قسم: الصحة ووافقه الأغذية - كلية الطب البيطرى - جامعة القاهرة.
رئيس القسم: أ/ محمد عبد الرحمن عوض

هذا تواجد الميكروبات المنقوذة الذهبية في الجين الطري

عبدو العشماوي

جمعت 200 عينة من الجين الطري من البائعيين في مدينة بغداد، وتم فحصها...

لمعرفة نسبة تواجد الميكروبات المنقوذة الذهبية.

دلت النتائج على أن متوسط الحد الكلي للميكروبات 288 x 10^5 / جم، كما أوضح أن 54% من عينات الجين الطري تحتوي على أكثر من 10^6 / جم. ولم توجد علاقة أحيائية بين عدد الميكروبات ودرجة التركيز المائي وجسيما في العينات، وكانت مستويات الميكروبات المنقوذة ذات مقاومة عالية للإنسولين، الاسترويدين، أسيكسيفين، أسيكلويسين، وذات حساسية لكل من الجيرازيبين، دينازيبين، ريفامبين وباركلازيبين.

وأظهرت بعض المستحاثات بيضاء اللون مقاومة عالية للإضدادات الحيوية من العناصر الحرة.

تم مناقشة الأهمية الصحية للميكروبات المنقوذة - كما توقفت الشروط الصحية الواقي توازنها في النتائج للجين.
OCCURANCE OF COAGULASE-POSITIVE STAPHYLOCOCCI IN SOFT CHEESE
(With 5 Tables)

By

A.M. AL-ASHMAWY
(Received at 3/6/1981)

SUMMARY

Two hundred samples of soft cheese, collected from different retailers in Baghdad City, were examined for incidence of coagulase-positive Staph. aureus. The average count of coagulase-positive Staph. aureus per gram cheese was 28.88 x 10^5. 52% of cheese samples proved to contain 10^7/g coagulase-positive Staphylococci.

No correlation could be detected between pH value and the number of Staph. aureus in examined samples.

Isolated strains were highly resistant to Penicillin, Streptomycin and Ampicillin, while they were sensitive to Carbenicillin, Tetracyclin, Rifampin and Erythromycin. White colonies showed more resistance to antibiotics than golden-yellow colonies of isolated Staph. aureus.

The public health importance of isolated organisms as well as recommended hygienic measures for cheese making are discussed.

INTRODUCTION

The great majority of cheese produced in Iraq is the soft salted variety, which has the property of being palatable under normal storage conditions for many weeks in a brine solution. It is prepared from cow's, sheep's or goat's milk which is raw or inadequately heated. Therefore, serious problems of food poisoning outbreaks may arise among consumers. In Iraq, sporadic food poisoning cases have occurred in factories and hospitals following consumption of soft cheese, but no systematic work has been done to establish the incidence and role of enterotoxigenic Staphylococci in this connection. In view of the high incidence of Staphylococcal mastitis in cows, sheep and goats (KAPLAN et al., 1962 and ABDAL-KARIM & EL-ASHMAWY, 1979), the low standard of sanitation in the production and handling of milk and milk products, besides the environmental condition that favours the growth of existing staphylococci during storage, render the cheese unsafe for consumption due to performed enterotoxin.

The present investigation aimed to throw light on the incidence of coagulase-positive Staphylococci in soft cheese marketed in Baghdad and to study sensivity of isolated strains to antibiotics.

MATERIAL and METHODS

Two hundred samples of soft cheese, collected from different retailers in Baghdad city, were examined for enumeration of coagulase-positive Staph. aureus using egg yolk salt medium. Suspected colonies were confirmed by coagulase test (AOAC, 1970). Isolates were further identified according to COWAN and STEEL (1970). Sensitivity of isolates to 9 antibiotics were determined according to BLAIR et al. (1970).

The pH value of each sample was determined by using Pye Potentiometer (Model 293, PYE).

RESULTS

Tables 1-5 showed the obtained results.

