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Quantitative paper-based detection of male fertility biomarkers (Article)

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Abstract

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Male infertility is a reproductive disorder culminating from hormonal imbalances which may be caused by stress and use of health supplements. Invasive diagnostic tests and privacy issues have relatively deterred men from seeking infertility treatment. A rapid and reliable test using non-invasive samples is sought to observe the reproductive effects of subchronic thymoquinone administration and prolonged artificial light exposure to rats. Detection of testosterone as the male fertility biomarker from non-invasive samples was employed using adult male Sprague-Dawley rats treated with thymoquinone or exposed to 24-hours artificial light. All interventions were given within a 56 days period and sampling of blood, saliva and urine was performed at day 0 and day 56. Testosterone and corticosterone levels were determined using enzyme-linked immunosorbent assay (ELISA). Sperm analysis parameters subsequent to testes harvest at day 56 were measured and followed by a histological assessment. Paper-based lateral flow assay (PLFA) strip was developed based on the colour change from the antigen-antibody reaction on paper reflecting testosterone levels from urine samples. The colour change was recorded using a smartphone camera by an application that captures the RGB colour value. This study demonstrated that 30 mg/kg subchronic thymoquinone supplementation can reduce testosterone levels thus possibly affecting fertility. Meanwhile, the 24-hour light exposure showed significant effects on testosterone but not corticosterone levels compared to controls. The testosterone level assessment using the PLFA produced comparable data with ELISA results. This sensor holds potential to increase patient compliance with sampling by using non-invasive samples to test infertility in men. © 2018 Pharmascope Publications. All rights reserved.

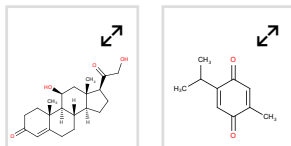
SciVal Topic Prominence [i](#)

Topic: Nigella sativa | Seeds | Thymoquinone TQ

Prominence percentile: 97.393 [i](#)

Chemistry database information [i](#)

Substances



Author keywords

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Chemicals and CAS Registry Numbers:

cisplatin, 15663-27-1, 26035-31-4, 96081-74-2; corticosterone, 50-22-6; testosterone, 58-22-0; thymoquinone, 490-91-5

Manufacturers:

Device manufacturer:

Enzo

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