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PROJECT TITLE: Bioactive plant extracts traditionally used to reduce menopausal disorders: identification, characterisation of the phytocomplex metabolic profile and functional validation

Project description

Menopause is defined as the cessation of menstrual cycles due to exhaustion of follicular ovarian function, which causes a reduction in estrogen and progestin hormones. It is preceded by perimenopause, during which vasomotor symptoms, sleep disturbances, and urogenital problems may occur, with a negative impact on quality of life. Hormone replacement therapy (HRT) is used to reduce the symptoms of menopause. However, it is only taken by 5% of menopausal women due to fear of side effects (i.e. thromboembolic disease, breast cancer) and low efficacy, which lead to the use of phytotherapy as an alternative that allows to eliminate the risk of diseases related to HRT and has a better emotional impact on the woman, promoting compliance with the treatment [1]. Among the many phytoestrogens, prenylated flavonoids found in *Humulus lupulus* are the most widely used [2]. However, other categories of phytoestrogens (isoflavones, lignans, and coumestan) are present in numerous other plants that may play a role in combating menopausal disorders, such as soya, red clover, and cimicifuga. These plants come mainly from India and China, whose quality is often uneven, and sustainability is undoubtedly critical due to the impossibility of controlling the supply chain [3]. Thus, the aim of the project is to develop new safe plant extracts, effective and sustainable, to be used in plant-based food supplements or medicines from Mediterranean plants, which are traditionally claimed to have a protective effect against menopausal symptoms. The extracts obtained with suitable extraction techniques for the extraction of phytoestrogens, using eco-friendly solvents, will be studied for the metabolic profile of the phytocomplex (by UHPLC-MS), identifying the extracts with higher content of bioactive compounds. *In vitro* studies on the human breast cancer cell line MCF-7 will evaluate the pro-estrogenic activity of the extracts, using 17β-estradiol and standardised *H. lupulus* extracts as positive controls.

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