

SCIENTIFIC REPORT - SHORT TERM SCIENTIFIC MISSION (STSM)

(COST Action FA1403, POSITIVE)

STSM topic: Training in meta-analysis tools to assess the impact of ellagitannins and anthocyanins on cardiometabolic biomarkers.

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Host: Dr. Mayte García Conesa and Dr. Antonio González (CEBAS-CSIC)

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Background and aims of the STSM

The main purpose of this STSM was to progress the data entry and analysis for the systematic review, which will determine the impact of ellagitannins and anthocyanins on a range of cardio-metabolic biomarkers and inter-individual variability. This objective fits into COST POSITIVE Action Working Group 2 (WG2). Many published human studies are undertaken in different countries, from people with different ethnicity, gender, age, and health status, all which may play a role in the outcome of the study. One of the main objectives of this COST Action is to understand the inter-individual variability in the response to ellagitannins and anthocyanin intake on specific cardio-metabolic biomarkers.

Prior to commencement of this STSM an extensive data extraction was performed whereby all the required outcomes were entered into excel templates. These extracted excel files need to be combined into one file to use for the data entry into the meta-analysis software and the meta-analysis. The aim of this STSM was to contribute to the WG2 outcome and receive training on how to perform meta-analyses.

This STSM consisted of two main aims:

- 1) To acquire skills and knowledge of the tools needed for meta-analysis that will be applied for the analysis of all the data prepared by the WG2 members to complete current and future objectives planned within this COST Action.
- 2) To contribute to the current meta-analysis under development specifically evaluating the effects of ellagitannins and anthocyanins and the assessment of inter-individual variability on specific cardio-metabolic biomarkers.

Description of the work carried out during the STSM and description of the main results obtained

1. Individual Excel files with only the studies for a particular outcome were made.
2. For each outcome the data was converted into the same units prior to data entry into the meta-analysis software.

Mean and standard deviation was used for all outcomes, and specific units of measurement were used for the following:

- BMI (kg/m²)
- WC (cm)
- Insulin (mU/L)
- Glucose, TGs, LDL, HDL and total cholesterol (mmol/L)
- DBP/SBP (mmHg)
- HOMA, Hb1ac (%)

2. Data entry for each outcome in the Comprehensive Meta-Analysis V3 program:

- sample mean, SD pre and post, N, in each group, Pre/Post Corr.
- sample mean change, SD pre and post, N, in each group, Pre/Post Corr.
- sample size and p-value.

3. Analysis using the Comprehensive Meta-Analysis V3 software for each specific cardio-metabolic biomarker to determine the overall effect of all studies for ellagitannins and anthocyanins combined.

Outcomes using Random model (note we are awaiting more data extractions, this is not the final result):

- **BMI** 51 studies (p0.332)
- **WC** 23 studies (p0.004)
- **DBP** 104 studies (p0.000)
- **SBP** 106 studies (p0.000)
- **Cholesterol** 113 studies (p0.000)
- **LDL** 99 studies (p0.005)
- **HDL** 102 studies (0.012)
- **TGs** 98 studies (p0.192)
- **FMD** 33 studies (p0.123)
- **Glucose** 70 studies (p0.047)
- **Insulin** 33 (p0.598)
- **Hb1ac** 18 studies (p0.579)
- **HOMA** 16 studies (p0.274)

4. A summary was prepared for each outcome that included the inter-individual variability to stratify each outcome into the following groups:

- Quality score.
- Acute or chronic study for outcomes such as insulin, glucose DBP/SBP.
- Age range (I propose mean age people over 50 or under 50, but this will need further discussion).
- BMI (<25 and >25)
- gender (M/F)
- ethnicity (caucasian, black, asian, middle eastern and mixed)
- Health status (heathy, overweight, disease, at risk). Note that overweight includes obese.
- Medication usage (Y/N)
- Smoking, non-smoking or mixed.
- menopausal status (yes, no, mixed)
- Source (nuts, berry, wine/grapes and grape seed extract, pomegranate and supplement).
- Duration of intervention (days). The duration of intervention was used for the meta-regression analysis.

5. The data for inter-individual variability was added to the existing data files for LDL, HDL, BMI, WC, TGs, TC. The remaining outcomes (HOMA, Hb1ac, FMD, insulin and glucose) will be finished by Dr. Antonio Gonzalez and Dr. María Teresa García Conesa prior to the next COST POSTIVE meeting in Poland.

6. The effects of different dietary groups (red wine, berries, pomegranate, nuts) and the effects of inter-individual variability (disease status, gender, smoking, medications, and Country) were assessed for LDL cholesterol. However, these are not the final statistics as the additional studies from the further extractions will still need to be added. This was completed for a training exercise and to determine how to complete the meta-analysis for the other outcomes.

Future collaboration with the host institution and foreseen publications/articles resulting from the STSM.

In the next months we will complete the data entry for new studies and for all the outcomes. I will contribute to further discussion with Dr. Antonio González and María Teresa García into how to split the outcomes for publication and I will contribute to further analysis in Norwich if possible. Additionally, we will contribute to preparing figures and text for the future manuscripts. These will be discussed further at the next meeting in February and via email.