LAMPIRAN

1. Hasil Perhitungan densitas

$$\text{Densitas} = \frac{\text{berat piknometer isi – berat pikometer kosong}}{\text{Volume piknometer}} \times 100\%$$

1.1 minyak kelapa murni hasil santan murni

Densitas = $\frac{20{,}04-10{,}88}{10}$ x 100%

= 0,916

1.2 minyak kelapa dengan rhizopus oligosporus

Densitas = $\frac{20{,}14-10{,}94}{10}$

= 0,920

2. Hasil perhitungan volume minyak (%)

2.1 minyak kelapa murni hasil santan murni pada t= 3 menit

% minyak (1700 rpm)= $\frac{1{,}3\ ml}{10\ ml}$ x 100% = 13%

% minyak (2100 rpm)= $\frac{1{,}3\ ml}{10\ ml}$x 100% = 13%

% minyak (2500 rpm)= $\frac{1{,}4\ ml}{10\ ml}$x 100% = 14%

% minyak (2900 rpm)= $\frac{1{,}5ml}{10\ ml}$x 100% = 15%

% minyak (3300 rpm)= $\frac{1{,}5\ ml}{10\ ml}$x 100% = 15%

2.2 minyak kelapa murni hasil santan murni pada t= 5 menit

% minyak (1700 rpm)= $\frac{2{,}1\ ml}{10\ ml}$ x 100% = 21%

% minyak (2100 rpm)= $\frac{2{,}2\ ml}{10\ ml}$x 100% = 22%

% minyak (2500 rpm)= $\frac{2{,}3\ ml}{10\ ml}$x 100% = 23%

% minyak (2900 rpm)= $\frac{2,4ml}{10\ ml}$x 100% = 24%

% minyak (3300 rpm)= $\frac{2,5\ ml}{10\ ml}$x 100% = 25%

2.3 minyak kelapa murni hasil santan murni pada t= 7 menit

% minyak (1700 rpm)= $\frac{2,6\ ml}{10\ ml}$ x 100% = 26%

% minyak (2100 rpm)= $\frac{2,7\ ml}{10\ ml}$x 100% = 27%

% minyak (2500 rpm)= $\frac{2,7\ ml}{10\ ml}$x 100% = 27%

% minyak (2900 rpm)= $\frac{2,9\ ml}{10\ ml}$x 100% = 29%

% minyak (3300 rpm)= $\frac{2,9\ ml}{10\ ml}$x 100% = 29%

2.4 minyak kelapa murni hasil santan murni pada t= 9 menit

% minyak (1700 rpm)= $\frac{2,9\ ml}{10\ ml}$ x 100% = 29%

% minyak (2100 rpm)= $\frac{3,0\ ml}{10\ ml}$x 100% = 30%

% minyak (2500 rpm)= $\frac{3,1\ ml}{10\ ml}$x 100% = 31%

% minyak (2900 rpm)= $\frac{3,1ml}{10\ ml}$x 100% = 31%

% minyak (3300 rpm)= $\frac{3,1\ ml}{10\ ml}$x 100% = 31%

2.5 minyak kelapa murni hasil santan murni pada t= 3 menit

% minyak (1700 rpm)= $\frac{3,3\ ml}{10\ ml}$ x 100% = 33%

% minyak (2100 rpm)= $\frac{3,4\ ml}{10\ ml}$x 100% = 34%

% minyak (2500 rpm)= $\frac{3,4\ ml}{10\ ml}$x 100% = 34%

% minyak (2900 rpm)= $\frac{3,4ml}{10\ ml}$ x 100% = 34%

% minyak (3300 rpm)= $\frac{3{,}5\ ml}{10\ ml}$x 100% = 35%

2.6 minyak kelapa murni dengan rhizopus oligosporus pada t= 3 menit

% minyak (1700 rpm)= $\frac{1{,}6\ ml}{10\ ml}$ x 100% = 16%

% minyak (2100 rpm)= $\frac{1{,}6\ ml}{10\ ml}$x 100% = 16%

% minyak (2500 rpm)= $\frac{1{,}8\ ml}{10\ ml}$x 100% = 18%

% minyak (2900 rpm)= $\frac{1{,}9ml}{10\ ml}$x 100% = 19%

% minyak (3300 rpm)= $\frac{2{,}0\ ml}{10\ ml}$x 100% = 20%

2.7 minyak kelapa murni dengan rhizopus oligosporus pada t= 5 menit

% minyak (1700 rpm)= $\frac{1{,}6\ ml}{10\ ml}$ x 100% = 17%

