Evaluation of Antipyretic Effects of Ultrahigh Dilutions of Baptisia tinctoria in Comparison with Paracetamol

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ABSTRACT

Introduction: Homeopathy being an alternative treatment option has many controversies. The study aims to estimate the antipyretic effects of Baptisia tinctoria (200c and 1M ultrahigh dilutions) in animal fever model.

Methods: This study used Saccharomyces cerevisiae induced fever model. Animals were divided into 4 groups namely, negative control, positive control and Baptisia tinctoria 200c and 1M groups. During study, after each hour rectal temperature was checked. Paracetamol and homeopathic Baptisia tinctoria (200c and 1M) and paracetamol were given orally. One way statistical analysis was done with ANOVA followed by post hoc test. Significance level was p≤0.05.

Results: B. tinctoria in both potencies significantly reduced fever in rabbits compared to negative control group (p ≤ 0.05). At the end of study, paracetamol reduced by 2.5°F, while B. tinctoria 200c reduced by 1.7°F temperature and B. tinctoria 1M reduced by 1.9°F.

Conclusion: The study revealed that B. tinctoria showed its activity against fever, however, it has weaker action as compared to paracetamol.

Keywords: Antipyretic, Baptisia tinctoria, homeopathy, ultrahigh dilutions.

INTRODUCTION

Hyperpyrexia (fever) is an adaptive reaction to various inflammatory and infectious problems [1]. It can cause damage to the brain [2]. Several medicines in homeopathy are being traditionally used for fever. Some of the effective antipyretics include Aconitum napellus [3], Nux vomica [4], Typhoidinum [5] Belladonna and Pyrogenium [6].

Homeopathy works on the principle of similarity that the medicine having similarity to disease picture could treat the disease [7]. Baptisia is a remedy for septic states especially septicemia that comes on rapidly, have low-grade fever type and have a short duration of action [8]. S. cerevisiae induced pyrexia model was used to induce fever. S. cerevisiae causes elevation in temperature by elevating plasma levels of inflammatory cytokines [9-11]. Several studies in literature used S. cerevisiae induced pyrexia model [9, 11-16].

Literature search showed that no study was done to evaluate antipyretic effects of homeopathic medicine...
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*Baptisia tinctoria*. The current investigation was done primarily to examine if *Baptisia tinctoria* ultrahigh dilutions could show antipyretic activity in *S. cerevisiae* induced pyrexia model.

## MATERIALS AND METHODS

### Materials

Paracetamol GlaxoSmithKline, Pakistan, Limited, *Baptisia tinctoria* 200c (Lot No. 9161211), *Baptisia tinctoria* 1M (Lot No. 7020207), *Saccharomyces cerevisiae*, normal saline, distilled water, digital thermometer were used.

### System Performance Controls

Paracetamol was used as positive control of the experiment and administered to one group contained 6 rabbits. It was administered orally at the dosage of 150 mg/kg body weight. Alcohol (5 drops of medicine in purified water) was used as negative control and given orally to one group contained 6 rabbits.

### Quality Control

For experiment conduction, 3 persons were trained for animal handling. Animals were carefully and gently held and treated during temperature measurement to minimize stress-induced hyperthermia. Only skilled persons were allowed to handle and measure the temperature of rabbits.

### Animals

Adult healthy rabbits of local strain were purchased from the market. The weight of rabbits ranged from 1000 to 1700 grams, and both male and female rabbits were included in the study. All the animals stayed in the air-conditioned animal house situated in Railway Campus, The Islamia University Bahawalpur. Standard diet and water were provided *ad libitum*.

Acclimatization for 7 days prior to study was carried out.

### Ethics Approval

The study was approved by Pharmacy Research Ethics Committee (PREK), The Islamia University of Bahawalpur, Pakistan (88-2015/PREC).

### Experimental Setup

Rabbits were divided in four groups each having animals. The activity was performed according to methodology of Ahamd *et al.* [5]. >1°F increase in temperature of rabbits was inclusion criteria. Group 1 and 2 were control groups namely negative control (Alcohol) and positive control (Paracetamol). Group 3 and 4 were experimental groups and received *B. tinctoria* 1M and 200c, respectively.

### Intervention

Paracetamol was administered orally at the dosage of 150 mg/kg [13] after 4 h of yeast injection. *B. tinctoria* 1M and 200c were given through oral route after mixing in purified water (5cc). All homeopathic medicines were given after 4 hours of yeast injection.

### Statistical Methods

Results and data obtained by this study were evaluated using SPSS (I.B.M.SPSS. statistics.v20_32bit_oxava.com). ANOVA followed by post hoc test was used for checking any statistical significance. \( P <0.05 \) was taken as significant.

