THAT WHICH IS CLAIMED IS:

1. A mustard (e.g., *Brassicaceae*) plant or part thereof comprising at least one non-natural mutation in an endogenous gene encoding a myrosinase (i.e., glucosinolase, thioglucosidase (e.g., β-thioglucosidase), thioglucoside glucohydrolase; EC 3.2.1.147 (EC 3.2.3.1 transferred to 3.2.1.147)), an endogenous gene encoding a cytochrome P450 mono-oxygenase (i.e., CYP79F1, homomethionine N-monooxygenase; EC 1.14.14.42), and/or an endogenous gene encoding a 2-oxo acid-dependent dioxygenase (i.e., AOP2, 2-oxoglutarate-dependent dioxygenase; EC 1.14.11.M8), optionally, wherein the plant or part thereof comprising at least one non-natural mutation in an endogenous gene exhibits a reduction in the activity of the myrosinase, the AOP2, and/or the CYP79F.

2. The mustard plant or part thereof of claim 1, wherein the plant or part thereof comprising at least one non-natural mutation in an endogenous gene exhibits reduced hydrolysis of glucosinolates (e.g., reduced production/amounts of thiocyanates (e.g., allyl isothiocyanate), reduced production of glucose (e.g., reduced hydrolysis of sinigrin (i.e., allylglucosinolate or 2-propenylglucosinolateand/or reduced amounts/production of alkenyl glucosinolates and/or aliphatic glucosinolates.

3. The mustard plant or part thereof of claim 1 or claim 2, wherein when eaten the plant or part thereof comprising at least one non-natural mutation in an endogenous gene exhibits reduced pungency and/or reduced bitterness.

4. The mustard plant or part thereof of any one of the preceding claims, wherein the null allele is a full knockout mutant CYP79F1 allele, a full knockout mutant AOP2 allele and/or a full knockout mutant myrosinase allele, optionally, wherein the full knockout mutant CYP79F1 allele results in the production of a nonfunctional CYP79F1 protein or no production of a CYP79F1 protein, the full knockout mutant AOP2 allele results in the production of a nonfunctional AOP2 protein or no production of a AOP2 protein, the full knockout mutant myrosinase allele results in the production of a nonfunctional myrosinase protein or no production of a myrosinase protein.

5. The mustard plant or part thereof of any one of the preceding claims, wherein the mustard plant or part thereof is a kale plant or part thereof, a collard plant or part thereof, a spinach plant or part thereof, a cabbage plant or part thereof, a beet plant or part thereof, a watercress plant or part thereof, a lettuce plant or part thereof (e.g. romaine), a swiss chard plant or part thereof, an arugula plant or part thereof, an endive plant or part thereof, a bok choy plant or part thereof, a rutabaga plant or part thereof, a turnip plant or part thereof, a mustard plant or part thereof, a cabbage plant or part thereof, a broccoli plant or part thereof, a cauliflower plant or part thereof, a Brussels sprout plant or part thereof, a radish plant or part thereof, or a kohlrabi plant or part thereof, optionally, wherein the mustard plant or part thereof is *Brassica oleracea* (e.g., *B. oleracea* var. *oleracea, B. oleracea* var. *capitata, B. oleracea* var. *botrytis, B. oleracea* var. *gemmifera, B. oleracea* var. *sabauda, B. oleracea* var. *gongyiodes, B. oleracea* var. *italic, B. oleracea* var. *sabellica, B. oleracea* var. *acephala*), *Brassica juncea, Brassica rapa (B. rapa* subsp. *pekinensis, B. rapa* subsp. *Chinensis, B. rapa* subsp. *rapa), Brassica napas, Brassica carinata, Brassica campestris, Brassica nigra* or *Raphanus raphanistrum* (e.g., *Raphanus raphanistrum* subsp. *Sativus*).

6. The mustard plant or part thereof of any one of the preceding claims, wherein the at least one non-natural mutation is a base substitution, a base deletion and/or a base insertion.