% minyak (2100 rpm)= $\frac{2{,}0\ ml}{10\ ml}$x 100% = 20%

% minyak (2500 rpm)= $\frac{2{,}0\ ml}{10\ ml}$x 100% = 20%

% minyak (2900 rpm)= $\frac{2{,}1ml}{10\ ml}$x 100% = 21%

% minyak (3300 rpm)= $\frac{2{,}1ml}{10\ ml}$x 100% = 21%

2.8 minyak kelapa murni dengan rhizopus oligosporus pada t= 7 menit

% minyak (1700 rpm)= $\frac{2{,}7\ ml}{10\ ml}$ x 100% = 27%

% minyak (2100 rpm)= $\frac{2{,}8\ ml}{10\ ml}$x 100% = 28%

% minyak (2500 rpm)= $\frac{3{,}0\ ml}{10\ ml}$x 100% = 30%

% minyak (2900 rpm)= $\frac{3{,}1ml}{10\ ml}$x 100% = 31%

% minyak (3300 rpm)= $\frac{3{,}1ml}{10\ ml}$x 100% = 31%

2.9 minyak kelapa murni dengan rhizopus oligosporus pada t= 9 menit

% minyak (1700 rpm)= $\frac{2{,}9\ ml}{10\ ml}$ x 100% = 29%

% minyak (2100 rpm)= $\frac{3{,}0\ ml}{10\ ml}$x 100% = 30%

% minyak (2500 rpm)= $\frac{3{,}3\ ml}{10\ ml}$x 100% = 33%

% minyak (2900 rpm)= $\frac{3{,}3ml}{10\ ml}$x 100% = 33%

% minyak (3300 rpm)= $\frac{3{,}5ml}{10\ ml}$x 100% =35%

2.10 minyak kelapa murni dengan rhizopus oligosporus pada t= 12 menit

% minyak (1700 rpm)= $\frac{4{,}1\ ml}{10\ ml}$ x 100% = 41%

% minyak (2100 rpm)= $\frac{4{,}3\ ml}{10\ ml}$x 100% = 43%

% minyak (2500 rpm)= $\frac{4{,}4\ ml}{10\ ml}$x 100% = 44%

% minyak (2900 rpm)= $\frac{4{,}7ml}{10\ ml}$x 100% = 47%

% minyak (3300 rpm)= $\frac{4{,}9ml}{10\ ml}$x 100% = 49%

3. Perhitungan % kesalahan

3.1 perhitungan % kesalahan pada waktu 3 menit

y = 0,0015(x)+10,25

y1 = 0,0015(1700)+10,25

= 2,55 + 10,25

= 12,8

y2 = 0,0015(2100)+10,25

= 3,15 + 10,25

= 13,4

y3 = 0,0015(2500)+10,25

= 3,75 + 10,25

= 14

y4 = 0,0015(2900)+10,25

= 4,35 + 10,25

=14,6

y5 = 0,0015(3300)+10,25

= 4,95 + 10,25

= 15,2

% kesalahan y1 = $\frac{12,8-13}{12,8}$ x 100 % = 1,56%

% kesalahan y2 = $\frac{13,4-13}{13,4}$ x 100 % = 2,98%

% kesalahan y3 = $\frac{14-14}{14}$ x 100 % = 0%

% kesalahan y4= $\frac{14,6-15}{14,6}$ x 100 % = 2,73%

% kesalahan y5 = $\frac{15,2-15}{15,2}$ x 100 % = 1,31%

%kesalahan rata-rata = $\frac{(1,56+2,98+0+2,73+1,31)\%}{5}$

= 1,71%

3.2 perhitungan % kesalahan pada waktu 5 menit

y = 0,0025(x)+16,75

y1 = 0,0025(1700)+16,75

= 4,25 + 16,75

= 21

y2 = 0,0025(2100)+16,75

= 5,25 + 16,75

= 22

y3 = 0,0025(2500)+16,75

= 6,25 + 16,75

= 23

y4 = 0,0025(2900)+ 16,75

= 7,25 + 16,75

=24

y5 = 0,0015(3300)+ 16,75

= 8,25 + 16,75

= 25

% kesalahan y1 = $\frac{21-21}{21}$ x 100 % = 0%

% kesalahan y2 = $\frac{22-22}{22}$ x 100 % = 0%

% kesalahan y3 = $\frac{23-23}{23}$ x 100 % = 0%

% kesalahan y4= $\frac{24-24}{24}$ x 100 % = 0%

% kesalahan y5 = $\frac{25-25}{25}$ x 100 % = 0%

%kesalahan rata-rata = $\frac{(0+0+0+0+0)\%}{5}$

= 0%

3.3 perhitungan % kesalahan pada waktu 7 menit

y = 0,002(x)+22,6