### RESULTS

Table 1 described the baseline characteristics of different groups. At the 4th hour after yeast administration temperature of more than 1°F was raised in all the rabbits.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Negative Control</th>
<th>Paracetamol</th>
<th><em>B. tinctoria</em> 200C</th>
<th><em>B. tinctoria</em> 1M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body weight (kg)</td>
<td>102.6 ± 0.31</td>
<td>1.3 ± 0.07</td>
<td>1.3 ± 0.09</td>
<td>1.3 ± 0.08</td>
</tr>
<tr>
<td>Temperature (°F)</td>
<td>102.6 ± 0.31</td>
<td>102.2 ± 0.86</td>
<td>102.6 ± 0.22</td>
<td>102.7 ± 0.25</td>
</tr>
</tbody>
</table>
Table 2 showed the temperature variation of negative control group was continuously increased till the 8th hour of study from 102.6 to 104.9. Afterwards slight decrease in temperature was observed. Paracetamol, positive control of study, decreased the temperature markedly during first hour of study. However, a slight increase of temperature was seen that was going to normal temperature in the 10th hour of the experiment. *B. tinctoria* 1M group showed an increase of 1.9°F temperature after 4th hour of administration of baker’s yeast. Medicine showed a gradual decrease of temperature from 104.6°F to 104.1°F in first hour (p value 0.203), at 2nd hour of medicine administration to 103.9°F (p value 0.06), at 3rd hour to 102.9°F (p value <0.001), at 4th hour to 102.7°F (p value <0.001), at 5th hour to 102.8°F (p value 0.001) and again showed decrease of temperature to 102.7°F (p value 0.041) in 6th hour of medicine administration. “*B. tinctoria* 200c” group showed an increase of temperature from 102.6 ± 0.22°F to 104.3±.26°F after 4 hour of yeast administration. After 1 hour of *B. tinctoria* 200c administration, temperature decreased to 103.8 ± 0.47°F (p value 0.08), at 2nd hour temperature decreased to 103 ± 0.31°F (p value <0.001), at 3rd hour temperature decreased to 102.4±.56°F (p value <0.001), at 5th hour temperature decreased to 103±.25°F (p value 0.004), at 6th hour temperature decreased towards normal baseline temperature (p value 0.021). Figure 1 compares antipyretic effects of both potencies of *B. tinctoria* with paracetamol.

**Table 2. Antipyretic effects of homeopathic ultrahigh dilutions.**

<table>
<thead>
<tr>
<th>No.</th>
<th>Treatment</th>
<th>Rectal Temperature °F</th>
<th>Rectal Temperature °F after Medicine Administration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dose</td>
<td>0 hour</td>
<td>4th hour</td>
</tr>
<tr>
<td>Negative Control</td>
<td>Five drops</td>
<td>102.6± 0.31</td>
<td>104.1± 0.26</td>
</tr>
<tr>
<td>90% Ethanol (Vehicle)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paracetamol</td>
<td>150 mg/kg</td>
<td>102.2± 0.86</td>
<td>105.0± 0.50</td>
</tr>
<tr>
<td><em>Baptisia tinctoria</em> 1M</td>
<td>Five drops</td>
<td>102.7± 0.25</td>
<td>104.6± 0.25</td>
</tr>
<tr>
<td><em>Baptisia tinctoria</em> 200C</td>
<td>Five drops</td>
<td>102.6± 0.22</td>
<td>104.3± 0.26</td>
</tr>
</tbody>
</table>

Note: *p ≤0.05, **p ≤0.01, ***p ≤ 0.001 compared to negative control. The data is represented as Mean ± S.E.M N=6, Reading at 0 hour is temperature before *S. cerevisae* injection, 4th hour reading is after fever induction, afterwards hourly readings are after medicine administration reading.
DISCUSSION

*B. tinctoria* ultrahigh dilutions reduced *S. cerevisiae* induced pyrexia significantly as compared to paracetamol. Baker’s yeast causes fever by releasing prostaglandin [9] and antipyretics decrease temperature by reducing PG [17, 18]. Paracetamol 150 mg/kg by oral route reduced *S. cerevisiae* induced pyrexia sufficient to reach statistical significance. Paracetamol act by acting on cyclooxygenase [19]. Other studies also depicts similar findings [3, 13, 20].

Homoeopathic medicine *B. tinctoria* reduced baker’s yeast induced fever so it can be assumed that these medicines could play role in reducing PG and cytokine production. However, homeopathic medicines are hypothesized to control inflammation through stimulation of vital force [21]. In selection of homoeopathic medicines, not only local symptoms but the whole pathophysiological characteristic symptoms are considered [7, 21]. In homeopathy, the similarity between drug-specific pathogenesis ‘remedy picture’ and disease-specific individual status is a crucial factor in cure [22]. *B. tinctoria* is a remedy for blood poisons and septic states with low grade fever [8]. In current study, it reduced temperature significantly in few hours, but the effect was not permanent, nor strong. *S. cerevisiae* caused high grade fever during the study. Lack of complete similarity between disease condition and remedy picture might be responsible for slow decreasing of temperature by *B. tinctoria* ultrahigh dilutions as compared to paracetamol. Some other studies described the slow antipyretic effect of *A. napellus* and Typhoidinum against *S. cerevisiae* induced pyrexia due to lack of similarity of causative factor [3, 5]. The effects of *B. tinctoria* ultrahigh dilutions should be evaluated on *Salmonella typhi* induced fever as it has more similarity with typhoid fever type. It can be hypothesized that medicine will be more effectively work in *S. typhi* induced fever due to low grade fever similarity. Moreover, previous studies showed Nux vomica and Pyrogenium as effective remedies in *S. cerevisiae* induced pyrexia on the basis of some similarity of these medicines with *S. cerevisiae* induced pyrexia [4, 6]. It is poorly understood that how these medicines work however these medicines exert effects in experimental models and clinical trials [23, 24].

CONCLUSION

In conclusion, homoeopathic medicine *B. tinctoria* has weak but significant antipyretic effect against *S. cerevisiae* induced pyrexia, however, it could be important alternative antipyretic when criteria of similarity is met. Homeopathic medicines worked well when criteria of similarity met entirely. If there is a partial similarity, then results are slower or sometimes none.

REFERENCES


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