

**INFLUENCE OF THERMAL PROCESSING ON CHEMICAL COMPOSITION AND  
ANTINUTRITIONAL FACTORS OF DURIAN (*Durio zibethinus*) SEED**



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## 2. Letter of Offer (Research Grant)



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Puan Marina Zulkifli  
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Puan

### KELULUSAN GERAN DANA PEMBUDAYAAN PENYELIDIKAN (RAGS) 2013

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Dengan hormatnya perkara di atas adalah dirujuk.

2. Sukacita dimaklumkan pihak Kementerian Pengajian Tinggi melalui surat JPT.S(BPKI)2000/018/07/02.Jld.4(31) yang bertarikh 27 Ogos 2013 telah meluluskan kertas cadangan penyelidikan puan untuk dibiayai di bawah geran Dana Pembudayaan Penyelidikan 2013.

3. Bagi pihak Universiti kami mengucapkan tahniah kepada puan kerana kejayaan ini dan seterusnya diharapkan berjaya menyiapkan projek ini dengan cemerlang.

4. Peruntukan kewangan akan disalurkan melalui tiga (3) peringkat berdasarkan kepada laporan kemajuan serta kewangan yang mencapai perbelanjaan lebih kurang 50% dari peruntukan yang diterima.

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Sekian, harap maklum.

**"SELAMAT MENJALANKAN PENYELIDIKAN DENGAN JAYANYA"**

Yang benar

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## b. Enhanced Executive Summary

### ABSTRACT

#### **INFLUENCE OF THERMAL PROCESSING ON CHEMICAL COMPOSITION AND ANTINUTRITIONAL FACTORS OF DURIAN (*DURIO ZIBETHINUS*) SEED**

The effects of some heat treatments on the chemical composition of durian (*Durio zibethinus*) seeds were determined. Heat treatments applied were boiling, microwave cooking and autoclaving. The raw *D.zibethinus* seeds contained the highest chemical composition in terms of protein, fat, total ash, minerals, and crude fibre content. Nevertheless, boiling, microwave cooking and autoclaving processes caused significant ( $p < 0.05$ ) decreases in crude protein, crude fat, total ash, mineral compositions, and crude fibre content of *D.zibethinus* seeds. However, all heat treatments employed significantly ( $p < 0.05$ ) increased the moisture content and total carbohydrate content of *D.zibethinus* seeds. Heat treatments brought a total removal of ferum of treated *D.zibethinus* seeds. Raw and treated *D.zibethinus* seeds were evaluated for their antinutritional components including phytates, oxalates, saponins and tannins. Based on the results, raw *D.zibethinus* seeds showed the highest amount of phytates ( $864.94 \pm 12.24$  mg/100g), oxalates ( $217.98 \pm 5.00$  mg/100g), saponins ( $161.63 \pm 2.48$  mg/100g) and tannins ( $564.44 \pm 7.18$  mg/100g) while the least amount of antinutritional components were recorded in boiled *D.zibethinus* seeds with  $181.32 \pm 4.46$  mg/100g (79.04% reduction),  $105.55 \pm 13.07$  mg/100g (51.58% reduction),  $60.22 \pm 1.27$  mg/100g (62.74% reduction) and  $232.19 \pm 4.92$  mg/100g (58.79% reduction) for each phytates, oxalates, saponins and tannins respectively. All treatments conducted on *D.zibethinus* seeds caused significantly ( $p < 0.05$ ) decreases in the level of all antinutritional factors studied as compared to the raw seeds. Boiling caused the highest reduction in the level of antinutritional factors in *D.zibethinus* seeds followed by autoclaving and microwave cooking.

### c. Introduction

*Durio zibethinus* is a large seasonal crop in South East Asia. It is rather unknown outside that region due to the several problems relating to shipping and shelf life. Although certainly a matter of taste, it is regarded as a delicacy by most of the Asians. However, to many others, its smell is rather penetrating or even intolerable (Subhadrabandhu and Ketsa, 2002). Its shape is typically ranging from ovoid to nearly round-shaped, and characterized by a distinctive, strong, pungent, and penetrating odor (Foo and Hameed, 2011). According to Amiza *et al.* (2004), despite its prolific implementations in food manufacturing industries, such exertions are hampered by the massive generation of *D.zibethinus* residues, mainly in the form of shells, seeds, peels, and rinks that constitute about 70% of the entire fruits. However, the seed of *D.zibethinus*, which comprises about 20% - 25% of the entire fruit can be milled into flour and can be incorporated into some traditional foods such as cakes, biscuits, and tarts.

A study conducted by Haruenkit *et al.* (2010) showed that *D.zibethinus* possesses high nutritional and bioactive properties. The seeds of the *D.zibethinus* are very nutritious and rich in fibre (Amiza *et al.*, 2004). It is, however, despite their promising nutritional significance, they may contain some inherent antinutritional factors, which limit their nutritive value by exerting certain deleterious effects. Antinutritional components are any substances that can limit the utilization of nutrients in human body (Seena, 2005). Plants generally contain secondary metabolites which are biologically active, and some of them are known as antinutritional components. Tannins, phytates, trypsin inhibitors and others are the examples of antinutritional components present in the legume seeds (Khattab and Arntfield, 2009). However, several study conducted showed that levels of tannins, phytic acid, trypsin inhibitor, and oligosaccharides in mung beans, cowpea, pea and kidney bean seeds were drastically reduced after boiling, autoclaving, and microwave cooking (Mubarak, 2005; Khattab and Arntfield, 2009).