y1 = 0,002(1700)+ 22,6

= 3,4 + 22,6

= 26

y2 = 0,002(2100)+ 22,6

= 4,2+ 22,6

= 26,8

y3 = 0,002(2500)+ 22,6

= 5 + 22,6

= 27,6

y4 = 0,002(2900)+ 22,6

= 5,8 + 22,6

= 28,4

y5 = 0,002(3300)+ 22,6

= 6,6 + 22,6

= 29,2

% kesalahan y1 = $\frac{26-26}{26}$ x 100 % = 0%

% kesalahan y2 = $\frac{26,8-27}{26,8}$ x 100 % = 0,74%

% kesalahan y3 = $\frac{27,6-27}{27,6}$ x 100 % = 2,17%

% kesalahan y4= $\frac{28,4-29}{28,4}$ x 100 % = 2,11%

% kesalahan y5 = $\frac{29,2-29}{29,2}$ x 100 % = 0,68%

%kesalahan rata-rata = $\frac{(0+0,74+2,17+2,11+0,68)\%}{5}$

= 1,14%

3.4 perhitungan % kesalahan pada waktu 9 menit

y = 0,0013(x)+27,275

y1 = 0,0013 (1700)+ 27,275

= 2,21 + 27,275

= 29,485

y2 = 0,0013 (2100)+ 27,275

= 2,73+ 27,275

= 30,005

y3 = 0,0013 (2500)+ 27,275

= 3,25 + 27,275

= 30,525

y4 = 0,0013 (2900)+ 27,275

= 3,77 + 27,275

= 31,045

y5 = 0,0013 (3300)+ 27,275

= 4,29 + 27,275

= 31,565

% kesalahan y1 = $\frac{29,485-29}{29.485}$ x 100 % =1,64%

% kesalahan y2 = $\frac{30,005-30}{30,005}$ x 100 % = 0,02%

% kesalahan y3 = $\frac{30,525-31}{30,525}$ x 100 % = 1,55%

% kesalahan y4= $\frac{31,045-31}{31,045}$ x 100 % = 0,14%

% kesalahan y5 = $\frac{31,565-31}{31,565}$ x 100 % = 1,78%

%kesalahan rata-rata = $\frac{(1,64+0,02+1,55+0,14+1,78)\%}{5}$

= 1,026%

3.5 perhitungan % kesalahan pada waktu 12 menit

y = 0,001(x)+31,5

y1 = 0,001 (1700)+ 31,5

= 1,7 + 31,5

= 33,2

y2 = 0,001 (2100)+ 31,5

= 2,1+ 31,5

= 33,6

y3 = 0,001 (2500)+ 31,5

= 2,5 + 31,5

= 34

y4 = 0,001 (2900)+ 31,5

= 2,9 + 31,5

= 34,4

y5 = 0,001 (3300)+ 31,5

= 3,3 + 31,5

= 34,8

% kesalahan y1 = $\frac{33,2-33}{33,2}$ x 100 % =0,6%

% kesalahan y2 = $\frac{33,6-34}{33,6}$ x 100 % = 1,19%

% kesalahan y3 = $\frac{34-34}{34}$ x 100 % = 0%

% kesalahan y4= $\frac{34,4-34}{34,4}$ x 100 % = 1,16%

% kesalahan y5 = $\frac{34,8-35}{34,8}$ x 100 % = 0,57%

%kesalahan rata-rata = $\frac{(0,6+1,19+0+1,16+0,57)\%}{5}$

= 0,7%

3.6 perhitungan % kesalahan pada waktu 3 menit

y = 0,0028(x)+10,925

y1 = 0,0028 (1700)+ 10,925

= 4,76 + 10,925

= 15,685

y2 = 0,0028 (2100)+ 10,925

= 5,88+ 10,925

= 16,805

y3 = 0,0028 (2500)+ 10,925

= 7 + 10,925

= 17,925

y4 = 0,0028 (2900)+ 10,925

= 8,12 + 10,925

= 19,045

y5 = 0,0028 (3300)+ 10,925

= 9,24 + 10,925

= 20,165

% kesalahan y1 = $\frac{15,685-16}{15,685}$ x 100 % =2%

% kesalahan y2 = $\frac{16,805-16}{16,805}$ x 100 % = 4,79%

% kesalahan y3 = $\frac{17,925-18}{17,925}$ x 100 % = 0,41%

% kesalahan y4= $\frac{19,045-19}{19,045}$ x 100 % = 0,23%

% kesalahan y5 = $\frac{20,165-20}{20,165}$ x 100 % = 0,81%

%kesalahan rata-rata = $\frac{(2+4,79+0,41+0,23+0,81)\%}{5}$

= 1,64%

3.7 perhitungan % kesalahan pada waktu 5 menit

