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Bionic sensing system and characterization of exhaled nitric oxide detection based on canine olfaction

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COMMENTS 0

ABSTRACT

section 1:Design the relative optimal bionic chamber size and the pumping flow capacity of the air pump. The chamber's length, inner diameter, and pump flow capacity are designed, experimented and analyzed.
section 2:The chamber's relatively optimal sieve plate structure is obtained through the design, experiment, and analysis of the number of sieve plates, the number of air holes, and the diameter of air holes in the bionic chamber.
section 3:The response voltages of the NO sensor in three bionic chambers were collected in the same experimental environment.

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Bionic chamber design

1 The experimental factors are reasonably designed and investigated through the orthogonal test method, and the level table of orthogonal test factors is established .

2 Bionic chambers printed in 3D according to orthogonal design results.

3 Under the same conditions, nine experiments were carried out according to the orthogonal experimental design table.

4 The sensor's output voltage is collected using a data acquisition card.

5 The voltage data is processed by Matlab software by moving the average.

6 The stable response signal is averaged.

7 The same group experiment was repeated three times.

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Optimal design of bionic chamber sieve plates

8 The experimental factors are reasonably designed and investigated through the orthogonal test method, and the level table of orthogonal test factors is established .

9 Bionic chambers printed in 3D according to orthogonal design results.

10 Under the same conditions, nine experiments were carried out according to the orthogonal experimental design table.

11 The sensor's output voltage is collected using a data acquisition card.

12 The voltage data is processed by Matlab software by moving the average.

13 The stable response signal is averaged

14 The same group experiment was repeated three times.

The response voltages of sensor in three bionic chambers

15 Clean the experimental environment with nitrogen before the experiment and ensure that sensors used in each experiment have the same baseline voltage.

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16 Inject different volumes (0.35ml, 0.7ml, 1.05ml) of NO gas into the closed box. The concentration of NO gas in the closed box after mixing is 15ppb, 30ppb, and 45ppb.

17 The sensor was placed in bionic chambers, and the pumping flow capacitywas set to 1L/min.

18 The sensor's output voltage is collected using a data acquisition card.

19 The voltage data is processed by Matlab software by moving the average.

20 The stable response signal is averaged.

21 The same group experiment was repeated three times.

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