(1-naphthyl)propanoic acid** **D-β-(1-NAPHTHYL)ALANINE** $C_{13}H_{13}NO_2$ FW 215.25 Mp 256-258 °C $[\alpha]_D^{20}$ = +11.8 ° (c=0.5; HCl) Chemical puriry > 98% (TLC, NMR) Enantiomeric purity > 98.5% (GLC, HPLC)
NPAA-58		***(2R,3S)*-(-)-2-Amino-3-(phenylthio)butanoic acid** **L-*allo*-S-PHENYL-β-METHYLCYSTEINE** $C_{10}H_{13}NO_2S$ FW 211.28 Mp 175-176 °C $[\alpha]_D^{20}$ = -14.16° (c=0,48; 6N HCl/C_2H_5OH=12/1) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 99 % (GLC, HPLC)
NPAA-59		**(*2S,3R*)-(+)-2-Amino-3-(phenylthio)butanoic acid** **D-*allo*-S-PHENYL-β-METHYLCYSTEINE** $C_{10}H_{13}NO_2S$ FW 211.28 Mp 175-176 °C $[\alpha]_D^{20}$ = +14.16° (c=0.48; 6N HCl/C_2H_5OH=12/1) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 99 % (GLC, HPLC)
NPAA-60		***(2R,3S)*-(-)-2-Amino-3-(benzylthio)butanoic acid** **L-*allo*-S-BENZYL-β-METHYLCYSTEINE** $C_{11}H_{15}NO_2S$ FW 225.31 Mp 174-176 °C $[\alpha]_D^{20}$ = -84.12° (c=0.23; 6N HCl/C_2H_5OH=2/1) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 99 % (GLC, HPLC)

NPAA-35		***(R)*-(-)-2-Amino-3-(benzylamino)propanoic acid** **D-β-(N-BENZYLAMINO)ALANINE** $C_{10}H_{14}N_2O_2$ FW 194.21 Mp 192-194 °C $[\alpha]_D^{20}$ = -29.67° (c=1.0; 6N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98 % (GLC, HPLC)
NPAA-36		***(S)*-(-)-2-amino-2-methyl-3-phenylpropanoic acid, monohydrate** **L-α-METHYLPHENYLALANINE, MONOHYDRATE** $C_{10}H_{13}NO_2 \cdot H_2O$ FW 197.23 Mp 248-250 °C (dec.) $[\alpha]_D^{20}$ = -4.48° (c=1.04; 1N HCl) Chemical puriry > 98% (TLC, NMR) Enantiomeric purity > 99% (GLC, HPLC)
NPAA-37		***(R)*-(+)-2-amino-2-methyl-3-phenylpropanoic acid, monohydrate** **D-α-METHYLPHENYLALANINE, MONOHYDRATE** $C_{10}H_{13}NO_2 \cdot H_2O$ FW 197.23 $[\alpha]_D^{20}$ = +4.48° (c=1.04; 1N HCl) Mp 248-250 °C (dec.) Chemical purity >98% (TLC, NMR) Enantiomeric purity > 99% (GLC, HPLC)
NPAA-38		***(S)*-(-)-2-Amino-3-(4'-fluoro)phenylpropanoic acid** **L-4-F-PHENYLALANINE** $C_9H_{10}NO_2F$ FW 189.23 Mp 252-255 °C $[\alpha]_D^{20}$ = -26.9° (c=0.03; H_2O) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98% (GLC, HPLC)
NPAA-39		***(R)*-(+)-2-Amino-3-(4'-fluoro)phenylpropanoic acid** **D-4-F-PHENYLALANINE** $C_9H_{10}NO_2F$ FW 189.23 Mp 252-255 °C $[\alpha]_D^{20}$ = +26.9° (c=0.03; H_2O) Chemical puriry > 98% (TLC, NMR) Enantiomeric purity > 98% (GLC, HPLC)
NPAA-40		***(S)*-(-)-2-Amino-2-methyl-3-(4'-fluoro)phenyl -propanoic acid** **L-4-F-α-METHYLPHENYLALANINE** $C_{10}H_{12}NO_2F$ FW 197.21 Mp 300-303 °C $[\alpha]_D^{20}$ = -4.65° (c = 0.5; 1N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98% (GLC, HPLC)

