

## Equipment options for Beegnostic app

1. **Optimal.** Use external omnidirectional lavalier microphone with these parameters:

- Sensitivity more than -45dB. ( best -30dB);
- Frequency range from 100Hz to 3000Hz ( ideal range from 50Hz to 16000Hz or more);
- Microphone diameter smaller than 10 mm ( so that it can be easily inserted through the entrance of a beehive);
- Microphone cable length longer than 1.5 m;
- Microphone need to have TRRS output jack ( four ring contacts). If microphone output jack has two or three ring contact you need to use adapter TRS Female to TRRS Male;

This option – optimal. For addition you need buy microphone which price is 10 – 30 euros and if it has two or three ring contact you need adapter which price is 3 – 9 euros.



2. **Maximum.** Use external omnidirectional lavalier microphone and microphone amplifier. Amplifier minimal frequency range 70Hz to 3000Hz. This option is most expensive, but it can help to get more accurate results because if you need you can amplify sound. In this option microphone sensitivity can be worse.



### Recommended external omnidirectional lavalier microphone

Microphones:

<https://www.amazon.com/Professional-Microphone-Omnidirectional-Recording-Conference/dp/B01AG56HYQ> - no need to buy adapter.

<https://www.ebay.com/itm/BOYA-BY-M1-Omnidirectional-Lavalier-Microphone-for-Canon-Nikon-DSLR-Camcorder/361584748253> - no need to buy adapter.

<https://www.ebay.com/itm/Lavalier-Microphone-Clip-on-Omnidirectional-Mic-Condenser-Audio-for-iPhone-Y0E2/382402102465> - no need to buy adapter.

Microphone's adapter:

<https://www.amazon.com/ENVEL-Convertors-Smartphone-Microphone-Simultaneously/dp/B01M0T6PSF>

<https://www.amazon.com/Movo-MC3-Microphone-Adapter-Smartphones/dp/B01N9CJDVE>

Amplifier:

<https://www.ebay.com/itm/Professional-Dual-Microphone-Amplifier-Pre-Computer-Microphone-Microphone-Reverb/161835269113>

## Procedure for diagnosing bee colony

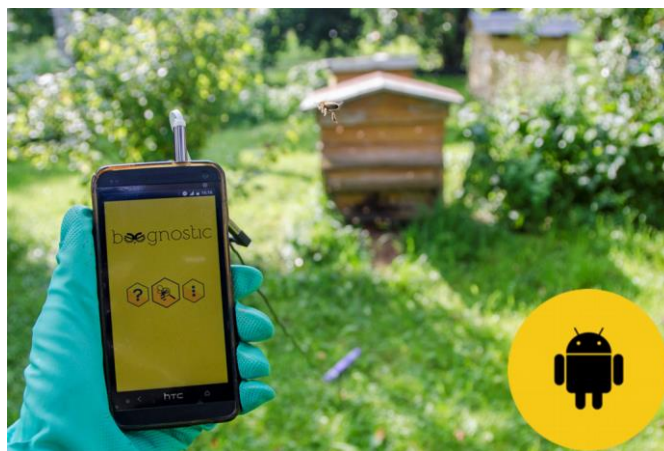
1. Download Beegnostic app into your smartphone  
(<https://play.google.com/store/apps/details?id=com.lucma.soft.beegnostic>);
2. Simply insert omnidirectional microphone through the entrance of a beehive;



3. Plug microphone in your smartphone;



4. Open Beegnostic app;



5. Wait about 3 minutes to bees calm down;
6. Press app button "Diagnose";



7. In the screen will pop out message “Testing”. Wait about 10 seconds to app test audio quality;
8. If after 10 seconds change message to “Signal quality – bad please choose a better place or change the gain of the microphone amplifier” you need to change microphone position or amplify sound and again press button “Diagnose”;
9. If audio quality is good, the message change to “Recording”;
10. Wait about 40 seconds. In this time the app will analyse recorded audio and determine bee colony behaviour;
11. When recording it is important to reduce side-effects sound which caused by vehicles, animals humans and natural phenomena (like rain, thunder). If the environment is noise, the accuracy of results can be very low. Then it is recommended to wait until these noises disappear.
12. Decide if bee colony inspection is needed.
13. If the available microphone does not achieve the required audio signal quality, consider to purchase more sensitivity microphone or microphone amplifier.

**The app results is advisory in nature, so we are not responsible of the loss incurred because of the decisions and actions you have taken.**

We suggest watching video how to diagnose bee colony using Beegnostic app:

<https://www.youtube.com/watch?v=mVG-KIWOPsA>



## Awards

- The Beegnostic project in 2017 was presented in the EUCYS (European Union Contest For Young Scientists), National stage in Lithuania and won the first place ( Gold medal).



- The project was presented in the EUCYS 2017 Tallinn ( Final stage) and won the FoodDrinkEurope bioeconomy prize for the best project in the field of agri food at the European Union Contest for Young Scientists.



For more information please visit our website: [www.beegnostic.eu](http://www.beegnostic.eu)

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Thank you for your time.

Beegnostic team

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