

TABLE 1 Cellular composition and biosynthetic requirements for nitrogen^a

	Composition ^b	C for other compounds ^c	C skeleton subtotal ^d	N donation ^e	Total ^f	μ moles N ^g
alanine	488	55	543		543	488
arginine	281		281		281	1124
asparagine	229		229		229	458
aspartate	229	1565	1794	979	2772	229
cysteine	87	153	240		240	87
glutamate	250	810	1060	7108	8168	250
glutamine	250		250	10226	10476	500
glycine	582	418	1000		1000	582
histidine	90		90		90	270
isoleucine	276		276		276	276
leucine	428		428		428	428
lysine	326	28	354		354	652
methionine	146	7	153		153	146
phenylalanine	176		176		176	176
proline	210		210		210	210
serine	205	1409	1614		1614	205
threonine	241	276	517		517	241
tryptophan	54		54		54	108
tyrosine	131		131		131	131
valine	402		402		402	402
AMP + dAMP	190					948
GMP + dGMP	228					1142
CMP + dCMP	151					454
UMP + dTMP	161					321
Other compounds ^h	380					455

^aAll units are μ moles per g dry weight of *E. coli* grown in glucose-ammonia minimal medium. It is assumed that glutamate is made by the GS-glutamate synthase route.

^bChemical composition taken from (65), which should be consulted for assumptions. For the amino acids the content from proteins is presented.

^cThis refers to syntheses that require the carbon skeleton of the amino acid, e.g., methionine synthesis requires aspartate.

^dThis number is the amount of the carbon skeleton that must be synthesized.

^eAfter nitrogen donation it is not necessary to resynthesize the carbon skeleton, which is why this number is not contained within the previous column. For example, 7108 μ moles of α -ketoglutarate for glutamate synthesis come from deamination of glutamate, and only 1060 μ moles come from citric acid cycle components.

^fThis column shows the biosynthetic requirement, i.e., the total μ moles of each amino acid synthesized per g *E. coli*.

^gThis number is the number of nitrogen atoms in each compound times the amount in the composition column (footnote b). The sum of nitrogen content is about 10,300 μ moles of nitrogen atoms per gram.

^hThese include putrescine, spermidine, ethanolamine, glucosamines, and cell wall components. The amounts for each of these components have been presented (65).