DISCUSSION

The results reported in table (1) reveal that the average count of coagulase-positive Staph. aureus/g cheese was 28.88 x 10^5 ± 5.19 x 10^5 (3.9 x 10^7 - 6.7 x 10^7). The count of golden-yellow colonies of Staph. aureus ranged from 10^2 to 3.7 x 10^7, with a mean value of 10.8 x 10^5 ± 3.1 x 10^5. Frequency distribution of examined
samples showed that 52% of cheese samples contained coagulase-positive Staph. aureus $10^6$/g (Table 2).

Incidence of coagulase-positive Staphylococcal count in soft cheese were reported by BIRZU et al. (1968); IENISTEA et al. (1971); GHAVINIAN et al. (1975) and HELMY et al. (1975).

Some investigators stated that presence of coagulase-positive Staphylococci to a levels of one million per gram cheese results in production of detectable amount of toxins in cheese (CASHAN & BENNETT, 1965 and TATINI et al., 1970). Therefore, most of examined samples of cheese should be looked upon with suspicious as constituting a potential health hazard.

Moreover, statistical analysis of results showed that no correlation between the pH value and Staphylococcal count in examined samples exists. This finding agrees with those reported by WALKER et al. (1961).

The findings reported in table 3 show that isolated golden-yellow colonies of Staph. aureus induced mostly beta-haemolysis, while the white colonies produced mainly alpha-haemolysis or being non-haemolytic.

It has been reported that beta-haemolysis is associated with strains of bovine origin, while that of human strains produce predominantly alpha-haemolysis (EDWARD & PIPIMON, 1957; PARISI & BALDWIN, 1963 and HARRAH & MARHAM, 1966).

It worth mentioning that most of isolated white colonies reacted positively to coagulate test. A finding that substantiate what has been reported by WUTH (1971).

It is evident from the results given in tables (465) that isolated strains of coagulase-positive Staphylococci were highly resistant to Penicillin, Streptomycin and Ampicillin, but they were more sensitive to Caracmycin, Tetracyclin, Rifampin and Erythromycin. This finding coincides with that reported by PERTICA et al. (1966); LUKASOVA (1969); KUSCH et al. (1972) and DEVOOGD & MILLET (1974). Isolated white colonies of Staphylococci showed increased resistance to antibiotics than the golden-yellow colonies.

MAYER (1975) reported that toxin production was much more frequent among the antibiotics-resistant strains.

To control Staphylococcal enterotoxin gastroenteritis, it is difficult to ensure the complete exclusion of the organism in cheese as staphylococci are ubiquitous in nature. The main efforts should be directed towards preventing the multiplication of contaminating Staphylococci, thus decreasing enterotoxin production. Milk should be cooled as soon as possible to 10°C or below until processed. Workers with sinus infections or recurrent boils or colds should be prevented from sharing in processing or handling dairy products. In conclusion, strict hygienic measures should be adopted during manufacturing, handling and storage of dairy products.

Table (1): Statistical results of staphylococcal count/g and pH value in the examined samples

<table>
<thead>
<tr>
<th></th>
<th>Min.</th>
<th>Max.</th>
<th>Mean $\pm$ S.E.M.</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH value</td>
<td>5.0</td>
<td>6.8</td>
<td>6.16 $\pm$ 0.0717</td>
</tr>
<tr>
<td>Count of coagulate positive staphylococci</td>
<td>$3.9 \times 10^3$</td>
<td>$6.7 \times 10^7$</td>
<td>$28.85 \times 10^5$ $\pm$ $5.19 \times 10^5$</td>
</tr>
<tr>
<td>Count of golden-yellow colonies.</td>
<td>$10^2$</td>
<td>$3.7 \times 10^7$</td>
<td>$10.80 \times 10^7$ $\pm$ $3.10 \times 10^5$</td>
</tr>
</tbody>
</table>
## STAPHYLOCOCCI IN SOFT CHEESE

