

DETERMINATION OF THE QUALITY OF ACTIVE INGREDIENTS IN PAIN KILLERS USING GC-MS

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Introduction

- ❖ Pain serves the useful function of alerting human when some component of their physiological system has gone wrong.
- ❖ Stimulus of pain is never easily defined nor readily removed and therefore it is necessary to treat the pain as symptom.
- ❖ Many pharmaceutical companies have ventured into the business of manufacturing over the counter drugs (OTC's) and this has led to the manufacture of pain relievers that reach the consumers with different branded names.
- ❖ Three common non-narcotic pain relievers are considered safe to be sold over the counter and include aspirin (acetylsalicylic acid), acetaminophen (4'-hydroxyacetanilide, commonly known as paracetamol)

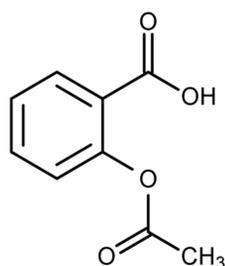


Figure 1: Aspirin

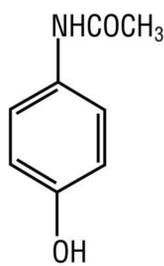


Figure 2: Acetaminophen

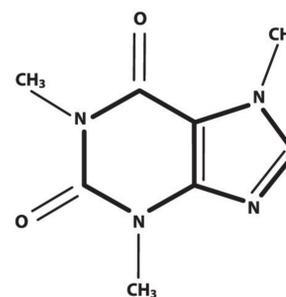


Figure 3: Caffeine

Objective

This study sought to determine the quality of acetaminophen (4'-hydroxyacetanilide), aspirin (acetylsalicylic acid) and caffeine (3,7-Dihydro-1,3,7-trimethyl-1-H-purine-2,6-dione) active ingredients in various pain relieving drugs currently dispensed in Kenya.

Methods

- ❖ Nine pain killers (panadol, action, hedex, maramoja, P500, P5500, elymol, neladol and APC tablets) were randomly bought from various shops around Nairobi, Kenya and taken to JKUAT laboratory for analysis.
- ❖ Extraction was done using dichloromethane (DCM).
- ❖ The DCM extracts were analyzed for quality of the active ingredients by gas chromatograph-mass Spectroscopy (GC-MS).
- ❖ GC-MS analysis was performed using 8--- series GC system with Trio-01 Ms detector in electron ionization (EI) mode. Separation was achieved with capillary column TFX-5 (30mX0.25mm I.D, 0.25 µm film).

Results

- ❖ Acetaminophen levels in panadol was comparable to Neladol and Elymol (455-560mg/tablet)

while hedex had the least (24mg/tablet). These values agreed well with the value on the label

on the blistered pack.

- ❖ The highest amount of aspirin was found in maramoja (937mg/tablet) followed by hedex (790mg/tablet).
- ❖ Panadol, Elymol and Neladol aspirin contents were below detectable limits.
- ❖ Maramoja (93mg/tablet) had high amounts of caffeine which was not significant to that of Action 980mg/tablet. Panadol (0.1mg/tablet) had the lowest caffeine content.

Table 1: Acetaminophen, caffeine and aspirin contents in selected pain killers.

Type of pain killer	Acetoaminophen (mean± s.d. n=6, mg/tablet)	Caffeine (mean± s.d. n=6, mg/tablet)	Asprin (mean± s.d. n=6, mg/tablet)
Panadol	474.5±49.8	0.1±0.0	BDL
Action	118.2±86.4	50.0±0.6	644.4±459.9
Hedex	24.876±6.4	80.4±23.0	790.9±167.0
Maramoja	61.7±33.6	92.9±22.4	937.3±84.9
P500	288.0±82.8	2.6±3.5	215.9±32.2
P5500	263.1±182.7	1.0±0.4	164.9±145.6
Elymol	565.8±79.1	4.6±2.7	BDL
Neladol	444.9±69.0	4.0±1.3	BDL
APC tablets	30.2±10.1	66.1±0.7	556.5±126.0

Conclusion

The outcome of this study suggests the possible availability of counterfeit drugs in the market. The brand mostly affected for analysis of acetaminophen were found in panadol, action, P500, P5500, elymol and neladol.

References:

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Acknowledgements

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