7. The mustard plant or part thereof of any one of the preceding claims, wherein the endogenous gene encoding a myrosinase comprising at least one non-natural mutation comprises a nucleotide sequence of any one of **SEQ ID NOs:141-599**, the endogenous gene encoding a cytochrome P450 mono-oxygenase comprising at least one non-natural mutation comprises a nucleotide sequence of any one of **SEQ ID NOs:788-799**, and/or the endogenous gene encoding a 2-oxo acid-dependent dioxygenase comprising at least one non-natural mutation comprises a nucleotide sequence of any one of **SEQ ID NOs:600-616 or 800-816**.

8. A mustard plant or part thereof (e.g., a plant cell) having reduced pungency or bitterness [when eaten] (e.g., reduced hydrolysis of glucosinolates and/or reduced amounts/production of alkenyl glucosinolates and/or aliphatic glucosinolates) comprising at least one non-natural mutation an endogenous myrosinase gene, an endogenous *AOP2* gene and/or an endogenous

CYP79F1 gene, wherein the at least one mutation is a substitution, insertion or a deletion that is introduced using an editing system that comprises a nucleic acid binding domain that binds to a target site in the endogenous myrosinase gene, in the endogenous *AOP2* gene or in the endogenous *CYP79F1* gene.

9. The mustard plant or part thereof of claim 8, wherein the null mutation is a full knockout mutant CYP79F1 allele, a full knockout mutant AOP2 allele and/or a full knockout mutant myrosinase allele, optionally, wherein the full knockout mutant CYP79F1 allele results in the production of a nonfunctional CYP79F1 protein or no production of a CYP79F1 protein, the full knockout mutant AOP2 allele results in the production of a nonfunctional AOP2 protein or no production of a AOP2 protein, the full knockout mutant myrosinase allele results in the production of a nonfunctional myrosinase protein or no production of a myrosinase protein.

10. The mustard plant or part thereof of claim 8 or claim 9, wherein the at least one non-natural mutation is a base substitution, a base deletion and/or a base insertion.

11. The mustard plant or part thereof of claims 8-10, wherein the endogenous gene encoding a myrosinase comprising at least one non-natural mutation is comprises a nucleotide sequence of any one of **SEQ ID NOs:141-599**, the endogenous gene encoding a cytochrome P450 mono-oxygenase comprising at least one non-natural mutation comprises a nucleotide sequence of any one of **SEQ ID NOs:788-799**, and/or the endogenous gene encoding a 2-oxo acid-dependent dioxygenase comprising at least one non-natural mutation comprises a nucleotide sequence of any one of **SEQ ID NOs:600-616** or **800-816**.

12. The mustard plant or part thereof of any one of claims 8 to 11, wherein the mustard plant or part thereof is a kale plant or part thereof, a collard plant or part thereof, a spinach plant or part thereof, a cabbage plant or part thereof, a beet plant or part thereof, a watercress plant or part thereof, a lettuce plant or part thereof (e.g. romaine), a swiss chard plant or part thereof, an arugula plant or part thereof, an endive plant or part thereof, a bok choy plant or part thereof, a rutabaga plant or part thereof, a turnip plant or part thereof, a mustard plant or part thereof, a cabbage plant or part thereof, a broccoli plant or part thereof, a cauliflower plant or part thereof,

a Brussels sprout plant or part thereof, a radish plant or part thereof, or a kohlrabi plant or part thereof, optionally, wherein the plant or part thereof *is Brassica oleracea* (e.g., *B. oleracea* var. *oleracea, B. oleracea* var. *capitata, B. oleracea* var. *botrytis, B. oleracea* var. *gemmifera, B. oleracea* var. *sabauda, B. oleracea* var. *gongyiodes, B. oleracea* var. *italic, B. oleracea* var. *sabellica, B. oleracea* var. *acephala*), *Brassica juncea, Brassica rapa (B. rapa* subsp. *pekinensis, B. rapa* subsp. *Chinensis, B. rapa* subsp. *rapa), Brassica napas, Brassica carinata, Brassica campestris Brassica nigra* or *Raphanus raphanistrum* (e.g., *Raphanus raphanistrum* subsp. *Sativus*).

