

Study demonstrates guarana's potential to prevent obesity



Experiments with rats showed that guarana extract prevented weight gain and insulin resistance

April 26, 2019 · Report: Camila Raposo

Guarana's anti-obesity potential was the subject of a study that included researchers from UFRGS, from the Universidad de la Costa, Colombia, and from the Federal University of Sergipe (UFS). From experiments with rats, scientists have proved that, in addition to preventing weight gain and fat accumulation, the plant can alleviate other conditions associated with obesity, such as insulin resistance. The results were published in the scientific journal *Phytotherapy Research*.

Rich in caffeine and with known antioxidant and anti-inflammatory properties, the extract from roasted guarana seeds has long been used as stimulant, aphrodisiac, tonic and also for weight loss. However, as the researchers claim that there was a lack of studies proving the supplement efficacy and security. "This extract is used in formulations (along with other compounds) for weight loss, but no one had proved the effect of this extract in its pure form," says the study co-author Rafael Bortolin, professor at the Universidad de la Costa and collaborator at UFRGS Center for Oxidative Stress Studies.

During 18 weeks, 24 rats were fed with an ordinary western diet – developed by the group to induce obesity in the animals –, while another 24 consumed a low-fat control diet. Also, half of each group received guarana powder supplementation in a quantity that, if transposed to humans, would be equivalent to 300 milligrams per person per day.

According to Bortolin, the manufacturer of the guarana extract used in the research recommends a daily use of 1 to 3 grams, "however, we didn't find scientific basis for this prescription. Also it is not easy to find out on the label what guarana is indicated for, but people in general use it because of its caffeine to feel alert and avoid sleepiness." The use of guarana in these high doses, he explains, is to achieve a higher caffeine intake that keeps the user awake, similar to what happens when we drink coffee. "The difference is that in order to lose weight, the use must be chronic, so it cannot be a high dose. Unlike a day when you have to study for a test and stay up all night, which is a momentary (acute) use when you can use a higher dosage."

The scientists observed that guarana supplementation decreased weight gain and prevented excessive fat accumulation among animals fed with the Western diet. It also prevented other conditions related to obesity, as insulin resistance and dysregulation of adipokines – substances secreted by the adipose tissue, directly related to body fat distribution, and whose imbalance is associated with obesity and metabolic syndromes among other diseases.

After demonstrating guarana's efficacy for the prevention and treatment of obesity, researchers began investigating its safety and possible adverse effects. "Many studies evaluating therapeutic potentials forget to evaluate the toxic potential of compounds (or extracts). We evaluated the toxic potential and identified no toxicity of guarana (in the concentration we used) in either the control group or the obese diet group," explains Bortolin. It is important to



Besides being rich in caffeine, the native plant of Amazon Rainforest has antioxidant and anti-inflammatory properties - Photo: Idesam / CC by NC 2.0

emphasize, however, that effects of the excessive use of guarana were not studied. "It is quite possible that at higher doses it might exert some toxicity, because it has caffeine. Just as coffee can be toxic in high doses, so can guarana," warns the researcher.

Finally, the mechanisms by which the substance acts to prevent weight gain were investigated. After verifying no quantity reduction of food intake, neither significant changes in the gut microbiota of the animals that consumed guarana, scientists analyzed changes in the brown adipose tissue – one of the two types of adipose tissue that we have in our body (the other is white).

While white adipose tissue has as its primary function the storage of energy, brown adipose tissue maintains body temperature and is the major site of thermogenesis in the mammals. Thermogenesis is a metabolic process that involves energy expenditure for heat production. A larger quantity of brown adipose tissue can, therefore, lead to a higher energy expenditure and, consequently, to weight loss.

"Thermogenesis is characterized by fat burning for heat production, instead of ATP [adenosine triphosphate, the molecule responsible for storing energy for the basic activities of cells]. It occurs because the mitochondria present in the brown adipose tissue have a lot of UCP, which is a protein that breaks down an electron gradient necessary for the production of ATP. Thus, if we have a larger volume of this tissue, or if we have more mitochondria in this tissue, or if we have more UCPs in these mitochondria we can say that we promote thermogenesis, that is, we 'activate' the tissue," explains Bortolin.

And that is what happened in the experiments. Guarana not only induced the expansion of brown adipose tissue but it also increased the number of mitochondria contained in it and the activation of proteins involved in the thermogenesis process. "It is known that the protein called by the acronym AMPK is related to energy expenditure and could contribute to the activation of brown adipose tissue. So, we investigated this protein and noticed that it was more phosphorylated (active) in the animals that consumed guarana. In addition, we also observed an increase in mitochondria number and UCP content. In summary, we saw that guarana was able to activate brown adipose tissue and we suggest that one of the mechanisms is via AMPK," complements the researcher. It is worth reiterating, however, that this was an initial step. Tests on obese humans are still needed to confirm the study results.

Scientific Article

BORTOLIN, Rafael Calixto et al. Guarana supplementation attenuated obesity, insulin resistance, and adipokines dysregulation induced by a standardized human Western diet via brown adipose tissue activation. *Phytotherapy Research*, 13 mar. 2019.

Translated into English by Marcos Vinícius Melo da Silva, under the supervision and translation revision of Elizamari R. Becker (P.h.D.) – IL/UFRGS.

Universidade Federal do Rio Grande do Sul

Av. Paulo Gama, 110 - Bairro Farroupilha - Porto Alegre - Rio Grande do Sul
CEP: 90040-060 - Fone: +55 51 33086000

Directions

