

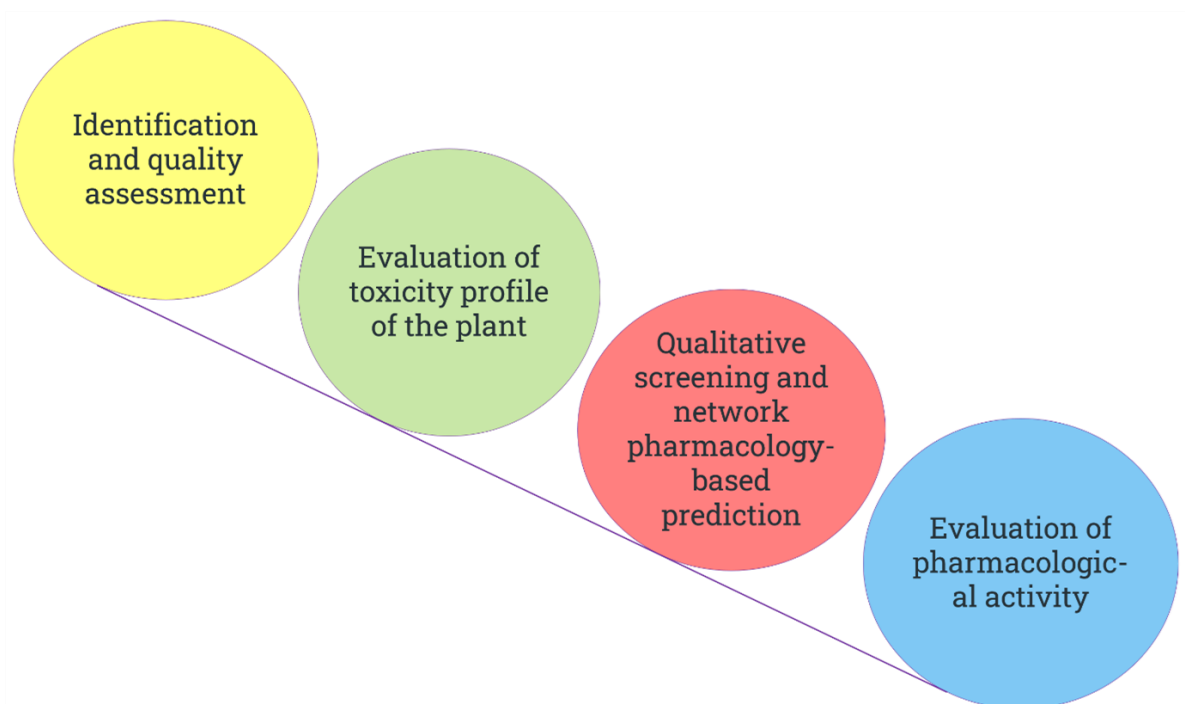
## **CHAPTER 3**

# **RATIONALE, OBJECTIVES & PLAN OF WORK**

### **3 Rationale, objectives, and plan of work**

#### **3.1 Rationale**

Low accessibility to allopathic drugs or a ballooning use of traditional remedies, due to several geographical, economical, or pharmacological aspects, as the first approach to treat any acute or chronic illness, has led to the extensive exploration of ethnomedicines used by different communities around the globe [14]. The least explored plant, *N. herpeticum*, despite being used locally as a remedy for various diseases, has no documentation to prove its ethnopharmacological claims. Hence, the ethnobotanical and ethnopharmacological aspects of the plant may provide an insight into its unexploited resource for natural product-based drug development before its definitive fast disappearance as a result of changing land use and globalisation of the socio-economic environment [50]. Moreover, drawing attention to the ancestral knowledge about the floral species aids in redefining solutions for the future [51]. DNA barcoding ensures quality control of the raw materials used, as DNA barcoding has been promoted as a replacement for traditional taxonomic research because it offers a quick and accurate way to identify and retrieve information about previously known or described species. The findings from the literature review reaffirm the fact that, in spite of the remarkable advantageous utility of the plants in the treatment of a range of ailments and disorders, authenticated documentation and scientific validation of the same for the preservation of biocultural diversity have not been done yet. A deeper insight into the pharmacological and toxicological aspects is also awaited, which, whenever elucidated, will fruitfully lead to the discovery of promising new therapeutic agents. From these observations, we have set up the following objectives for our work (Check section 3.2).



