DATE: January 31, 2008

RE: Review of Bitter Melon


Bitter melon (*Momordica charantia*) is also known as bitter gourd, balsam pear, karela, and pare. It grows in tropical areas of the Amazon, East Africa, Asia, India, South America, and the Caribbean. The fruit has a bitter taste that becomes more pronounced as it ripens. Traditionally, the seeds, fruit, leaves, and root have been used to treat microbial infections, sluggish digestion and intestinal gas, menstrual stimulation, wound healing, inflammation, fever reduction, hypertension, and as a laxative and emetic (induces vomiting). Current uses for bitter melon extracts (primarily from the fruit) include diabetes, dyslipidemia, microbial infections, and potentially as a cytotoxic agent for certain types of cancer. Research is still ongoing, but the primary active ingredients include charantin, insulin-like peptide, cucurbutanoids, momordicin, and oleanolic acids.

Most research focuses on the use of bitter melon in diabetes. Animal models show that bitter melon extract, especially the active ingredient charantin, increase glucose utilization by the liver, decrease gluconeogenesis (formation of glucose), improve glucose oxidation, enhance cellular uptake of glucose, promote insulin release and potentiate its effect, and increase the number of insulin producing beta cells in the pancreas of diabetic animals. The monograph describes four clinical trials involving people with diabetes; three of which had positive outcome (n = 9, 12, 18 per study) and one with a negative outcome (n = 40). The study with the negative results was a randomized, double-blind, placebo-controlled, three-month trial. In this study, bitter melon extract or placebo (two capsules three times daily; exact dosage not disclosed) was administered to 20 patients in each group. There was no statistically significant effect on HbA1C (glycosylated hemoglobin, a measure of blood glucose), fasting blood sugar, or total cholesterol. The authors comment that the amount of bitter melon given may have been insufficient to affect improvement, but this is purely a hypothesis since the dosage was not disclosed in the original article.

There are no human studies examining bitter melon's effect on dyslipidemia. However, several in vivo studies indicate that bitter melon extract decreases triglycerides and low
density lipoprotein (LDL) cholesterol and increases high density lipoprotein (HDL) cholesterol.

In vitro studies have demonstrated that bitter melon and MAP30 protein isolated from the seeds have broad-spectrum antimicrobial activity against gram-negative and gram-positive bacteria, including *Escherichia coli*, Salmonella, Shigella, Staphylococcus, Pseudomonas, Streptobacillus, Streptococcus, and *Helicobacter pylori*, and parasitic organisms *E. histolytica* and *Plasmodium falciparum*. The extracts also inhibit infection and growth of viruses, namely, HIV, *Herpes simplex*, and Epstein Barr virus.

No clinical trials have been conducted in patients with cancer, but bitter melon fruit and seed extract have been shown to inhibit the growth of cancer cell lines (prostate adenocarcinoma, human colon cancer, and the highly metastatic breast cancer cell line MDAMB 231). The extract contains a potent inhibitor of guanylate cyclase, which is present in high amounts in many types of tumor cells.

Considering that bitter melon extracts may potentiate the effects of insulin and oral hypoglycemic medications, patients should closely monitor blood sugar when adding bitter melon to their diabetes treatment regimen. Long-term consumption of the fruit in Asian cultures indicates that oral ingestion of bitter melon fruit is safe. Subcutaneous injection of p-insulin extracted from bitter melon appears to be safe; however, intravenous injection of bitter melon extracts is toxic and not recommended. Bitter melon extracts are not recommended for use in pregnancy or by women trying to become pregnant.

According to the article, dosage recommendations depend on the form of bitter melon being consumed. The dose of fresh juice is 50-100 mL but it is extremely bitter and difficult to drink. The standard dose for dry powder is 3-15 g daily. The standardized encapsulated extract dosage is 100-200 mg three times daily.

The article concludes that before any of the traditional or current uses of bitter melon can be recommended more clinical trials are needed to prove efficacy, to determine efficacious dosages, and to record the adverse side effect profile. Unfortunately, the original article has a photograph of *Momordica balsamina* (also known as balsam apple) rather than *Momordica charanina*, the subject of the article.

—Heather S. Oliff, PhD

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