



**MICROBIAL CONTAMINATION OF DRIED CHILLIES,
CHILLI PASTES, AND CHILLI POWDER SOLD AT
RETAIL MARKET IN PENANG**

by

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LIST OF ABBREVIATIONS

AFs	Aflatoxins
BAM	Bacteriological Analytical Manual
BGLB	Brilliant Green Lactose Bile
BPW	Buffered Peptone Water
CFU	Colony Forming Unit
CIT	Citrinin
CYA	Czapek Yeast Agar
DG18	Dichloran Glycerol (DG18) Agar
DON	Deoxynivalenol
DRBC	Dichloran Rose-Bengal Chloramphenicol
GBC	Gallbladder cancer
IARC	International Agency for Research on Cancer
LST	Lauryl Sulphate Tryptose
MEA	Malt Extract Agar
MPN	Most Probable Number
OTA	Ochratoxin A
PCA	Plate Count Agar
PDA	Potato Dextrose Agar
RASFF	Rapid Alert System for Food and Feed
ST	Sterigmstocystin
TNTC	Too Numerous to Count

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- Appendix F Description of chilli samples sold at retail market in Penang.

KONTAMINASI MIKROB DALAM CILI KERING, PES CILI, DAN SERBUK CILI YANG DIJUAL DI PASARAN RUNCIT DI PULAU PINANG

ABSTRAK

Cili telah digunakan sebagai salah satu bahan utama dalam pelbagai hidangan tempatan di Malaysia untuk memberikan daya tarikan visual, warna dan rasa. Walau bagaimanapun, produk cili terdedah kepada pencemaran kulat terutamanya *Aspergillus* spp., *Fusarium* spp. dan *Penicillium* spp. semasa prapenanaman, penuaian, dan pascapenanaman sekiranya keadaan sesuai untuk pertumbuhannya manakala kebersihan produk cili masih tidak diketahui. Kajian ini bertujuan untuk mengetahui kontaminasi mikrob dalam cili kering, pes cili, dan serbuk cili yang dijual di pasar runcit di Pulau Pinang. Lima belas sampel cili dikumpulkan dan dianalisis untuk Jumlah Bilangan Plat (TPC), jumlah kolifom, jumlah kulat dan pengenalpastian kulat. Hasil kajian menunjukkan bahawa cili kering mempunyai jumlah mikrobiologi tertinggi dengan 1.0×10^4 CFU/g, diikuti dengan serbuk cili dengan 9.1×10^3 CFU/g manakala pes cili tidak mempunyai pertumbuhan bakteria iaitu $<1.0 \times 10^1$ CFU/g untuk TPC. Seterusnya, untuk jumlah kolifom, kebanyakan sampel memiliki <3.0 MPN/g menunjukkan bahawa majoriti produk cili di pasar runcit Pulau Pinang cili bebas dari kolifom. Di samping itu, jumlah kulat dalam sampel direkodkan antara $<1.0 \times 10^1$ CFU/g hingga 3.5×10^4 CFU/g. Cili kering merekodkan jumlah kulat yang tertinggi diikuti dengan serbuk cili dan pes cili. Spesies *Aspergillus* didapati dalam frekuensi tertinggi diikuti oleh spesies *Fusarium*. Hasil kajian ini menunjukkan bahawa produk cili boleh dikontaminasi oleh kulat semasa tempoh penyimpanan. Oleh itu, amalan pertanian dan pasca menuai yang baik sangat disyorkan untuk mengurangkan risiko pencemaran mikrob pada cili.

MICROBIAL CONTAMINATION OF DRIED CHILLIES, CHILLI PASTES, AND CHILLI POWDER SOLD AT RETAIL MARKET IN PENANG

ABSTRACT

Chillies have been used as one of the main ingredients in various local dishes in Malaysia to give visual appeals, colour, taste and hot sensation. However, chilli products are prone to fungal contamination especially *Aspergillus* spp., *Fusarium* spp. and *Penicillium* spp. during preharvest, harvest, and postharvest if the conditions are favourable for its growth and the hygiene of chilli products still uncertain. This study was aimed to determine the microbial contamination of dried chillies, chilli pastes, and chilli powder sold at retail market in Penang. Fifteen packaged chilli samples were collected and analysed for Total Plate Count (TPC), coliform count, total fungal count and fungal identification. Results showed that dried chillies had the highest microbiological load with 1.0×10^4 CFU/g, followed by chilli powder with 9.1×10^3 CFU/g meanwhile chilli paste had no bacterial growth which was $<1.0 \times 10^1$ CFU/g for TPC. Moreover, as for coliform count, majority of the samples had <3.0 MPN/g showed that chillies obtained from retail market in Penang free from coliform. In addition, total fungal count in chillies were ranged between $<1.0 \times 10^1$ CFU/g to 3.5×10^4 CFU/g. Dried chilli recorded the highest fungal load followed by chilli powder and chilli paste. *Aspergillus* spp. were found in high frequency followed by *Fusarium* spp. This findings showed that both storage fungi can contaminate chilli products. Thus good agricultural and post-harvest handling practices are highly recommended to reduce the risk of microbial contamination in chillies.