

ABSTRAK

Dwi sumartini putri

URINOIR PINTAR PENDETEKSI HIDRASI DAN GAS AMONIA PADA URINE

xvi + 71 Halaman + 8 Tabel + 7 Lampiran

Sistem saluran kemih memainkan peran krusial dalam proses pembuangan limbah metabolik tubuh serta dalam menjaga keseimbangan cairan dan elektrolit. Sistem ini turut berfungsi menjaga homeostasis tubuh melalui produksi urin yang merupakan hasil dari aktivitas metabolisme. Karakteristik urin, seperti warna, kejernihan, dan bau, dapat memberikan informasi terkait dengan kondisi kesehatan, khususnya mengenai hidrasi dan kandungan zat tertentu di dalam tubuh. Warna urin dipengaruhi oleh jumlah cairan yang dikonsumsi. Jika tubuh cukup cairan, urin akan terlihat bening atau terang, sementara jika kekurangan cairan, urin akan lebih pekat. Selain itu, bau urin dipengaruhi oleh konsentrasi gas amonia. Kadar amonia dalam urin akan meningkat seiring dengan berkurangnya asupan cairan tubuh, menunjukkan hubungan negatif antara jumlah cairan yang dikonsumsi dan kadar amonia. Berdasarkan hal tersebut, penelitian ini mengembangkan prototipe alat "Urinoir Pintar" yang mampu mendeteksi tingkat hidrasi dan kandungan gas amonia dalam urin secara otomatis dan real-time. Sistem ini menggunakan sensor MQ135 untuk mendeteksi kandungan amonia, serta sensor warna TCS3200 untuk menganalisis warna urin sebagai indikator tingkat hidrasi. Data hasil deteksi ditampilkan melalui LCD Graphic 128x64 untuk kemudahan pemantauan. Alat ini diharapkan mampu memberikan solusi praktis dan efisien bagi masyarakat serta tenaga medis dalam pemantauan status hidrasi dan deteksi dini gangguan kesehatan, khususnya terkait keseimbangan cairan dan fungsi ginjal.

Kata Kunci : Urine, Amonia, Dehidrasi, Sensor MQ135, Sensor TCS3200, LCD Graphic

Daftar Pustaka : 26 Jurnal (2013-2023)

ABSTRACT

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SMART URINAIR DETECTS HYDRATION AND AMMONIA GAS IN URINE

xvi + 71 Pages + 8 Tables + 7 Attachments

The urinary tract system plays a crucial role in the body's metabolic waste disposal process and in maintaining fluid and electrolyte balance. This system also functions to maintain the body's homeostasis through the production of urine which is the result of metabolic activity. Urine characteristics, such as color, clarity, and odor, can provide information related to health conditions, especially regarding hydration and the content of certain substances in the body. Urine color is influenced by the amount of fluid consumed. If the body is sufficiently hydrated, urine will look clear or bright, while if it is dehydrated, urine will be more concentrated. In addition, urine odor is influenced by the concentration of ammonia gas. Ammonia levels in urine will increase as body fluid intake decreases, indicating a negative relationship between the amount of fluid consumed and ammonia levels. Based on this, this study developed a prototype of a "Smart Urinal" device that is able to detect hydration levels and ammonia gas content in urine automatically and in real-time. This system uses an MQ135 sensor to detect ammonia content, and a TCS3200 color sensor to analyze urine color as an indicator of hydration levels. Detection data is displayed via a 128x64 Graphic LCD for easy monitoring. This tool is expected to provide a practical and efficient solution for the public and medical personnel in monitoring hydration status and early detection of health problems, especially related to fluid balance and kidney function.

Keywords: Urine, Ammonia, Dehydration, MQ135 Sensor, TCS3200 Sensor, Graphic LCD

Bibliography: 26 Journals (2013-2023)