Table (2): Frequency distribution of staphylococcal count/g in examined samples

<table>
<thead>
<tr>
<th>Range</th>
<th>No. of samples</th>
<th>No. of coagulase-positive staphylococci</th>
<th>%</th>
<th>Golden-yellow colonies of Staph. Aureus</th>
<th>No. of samples</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>$10^2$ - $10^3$</td>
<td>2</td>
<td>1.00</td>
<td>38</td>
<td>2.63</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$10^3$ - $10^4$</td>
<td>2</td>
<td>9.50</td>
<td>69</td>
<td>36.32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$10^4$ - $10^5$</td>
<td>75</td>
<td>37.50</td>
<td>57</td>
<td>30.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$10^5$ - $10^6$</td>
<td>92</td>
<td>46.00</td>
<td>15</td>
<td>7.90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$10^6$ - $10^7$</td>
<td>12</td>
<td>6.00</td>
<td>6</td>
<td>3.15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
<td>$100.00$</td>
<td>190</td>
<td>$100.00$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table (3): Comparison between coagulase-positive strains of Staph. aureus isolated from cheese

<table>
<thead>
<tr>
<th>No. of isolates</th>
<th>Phosphatase</th>
<th>B-Heamolysis</th>
<th>Haemolysis</th>
<th>non-heamolytic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Golden-yellow colonies</strong></td>
<td>156</td>
<td>112</td>
<td>71.79</td>
<td>50</td>
</tr>
<tr>
<td><strong>White colonies</strong></td>
<td>159</td>
<td>106</td>
<td>66.67</td>
<td>25</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>315</td>
<td>218</td>
<td>69.20</td>
<td>75</td>
</tr>
</tbody>
</table>

Table (4): The incidence of the sensitive and resistant strains of Staph. aureus (golden-yellow colonies) to antibiotics

<table>
<thead>
<tr>
<th>Antibiotic agent</th>
<th>Disk potency</th>
<th>Resistant strains</th>
<th>Sensetive strains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetracycline</td>
<td>5 mcg</td>
<td>30</td>
<td>19.23</td>
</tr>
<tr>
<td>Ampicillin</td>
<td>10 mcg</td>
<td>42</td>
<td>26.92</td>
</tr>
<tr>
<td>Rifampin</td>
<td>5 mcg</td>
<td>30</td>
<td>19.23</td>
</tr>
<tr>
<td>Dihydrostreptomycin</td>
<td>10 mcg</td>
<td>67</td>
<td>42.95</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>15 mcg</td>
<td>17</td>
<td>10.90</td>
</tr>
<tr>
<td>Streptomycin</td>
<td>10 mcg</td>
<td>59</td>
<td>37.82</td>
</tr>
<tr>
<td>Caracycin</td>
<td>30 mcg</td>
<td>21</td>
<td>13.46</td>
</tr>
<tr>
<td>Ampicillin</td>
<td>2 mcg</td>
<td>62</td>
<td>39.74</td>
</tr>
<tr>
<td>Pienicillin</td>
<td>10 mcg</td>
<td>58</td>
<td>37.18</td>
</tr>
</tbody>
</table>

S: Susceptible.
M: Moderately Susceptible.

Table (5): The incidence of the sensitive and resistant strains of Staph. aureus (white colonies) to antibiotics

<table>
<thead>
<tr>
<th>Antibiotic agent</th>
<th>Disk potency</th>
<th>Resistant strains</th>
<th>Sensetive strains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetracycline</td>
<td>5 mcg</td>
<td>34</td>
<td>21.38</td>
</tr>
<tr>
<td>Ampicillin</td>
<td>10 mcg</td>
<td>71</td>
<td>44.65</td>
</tr>
<tr>
<td>Rifampin</td>
<td>5 mcg</td>
<td>36</td>
<td>23.90</td>
</tr>
<tr>
<td>Dihydrostreptomycin</td>
<td>10 mcg</td>
<td>75</td>
<td>47.17</td>
</tr>
<tr>
<td>Erythramycin</td>
<td>15 mcg</td>
<td>57</td>
<td>35.85</td>
</tr>
<tr>
<td>Streptomycin</td>
<td>10 mcg</td>
<td>67</td>
<td>42.13</td>
</tr>
<tr>
<td>Caracycin</td>
<td>30 mcg</td>
<td>37</td>
<td>23.27</td>
</tr>
<tr>
<td>Ampicillin</td>
<td>2 mcg</td>
<td>83</td>
<td>52.20</td>
</tr>
<tr>
<td>Pienicillin</td>
<td>10 mcg</td>
<td>63</td>
<td>52.20</td>
</tr>
</tbody>
</table>

REFERENCES


