

**SCREENING PARAMETERS ON THE BIOLOGICAL ACTIVE
COMPOUNDS OF COFFEE BEAN MIXED WITH *NIGELLA SATIVA***

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Thesis submitted in partial fulfilment of the requirements
for the award of the degree of
Bachelor of Chemical Engineering

**Faculty of Chemical & Natural Resources Engineering
UNIVERSITI MALAYSIA PAHANG**

DECEMBER 2016

ABSTRACT

The addition of *Nigella sativa* to coffee offers consumers to gain health benefits besides reducing the components which are bad to health. This research aimed to investigate the effect of significant parameters of coffee bean mixed with *Nigella sativa* in terms of biological compounds. The parameters studied included temperature, ratio of coffee to *Nigella sativa* and mixing time. The biological compounds included caffeine, total phenolic content and antioxidant activity. Design Expert was used to screen the parameters of the above factors. UV-VIS spectrophotometer was mainly used to measure the total phenolic content and antioxidant activity. From the screening process, three parameters which were temperature, ratio of *Nigella sativa* to coffee and mixing time contributed a significant effect to the caffeine content analysis for both black and white coffee with the P value < 0.05. Interaction was found between temperature and ratio of *Nigella sativa* to coffee. As for total phenolic content, all three parameters (temperature, ratio of *Nigella sativa* to coffee and mixing time) contributed significant effects to the overall results for black coffee with P value < 0.05. Significant interactions between temperature and ratio of *Nigella sativa* to black coffee and between ratio of *Nigella sativa* to black coffee and mixing time. On the other hand, only ratio of *Nigella sativa* to coffee and mixing time resulted to significant contribution to the total phenolic content of white coffee. For antioxidant activity, only two parameters contributed significant effects for the results for both coffee. For black coffee, they were temperature and mixing time with P value < 0.05. However, interaction was found between temperature and ratio of *Nigella sativa* to coffee. Whereas, ratio of *Nigella sativa* to coffee and mixing time significantly affected the antioxidant activity of white coffee with P value < 0.05. The results showed that *Nigella sativa* worked better with black coffee than white coffee. All parameters were significant to black coffee, only two parameters played significant roles to white coffee. The parameters were ratio of *Nigella sativa* to coffee and mixing time. As a conclusion, the additional of *Nigella sativa* to the coffee had improved the quality of coffee by reducing the caffeine content and increasing the total phenolic content and antioxidant activity of coffee.

ABSTRAK

Penambahan *Nigella sativa* dalam kopi menawarkan pengguna banyak manfaat kesihatan selain mengurangkan komponen kopi yang tidak baik. Kajian ini bertujuan untuk mengkaji kesan parameter terhadap penambahan *Nigella sativa* dalam kopi dari segi sebatian biologi. Parameter yang dikaji ialah suhu, nisbah *Nigella sativa* untuk kopi dan masa pencampuran. Sebatian biologi termasuk kandungan kafein, jumlah kandungan fenolik dan aktiviti antioksidan. Design Expert telah digunakan untuk menyaring faktor-faktor di atas. UV-VIS spektrofotometer terutamanya digunakan untuk mengukur jumlah kandungan fenolik dan aktiviti antioksidan. Tiga parameter termasuk suhu, nisbah *Nigella sativa* untuk kopi dan masa pencampuran menyumbang kesan yang besar kepada analisis kandungan kafein untuk kedua-dua kopi hitam dan putih dengan nilai $P < 0.05$. Bagi jumlah kandungan fenolik, ketiga-tiga parameter (suhu, nisbah *Nigella sativa* untuk kopi dan masa pencampuran) menyumbang kesan yang penting kepada keputusan keseluruhan untuk kopi hitam dengan nilai $P < 0.05$. Interaksi didapati berlaku antara suhu dengan nisbah *Nigella sativa* untuk kopi hitam dan nisbah *Nigella sativa* untuk kopi hitam dengan masa pencampuran. Bagi kopi putih, hanya nisbah *Nigella sativa* untuk kopi dan masa pencampuran menyumbangkan kesan penting kepada keputusan keseluruhan. Untuk aktiviti antioksidan, hanya dua parameter menyumbang kesan yang penting bagi keputusan untuk kedua-dua kopi. Bagi kopi hitam, suhu dan masa pencampuran ialah antaranya dua parameter yang menunjukkan nilai $P < 0.05$. Pada masa yang sama, interaksi didapati berlaku antara suhu dengan nisbah *Nigella sativa* untuk kopi. Sementara itu, nisbah *Nigella sativa* untuk kopi dan masa pencampuran adalah parameter penting bagi aktiviti antioksidan kopi putih dengan nilai $P < 0.05$. Hasil kajian menunjukkan bahawa *Nigella sativa* bekerja lebih baik dengan kopi hitam daripada kopi putih. Ketiga-tiga parameter menyumbangkan kesan penting kepada analisis kopi hitam tetapi hanya dua parameter memainkan peranan yang lebih penting untuk kopi putih. Mereka adalah nisbah *Nigella sativa* untuk kopi dan masa pencampuran. Kesimpulannya, penambahan *Nigella sativa* dalam kopi telah meningkatkan kualiti kopi dengan mengurangkan kafein kopi di samping meningkatkan jumlah kandungan fenolik dan aktiviti antioksidan.