Título: **EVALUATION OF THE EFFECTS OF THE COLOMBIAN BLUEBERRY VACCINIUM MERIDIONALE SWARTZ ON DYSLIPIDEMIA, HYPERTENSION, INFLAMMATION AND OXIDATIVE STRESS IN MEN AND WOMEN WITH METABOLIC SYNDROME / EVALUACIÓN DE LOS EFECTOS DEL CONSUMO DEL AGRAZ (MORTIÑO) COLOMBIANO VACCINIUM MERIDIONALE SWARTZ SOBRE DISLIPIDEMIAS, HIPERTENSIÓN, INFLAMACIÓN Y ESTRÉS OXIDATIVO EN HOMBRES Y MUJERES CON SÍNDROME METABÓLICO.**

DESCRIPCIÓN

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Resumen Ejecutivo: According to the analysis of the Observatorio Nacional de Salud of the Instituto Nacional de Salud de Colombia, cardiovascular diseases (CVD) are the main cause of death in Colombia [1]. The Departamento Administrativo Nacional de Estadística (DANE) reported 628.630 deaths due to CVD in 1998-2011 in Colombia [1]. These results represent 23.5% from all death causes in Colombia. Thus, identifying people who are at high risk for developing CVD in the future is crucial to intervene their health condition and decrease the mortality statistics in our country.

Metabolic syndrome (MetS) is a group of risk factors associated with insulin resistance that predispose to type 2 diabetes mellitus (DM2) and CVD. People with MetS have twice the risk for DM2 and 5 times for CVD [2]. Once DM2 has been developed, the risk for CVD is increased up to threefold. According to the revised National Cholesterol Education Program - Adult Treatment Panel III (NCEP/ATP-III), MetS is defined by the presence of 3 out of 5 of these characteristics: high triglycerides (TG greater or equal to150 mg/dL), low high density lipoprotein cholesterol (HDL-C lower than 40 mg/dL men, lower than 50 mg/dL women), high blood pressure (greater or equal to130/greater or equal to 85 mmHg), elevated fasting blood glucose (greater or equal to 100 mg/dL) and high waist circumference (WC greater or equal to 102 cm in men, greater or equal to 88 cm in women) [2]. Recently, the International Diabetes Federation (IDF) recommended to use cut-off points for WC based on the population studied; thus, for ethnic Central and South American WC values greater or equal to 90 cm in men and greater or equal to 80 cm in women [3] need to be considered. A pro-inflammatory state, increased oxidative stress and vascular endothelial dysfunction are also characteristics of MetS [2, 4-6].

In most countries between 20 and 30% of the adult population have MetS [7]. By using the IDF population-specific WC thresholds, the prevalence of MetS in 901 adults from Medellín, Colombia was 41%[8]. In addition, a recent study in 285 health practitioners and employees (20-61 years) at

the Universidad de Antioquia in Medellin found that the prevalence in this specific population was 17.5% [9].

Although the first line therapy for MetS is lifestyle changes such as dietary modifications and increasing physical activity [2, 4], it is not uncommon the use of multiple drugs to treat the different components of MetS. Due to the secondary effects of the polypharmacy and the economical burden to the health agencies, it is crucial to identify strategies that target these multiple risk factors associated with MetS to prevent both diabetes and CVD. The Colombian government in its law 1355 of 2009 (obesity law) [10] and in the Plan Decenal de Salud Pública 2012-2021 [11] has ordered actions and strategies to control the main CVD risk factors in Colombia. One strategy is to promote a healthy and balanced diet by increasing the daily consumption of fruits and vegetables in the general population.

The increased consumption of fruits and vegetables has been associated with reduced risk for CVD and mortality [12, 13]. One of the components that may be associated with these beneficial effects of fruits and vegetables are polyphenols, which have shown anti-inflammatory, antioxidant, hypolipidemic effects and to improve endothelial dysfunction [14-18]. Blueberries (genus Vaccinium) contain numerous polyphenols that have shown cardioprotective effects. A study in obese men and women with MetS showed that compared to controls, 8-wk supplementation of freeze-dried blueberries (Vaccinium corymbosum L.), caused significant decreases in blood pressure and in oxidized LDL and malondialdehyde, markers of lipid oxidation [19]. Another 6-wk blueberry supplementation study (V.ashei +V. corymbosum) evaluating a similar population also reported improvements in insulin sensitivity in the blueberry group compare to the placebo group [20].

In Colombia, it has been individually characterized a total of 20 populations and 100 plants of V. meridionale [21]. Rojano et al. [22, 23] and Garzon et al. [24, 25] have evaluated the polyphenol content of V. meridionale and demonstrated its antioxidant properties in vitro with similar or even higher potency than other Vaccinium reported. A recent study reported for the first time that a non-alcoholic extract of this Colombian blueberry (V. meridionale) exhibited cardioprotective effects against ischemia and reperfusion injury in isolated rat hearts [26]. Although V. meridionale Swartz is considered as a promissory fruit and a functional food for its high antioxidant content [25], and it has been included in the list of fruits with potential international market [27], there are no published studies in Colombia about the potential health benefits of the consumption of our local blueberry in humans. Therefore, the OBJECTIVE of this study is to evaluate the effects of the Colombian blueberry Vaccinium meridionale Swartz (mortiño) consumption on MetS biomarkers, such as dyslipidemia, hypertension, inflammation and oxidative stress.