13. A mustard plant regenerated from the plant part of any one of claims 1-12 optionally, wherein the plant exhibits reduced pungency and/or bitterness.

14. A method for editing a specific site in the genome of a mustard plant cell, the method comprising: cleaving, in a site specific manner, a target site within an endogenous myrosinase gene, an endogenous *AOP2* gene and/or an endogenous *CYP79F1* gene, thereby generating an edit in the endogenous myrosinase gene, the endogenous AOP2 gene and/or the endogenous CYP79F1 gene of the plant cell.

15. The method of claim 14, further comprising regenerating a mustard plant from the mustard plant cell comprising an edit in the endogenous myrosinase gene, the endogenous AOP2 gene and/or the endogenous CYP79F1 gene to produce a plant comprising the edit in its endogenous myrosinase gene, endogenous AOP2 gene and/or endogenous CYP79F1 gene, optionally, wherein the edit results in a non-natural mutation.

16. The method of claim 15, wherein the mustard plant comprising the edit in its endogenous myrosinase gene, endogenous AOP2 gene and/or endogenous CYP79F1 gene exhibits reduced pungency and/or bitterness.

17. The method of claim any one of claims 14-16, wherein the edit in the endogenous myrosinase gene results in a myrosinase gene having a nucleotide sequence of any one of **SEQ ID NOs:141-599**, the edit in the endogenous cytochrome P450 mono-oxygenase gene results in a

cytochrome P450 mono-oxygenase gene having a nucleotide sequence of any one of **SEQ ID NOs:788-799** and/or the edit in the endogenous 2-oxo acid-dependent dioxygenase gene results in a 2-oxo acid-dependent dioxygenase gene having a nucleotide sequence of any one of **SEQ ID NOs:600-616** or **800-816**.

18. A method of producing a mustard plant or part thereof comprising a mutated endogenous myrosinase gene, a mutated endogenous *AOP2* gene and/or a mutated endogenous *CYP79F1* gene and having a phenotype of reduced pungency and/or bitterness, the method comprising contacting a target site in an endogenous myrosinase gene, an endogenous *AOP2* gene and/or an endogenous *CYP79F1* gene with a nuclease comprising a cleavage domain and a DNA binding domain (e.g., editing system) comprising a nucleic acid binding domain that binds to the target site in the endogenous myrosinase gene, the endogenous *AOP2* gene and/or the endogenous *CYP79F1* gene, thereby producing a mustard plant or part thereof comprising a mutated endogenous myrosinase gene, a mutated endogenous *AOP2* gene and/or a mutated endogenous *CYP79F1* gene and having reduced pungency and/or bitterness.

19. The method of claim 18, wherein the mutation is a base substitution, a base insertion and/or a base deletion.

20. The method of claim 18 or claim 19, wherein the mutated endogenous myrosinase gene comprises a nucleotide sequence of any one of **SEQ ID NOs:141-599**, the mutated endogenous cytochrome P450 mono-oxygenase gene comprises a nucleotide sequence of any one of **SEQ ID NOs:788-799**, and/or the mutated endogenous 2-oxo acid-dependent dioxygenase gene comprises a nucleotide sequence of any one of **SEQ ID NOs:600-616** or **800-816**.

21. A mustard plant or part thereof produced by the method of any one of claims 14-20, wherein the plant or part thereof exhibits reduced pungency and/or reduced bitterness, optionally, wherein the mustard plant or part thereof is a kale plant or part thereof, a collard plant or part thereof, a spinach plant or part thereof, a cabbage plant or part thereof, a beet plant or part thereof, a watercress plant or part thereof, a lettuce plant or part thereof (e.g. romaine), a swiss chard plant or part thereof, an arugula plant or part thereof, an endive plant or part thereof, a bok

choy plant or part thereof, a rutabaga plant or part thereof, a turnip plant or part thereof, a mustard plant or part thereof, a cabbage plant or part thereof, a broccoli plant or part thereof, a cauliflower plant or part thereof, a Brussels sprout plant or part thereof, a radish plant or part thereof, or a kohlrabi plant or part thereof.