### 3.2 Objectives

**Objective 1.** Validation of pharmacognostical quality control assessment and DNA barcoding-assisted identification of *N. herpeticum*

**Objective 2.** Evaluation of the toxicity profile of the plant

**2a.** Performing an acute toxicity study as per the OECD-420 guideline

**2b.** Performing a repeated dose 28-day oral toxicity study as per OECD-407 guideline

**Objective 3.** Qualitative screening of the aqueous extract of *N. herpeticum* and network pharmacology-based prediction

**3a.** Prediction of antibacterial potential of the compounds

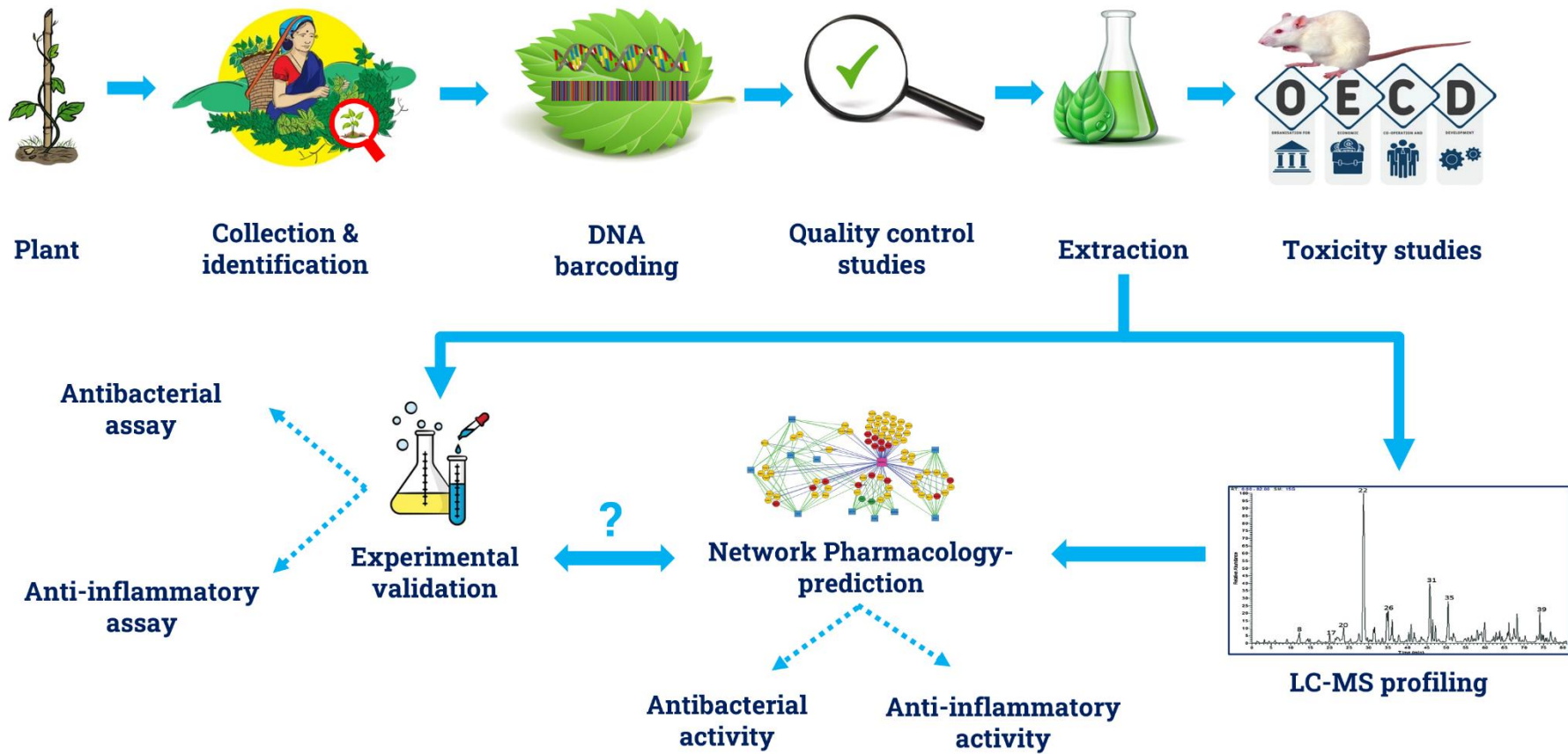
**3b.** Prediction of anti-inflammatory potential of the compounds

**Objective 4.** Evaluation of pharmacological activity of the aqueous extract of *N. herpeticum*

**4a.** Validation of antibacterial activity in vitro and to elucidate the mechanism of action using molecular docking and Molecular dynamics simulation

**4b.** Validation of anti-inflammatory activity in in vitro and in vivo models

### 3.3 Plan of work



**Fig. 3** A schematic representation of the plan of work