

Structures and Activities of Sweetness-inducing Substances (Miraculin, Curculin, Strogin) and the Heat-stable Sweet Protein, Mabinlin

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Summary

Recent progress in studies of a heat-stable sweet protein (mabinlin) and sweetness-inducing substances is reviewed. There were five homologues of mabinlin. Comparison of amino acid sequences of the heat-stable and unstable homologues indicated that the presence of arginine residue at B-47 greatly contributes to the heat-stability of mabinlin. Miraculin, which is an active protein from miracle fruits, has no taste, but has an ability to change a sour taste into a sweet taste. Curculin, is a sweet protein contained in fruits of a plant in Malaysia. It has a similar taste-modifying ability to that of miraculin. In addition, curculin can induce a sweet taste in response to water after the sweetness of curculin is diminished. Strogin is a glycoside of triterpene contained in the leaves of a plant in Malaysia, and has a sweet taste. Similar to curculin, cold water elicits a sweet taste after storogin was held in mouth. cDNAs for mabinlin, miraculin and curculin were cloned and the structures of their prepro-proteins were determined. Attempts to express these proteins in *Escherichia coli*, yeast and tobacco were carried out. It was confirmed that these proteins were expressed in these organisms. Mabinlin expressed in *E. coli* showed a sweet activity, but miraculin and curculin expressed in *E. coli* and yeast showed no activity at present. Further studies are under way to look for conditions in which active proteins are expressed.