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“Bridging the gap between increasing knowledge and decreasing resources”

## Fruits and Leaves of Bitter Gourd Varieties Differ in Antidiabetic Effects on Cell Culture Level

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### Abstract

Type II diabetes mellitus has been known to be a problem for elder people especially in the western world. This has changed in the past years with now 80 % of diabetic patients living in low-income and middle-income countries. To find an alternative treatment that is more affordable and available for the poor to control their blood glucose levels, the use of bitter gourd (*Momordica charantia*) fruits and leaves is discussed.

As bitter gourd fruits differ in size, shape and bitterness, varietal selection might be relevant for diabetes management. To test this assumption, nine germplasm accessions and seven commercial hybrids of *Momordica charantia* were planted on ‘AVRDC – The World Vegetable Center’s fields in Taiwan. Leaf and fruit extracts were tested for their effect on glucose uptake in TNF- $\alpha$  induced insulin resistant FL83B cells.

Bitter gourd leaves and fruits improved insulin dependent glucose uptake of the cells. Intervarietal differences in glucose uptake were found for fruits and leaves of commercial hybrids and germplasm accessions. The three most effective varieties, namely Best 165 F1, High Moon, and TOT 2533, were less to medium bitter with green or cream colour.

Bitter gourd varieties exert different effects on insulin dependent glucose uptake and thus in quality of antidiabetic treatment. Varietal selection and breeding can improve quantity and quality of antidiabetic compounds in bitter gourd products. Selecting varieties with stronger antidiabetic effects could help to develop and refine dietary recommendations for diabetes management with bitter gourd fruits or leaves. The common belief that varieties with strong bitter taste and dark green colour are best for diabetes treatment could not be confirmed.

**Keywords:** Diabetes mellitus, intervarietal differences, *Momordica charantia*