



**UREĐAJ:** Ultrazvučno-mikrovalni reaktor

**DEVICE:** Ultrasonic-microwave cooperative extractor/reactor

**PROIZVODAC I MODEL / MANUFACTURER AND TYPE:** Lab kits, MW-ER-01

**GODINA PROIZVODNJE / PRODUCTION YEAR:** 2015.

#### **Kratki opis uređaja**

Ultrazvučno-mikrovalni reaktor je uređaj u kojem se mogu provoditi reakcije u uvjetima niske temperature i normalnog tlaka uključivši pritom i djelovanje ultrazvuka, mikrovalova ili djelovanje ultrazvuka i mikrovalova zajedno. Moguće ga je koristiti za istraživanje metoda i mehanizama kemijskih reakcija, razne sinteze te pripreme i predobrade materijala.

#### **Short description of the device**

The ultrasonic-microwave cooperative reactor is a device in which reactions can be conducted under low temperature and normal pressure conditions, including ultrasound, microwave or combining them. It can also be used to investigate methods and mechanisms of chemical reactions, various synthesis and preparation and pretreatment of materials.

#### **Namjena**

U ultrazvučno – mikrovalnom reaktoru su omogućena tri načina rada: ultrazvuk, mikrovalovi i kombiniranje istih. Reakcije u ovom uređaju odvijaju se u uvjetima niske temperature i normalnog tlaka što ne zahtjeva posebno posuđe za njihovo odvijanje. Karakteristike uređaja uključuju podesiv raspon energije mikrovalova, te mogućnost podešavanja temperature. Istovremena upotreba ultrazvuka i mikrovalova ima velik potencijal s obzirom da osigurava

bolje uvjete prijenosa mase i topline, te smanjuje potrošnju energije, poboljšava kvalitetu proizvoda i omogućuje automatizaciju procesa. Upravo zbog svega navedenog se ovaj reaktor koristi za ekstrakciju bioaktivnih komponenti iz biljnog materijala, ali i za vođenje kemijskih reakcija uz ultrazvuk, mikrovalove ili kombinaciju ultrazvuka i mikrovalova.

### **Purpose**

In the ultrasonic - microwave cooperative reactor there are three provided modes of operation: ultrasound, microwaves and combining them. The reactions in this device take place under low temperature and normal pressure conditions, which does not require any specially designed equipment. Device features include an adjustable range of microwave power, and the ability to adjust the temperature. Simultaneous use of ultrasound and microwaves has great potential since it provides better conditions for mass and heat transfer and reduces energy consumption, improves product quality and enables automation of the process. Precisely because of all this, this reactor is used for extraction of bioactive components from plant material, as well as for conducting chemical reactions with ultrasound, microwaves or a combination of ultrasound and microwaves.

### **Tehničke značajke**

Podesivi parametri u ultrazvučno-mikrovalnom reaktoru uključuju postavljanje energije mikrovalova između 10 i 800 W, podešavanje temperature zagrijavanja uzorka do 120 °C ( $\pm 1$  °C), kao i postavljanje vremena trajanja reakcije, dok su snaga ultrazvuka (50 W), mikrovalna frekvencija (2450 MHz) i ultrazvučna frekvencija (40 KHz).

### **Technical characteristics**

Adjustable parameters in the ultrasonic -microwave cooperative reactor include microwave power setting between 10 and 800 W, setting the sample heating temperature up to 120 °C ( $\pm 1$  °C), as well as setting the time duration of the reaction, while ultrasonic power is 50 W, microwave frequency 2450 MHz and ultrasonic frequency 40 KHz.

### **Tip i priprava uzorka**

Sve vrste uzoraka.

### **Sample type and preparation**

All kinds of samples.