**FUENTE: CALIBRI**

**TAMAÑO: 10**

**INTERLINEADO: 1**

**JUSTIFICADO**

**PONER EN NEGRITA TÍTULO, AUTORES, AFILIACIÓN, TÍTULOS APARTADOS Y AUTOR DE CORRESPONDENCIA**

**Importante que los numeritos de la afiliación estén como superíndices y sin espacio (tal y como viene aquí)**

**ESPACIO ENTRE PÁRRAFOS: 6 ptos (salvo en corresponding autor y referencias bibliográficas)**

**TRAS LOS TÍTULOS PONDREMOS DOS PUNTOS Y SEGUIDO, NO PUNTO Y APARTE**

**Las referencias con una sangría en segunda línea de 0,5**

**Substrate oxidation in women during endurance exercise throughout menstrual cycle phases: IronFEMME pilot study**

**Ortega, CP.1, Cupeiro, R.1, Barba, L.1, Peinado, AB.1**

**1 LFE Research Group, Department of Health and Human Performance, Faculty of Physical Activity and Sport Sciences. Universidad Politécnica de Madrid, Spain.**

**Background:** The contribution of fats and carbohydrates to the exercise energetic needs depends on several factors, including gender (Isacco et al., 2012, Vaiksaar et al., 2011b, Kraemer et al., 2013). This happens mostly due to the ovarian hormone natural fluctuations through menstrual cycle (Isacco et al., 2012).

**Objective: To study the differences in substrate oxidation during exercise among different menstrual cycle phases in oral contraceptive users and eumenorrheic athletes.**

**Methods: Fifteen healthy endurance-trained women, eumenorrheic (n=9; 35± 4.3 years; 163±5.8 cm; 57.8±6kg; maximum oxygen consumption (VO2max) 50.9±3.7ml·min-1·kg-1) or oral contraceptives users (n=6; 28±3 years; 164±7 cm; 56.5±7 kg; VO2max 51.9 ±4.5 ml·min-1·kg-1) participated in the study. Each participant performed 40 min running at the speed corresponding to the 75% of VO2max previously determined. Exercise was completed on a treadmill and was performed in the different phases of menstrual cycle: early follicular (EFP), mid follicular (MFP) and luteal phase (LP) for the eumenorrheic women and hormonal phase (HP) and non-hormonal phase (NHP) in oral contraceptives users.**

**Results: There were no differences in** the Respiratory Exchange Ratio (RER) among different menstrual cycle phases in women with regular cycle: RER values from min 35 to 40 were, at EFP 0.88, at MDP 0.84 and at LP 0.85 . As well as in women on oral contraceptives mean RER values during HP and NHP from min 35 to 40 were 0.87 and 0.89 respectively. There were no differences in the macronutriente oxidation among the different menstrual cycle phases 1.90 g CHO·min-1 and 0.45 g fat·min-1 at EFP, 1.60 g CHO·min-1 and 0.55 g fat·min-1 at MFP and 1.73 g CHO·min-1 and 0.55 g fat·min-1 at LP. Either in women on oral contraceptives 1.87 g CHO·min-1 and 0.31 g fat·min-1 at HP and 2.08 g CHO·min-1 and 0.36 g fat·min-1 at NHP.

**Conclusions: Our preliminary results suggest that the different hormonal environments of each menstrual cycle phase do not significantly influence the energy metabolism in endurance-trained women.**

**Practical application:** More research is needed to confirm these preliminary results, which suggest that the use of energy substrates is not modified by the action of sex hormones. Based on these data, any dietetic or training strategy for improve performance should be designed taking into account several circumstances such as the duration or intensity of the effort, but not the menstrual cycle phase.

**References:**

Isacco, L., Duché, P., & Boisseau, N. (2012). Influence of hormonal status on substrate utilization at rest and during exercise in the female population. *Sports Medicine, 42*(4), 327-342.

Kraemer, R. R., Francois, M., Webb, N. D., Worley, J. R., Rogers, S. N., Norman, R. L., .Castracane, V. D. (2013). No effect of menstrual cycle phase on glucose and glucoregulatory endocrine responses to prolonged exercise. *European journal of applied physiology, 113*(9), 2401-2408.

Vaiksaar, S., Jürimäe, J., Mäestu, J., Purge, P., Kalytka, S., Shakhlina, L. & Jürimäe, T. 2011b. No effect of menstrual cycle phase on fuel oxidation during exercise in rowers. *European journal of applied physiology,* 111**,** 1027-1034.

**Correspondence address (Presenting author):**

Ms. Carmen Patricia Ortega Santos

Facultad de Ciencias de la Actividad Física y del Deporte–INEF. Universidad Politécnica de Madrid.

C/ Martín Fierro nº7.

28040 Madrid - España.

+447751175668

c.ortega@2016.ljmu.ac.uk