NPAA-41		***(R)*-(+)-2-Amino-2-methyl-3-(4'-fluoro)phenyl-propanoic acid** **D-4-F-α-METHYLPHENYLALANINE** $C_{10}H_{12}NO_2F$ FW 197.21 Mp 300-303 °C $[\alpha]_D^{20}$ = +4.65° (c = 0.5; 1N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98% (GLC, HPLC)
NPAA-42		***(S)*-(-)-2-Amino-2-methyl-3-(3'-bromo-4'-methoxy)phenylpropanoic acid** **L-3-BROMO-4-METHOXY-α-METHYLPHENYLALANINE** $C_{11}H_{14}NO_3Br$ FW 288.14 Mp 271-273 °C $[\alpha]_D^{20}$ = -5.7° (c = 0.5; 1N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98% (GLC, HPLC)
NPAA-43		***(R)*-(+)-2-Amino-2-methyl-3-(3'-bromo-4'-methoxy)phenylpropanoic acid** **D-3-BROMO-4-METHOXY-α-METHYLPHENYLALANINE** $C_{11}H_{14}NO_3Br$ FW 288.14 Mp 271-273 °C $[\alpha]_D^{20}$= +5.7° (c = 0.5; 1N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 98% (GLC, HPLC)
NPAA-44		***(S)*-(-)-2-Amino-3-(3'-bromo-4'-methoxy)phenylpropanoic acid** **L-3-BROMO-4-METHOXYPHENY-LALANINE** $C_{10}H_{12}NO_3Br$ FW 274.12 Mp 247-249 °C $[\alpha]_D^{20}$ = -34.3° (c = 0.3; H_2O) Chemical puriry > 98% (TLC, NMR) Enantiomeric purity > 98% (GLC, HPLC)
NPAA-45		***(R)*-(+)-2-Amino-3-(3'-bromo-4'-methoxy)phenylpropanoic acid** **D-3-BROMO-4-METHOXYPHENY-LALANINE** $C_{10}H_{12}NO_3Br$ FW 274.12 Mp 247-249 °C $[\alpha]_D^{20}$ = +34.3° (c = 0.3; H_2O) Chemical puriry > 98% (TLC, NMR) Enantiomeric purity > 98% (GLC, HPLC)
NPAA-46		***(S)*-(-)-2-Amino-2-methyl-3-(4'-hydroxy)phenylpropanoic acid** **L-α-METHYLTYROSINE** $C_{10}H_{13}NO_3$ FW 195.22 Mp 310-312 °C $[\alpha]_D^{20}$ = -6.93° (c=1.0; 0,1N HCl) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 99% (GLC, HPLC)

NPAA-47		***(R)*-(+)-2-Amino-2-methyl-3-(4'-hydroxy)phenylpropanoic acid** **D-α-METHYLTYROSINE** $C_{10}H_{13}NO_3$ FW 195.22 Mp 310-312 °C $[\alpha]_D^{20}$ = +6.93 ° (c=1.0; 0.1N HCl) Chemical puriry > 98% (TLC, NMR) Enantiomeric purity > 99 % (GLC, HPLC)
NPAA-48		***(S)*-2-Amino-2-methyl-3-(4'-O-benzyloxyphenyl)propanoic acid** **L-O-BENZYL-α-METHYLTYROSINE** $C_{17}H_{19}NO_3$ FW 285.35 Mp 280-282 °C (dec.) $[\alpha]_D^{20}$ = -6.92 ° (c=2.1; CF_3COOH/H_2O=2/1) Chemical purity > 98% (TLC, NMR) Enantiomeric purity > 99% (GLC)
NPAA-49		***(R)*-(+)-2-Amino-2-methyl-3-(4'-O-benzyloxyphenyl)propanoic acid** **D-O-BENZYL-α-METHYLTYROSINE** $C_{17}H_{19}NO_3$ FW 285.35 Mp 280-282 °C $[\alpha]_D^{20}$ = +6.92 ° (c=2.1; CF_3COOH/ H_2O =2/1) Chemical puriry > 98% (TLC, NMR) Enantiomeric purity > 99% (GLC, HPLC)
NPAA-50		***(2S,3S)*-(-)-3-Methylpyrrolidine-2-carboxylic acid** **L-*trans*-3-METHYLPROLINE** $C_6H_{11}NO_2$ FW 129.16 Mp 245-247 °C (dec.) $[\alpha]_D^{20}$ = -27.2° (c=0.7; H_2O) Chemical puriry > 98% (TLC, NMR) Enantiomeric purity > 99% (GLC, HPLC)
NPAA-51		***(2R,3R)*-(+)-3-Methylpyrrolidine-2-carboxylic acid** **D-*trans*-3-METHYLPROLINE** $C_6H_{11}NO_2$ FW 129.16 Mp 245-247 °C (dec.) $[\alpha]_D^{20}$ = +27.2° (c=0.7; H_2O) Chemical puriry > 98% (TLC, NMR) Enantiomeric purity > 99% (GLC, HPLC)
NPAA-52		***(S)*-(-)-2-N'-(N-BENZYLPROLYL)-AMINOBENZOPHENONE** $C_{25}H_{24}N_2O_2$ FW 384.48 Mp 101-102 °C (dec.) $[\alpha]_D^{20}$ = -134.5° (c=1.0; MeOH) Chemical purity > 99 % (TLC, NMR) Enantiomeric purity > 99% (HPLC)
NPAA-53		***(R)*-(+)-2-N'-(N-BENZYLPROLYL)-AMINOBENZOPHENONE** $C_{25}H_{24}N_2O_2$ FW 384.48 Mp 101-102 °C (dec.) $[\alpha]_D^{20}$ = +134.5° (c=1.0; MeOH) Chemical purity > 99% (TLC, NMR) Enantiomeric purity > 99% (HPLC)