CLAIMS

1. A brazzein variant comprising
$X_1X_2KCKX_6X_7YX_9NYPX_{13}X_{14}KCX_{17}X_{18}AX_{20}QCNYDCKLDKHARX_{34}GECFYDEX_{42}RNX_{45}X_{46}CX_{48}CDYCX_{53}YX_{55}$ (SEQ ID NO: 1),
wherein
X_1, X_{20}, and X_{47} are each independently an amino acid with polar uncharged side chain,
X_2 is an amino acid with a negatively charged side chain,
X_6 is a glutamine (E) or an amino acid with positively charged side chains,
X_7, X_{13}, X_{18}, X_{45}, and X_{48} are each independently an amino acid with hydrophobic side chain,
X_{17} is a lysine (K) or an amino acid with polar uncharged side chain,
X_{14} is an arginine (R) or an amino acid with polar uncharged side chain,
X_9 is an arginine (R) or an amino acid with negatively charged side chain,
X_{42} is an amino acid with positively charged side chain,
X_{34} is an alanine or an amino acid with polar uncharged side chain,
X_{46} is an amino acid with polar uncharged side chain,
X_{53} is a glutamic acid, a glutamine, or a lysine, and
X_{55} is a proline, an arginine, a threonine, or no residue,
wherein the variant has 4 to 8 amino acids differences from a wild type brazzein.

2. The brazzein variant of claim 1, wherein the variant has at least 85% sequence identity to a wild type brazzein.

3. The brazzein variant of any one of the preceding claims, wherein the variant retains substantially the same structure as wild type brazzein.

4. The brazzein variant of any one of the preceding claims, wherein the variant has the same secondary structure as wild type brazzein.

5. The brazzein variant of any one of the preceding claims, wherein the variant is capable of binding to a taste receptor.

6. The brazzein variant of any one of the preceding claims, wherein the variant is capable of binding to a human sweet taste receptor.

7. The brazzein variant of any one of the preceding claims, wherein the variant comprises
X_1 is a glutamine (Q) or a serine (S),
X_2 is an aspartic acid (D) or a glutamic acid (E),
X_6 is a glutamine (Q), a lysine (K), or an arginine (R),
X_7 is valine (V), methionine (M), or isoleucine (I)
X_9 is a glutamic acid (E) or an arginine (R),
X_{13} is isoleucine (I) or valine (V),
X_{14} is an asparagine (N), a serine (S), or an arginine (R),
X_{17} is a lysine (K) or a glutamine (Q),
X_{18} is a leucine (L) or isoleucine (I),
X_{20} is a serine (S) or an asparagine (N),
X_{34} is a serine (S), an alanine (A), or a threonine (T),
X_{42} is an arginine (R) or a lysine (K),
X_{45} is a methionine (M), leucine (L), or valine (V),
X_{46} is a glutamine (Q) or a threonine (T)
X_{48} is an isoleucine (I), valine (V), or leucine (L),
X_{53} is independently a glutamic acid, a glutamine, or a lysine, and
X_{55} is independently a proline, an arginine, a threonine, or no residue.

8. The brazzein variant of any one of the preceding claims, wherein the variant comprises one or more of substitutions selected from the group consisting of K6Q, E9R, S14R, Q17K, S34A, E53Q, or E53K.

9. The brazzein variant of any one of the preceding claims, wherein the variant comprises no residue at position 55.

10. The brazzein variant of any one of the preceding claims, wherein the variant comprises
i. K6Q, and Q17K,
ii. E9R,
iii. S34A, and E53Q,
iv. S14R, and an addition of 55R, or

v. E53K, and an addition of 55T.

11. The brazzein variant of any one of the preceding claims, wherein the variant comprises the sequence selected from the group consisting of

QDKCKQVYENYPINKCKLASQCNYDCKLDKHARSGECFYDERRNMQCICDYCEY (SEQ ID NO: 3),

QEKCKKIYRNYPVSKCQLANQCNYDCKLDKHARTGECFYDEKRNLQCVCDYCEY (SEQ ID NO: 4),

QDKCKKMYENYPVSKCQLANQCNYDCKLDKHARAGECFYDEKRNVQCICDYCQY (SEQ ID NO: 5),

SDKCKKVYENYPIRKCQLANQCNYDCKLDKHARSGECFYDEKRNLQCICDYCEYR (SEQ ID NO: 6), and

QDKCKRVYENYPISKCQIANQCNYDCKLDKHARSGECFYDEKRNLTCLCDYCKYT (SEQ ID NO: 7).

12. A polynucleotide and/or a vector encoding a brazzein variant of any one of the preceding claims.

13. A cell comprising a vector comprising the polynucleotide of claim 12.

14. A method of producing a brazzein variant, comprising expressing a polynucleotide and/or a vector encoding a brazzein variant of claims 1 to 13 in an expression system.