y = 0,0023(x)+14,175

y1 = 0,0023 (1700)+ 14,175

= 3,91 + 14,175

= 18,085

y2 = 0,0023 (2100)+ 14,175

= 4,83+ 14,175

= 19,005

y3 = 0,0023 (2500)+ 14,175

= 5,75 + 14,175

= 19,925

y4 = 0,0023 (2900)+ 14,175

= 6,67 + 14,175

= 20,845

y5 = 0,0023 (3300)+ 14,175

= 7,59 + 14,175

= 21,765

% kesalahan y1 = $\frac{18,085-17}{18,085}$ x 100 % =5,99%

% kesalahan y2 = $\frac{19,005-20}{19,005}$ x 100 % = 5,23%

% kesalahan y3 = $\frac{19,925-20}{19,925}$ x 100 % = 0,37%

% kesalahan y4= $\frac{20,845-21}{20,845}$ x 100 % = 0,74%

% kesalahan y5 = $\frac{21,765-21}{21,765}$ x 100 % = 3,51%

%kesalahan rata-rata = $\frac{(5,99+5,23+0,37+0,74+3,51)\%}{5}$

= 3,168%

3.8 perhitungan % kesalahan pada waktu 7 menit

y = 0,0028(x)+22,525

y1 = 0,0028 (1700)+ 22,525

= 4,76 + 22,525

= 27,285

y2 = 0,0028 (2100)+ 22,525

= 5,88+ 22,525

= 28,405

y3 = 0,0028 (2500)+ 22,525

= 7 + 22,525

= 29,525

y4 = 0,0028 (2900)+ 22,525

= 8,12 + 22,525

= 20,845

y5 = 0,0028 (3300)+ 22,525

= 9,24 + 22,525

= 31,765

% kesalahan y1 = $\frac{27,285-27}{27,285}$ x 100 % =1,04%

% kesalahan y2 = $\frac{28,405-28}{28,405}$ x 100 % = 1,42%

% kesalahan y3 = $\frac{29,525-30}{29,525}$ x 100 % = 1,60%

% kesalahan y4= $\frac{30,645-31}{30,645}$ x 100 % = 1,15%

% kesalahan y5 = $\frac{31,765-31}{31,765}$ x 100 % = 2,40%

%kesalahan rata-rata = $\frac{(1,04+1,42+1,60+1,15+2,40)\%}{5}$

= 1.52%

3.9 perhitungan % kesalahan pada waktu 9 menit

y = 0,0038(x)+22,625

y1 = 0,0038 (1700)+ 22,625

= 6,46 + 22,625

= 29,085

y2 = 0,0038 (2100)+ 22,625

= 7,98+ 22,625

= 30,605

y3 = 0,0038 (2500)+ 22,625

= 9,5 + 22,625

= 32,125

y4 = 0,0038 (2900)+ 22,625

= 11,02 + 22,625

= 33,645

y5 = 0,0038 (3300)+ 22,625

= 12,54 + 22,625

= 35,165

% kesalahan y1 = $\frac{29,085-29}{29,085}$ x 100 % =0,29%

% kesalahan y2 = $\frac{30,605-30}{30,605}$ x 100 % = 1,97%

% kesalahan y3 = $\frac{32,125-33}{32,125}$ x 100 % = 2,72%

% kesalahan y4= $\frac{33,645-33}{33,645}$ x 100 % = 1,91%

% kesalahan y5 = $\frac{35,165-35}{35,165}$ x 100 % = 0,46%

%kesalahan rata-rata = $\frac{(0,29+1,97+2,72+1,91+0,46)\%}{5}$

= 1.47%

3.10 perhitungan % kesalahan pada waktu 12 menit

y = 0,005(x)+32,3

y1 = 0,005 (1700)+ 32,3

= 8,5 + 32,3

= 40,8

y2 = 0,005 (2100)+ 32,3

= 10,5+ 32,3

= 42,8

y3 = 0,005 (2500)+ 32,3

= 12,5 + 32,3

= 44,8

y4 = 0,005 (2900)+ 32,3

= 14,5 + 32,3

= 46,8

y5 = 0,005 (3300)+ 32,3

= 16,5 + 32,3

=48,8

% kesalahan y1 = $\frac{40,8-41}{40,8}$ x 100 % =0,49%

% kesalahan y2 = $\frac{42,8-43}{42,8}$ x 100 % = 0,46%

% kesalahan y3 = $\frac{44,8-44}{44,8}$ x 100 % = 1,78%

% kesalahan y4= $\frac{46,8-47}{46,8}$ x 100 % = 0,42%

% kesalahan y5 = $\frac{48,8-49}{48,8}$ x 100 % = 0,40%

%kesalahan rata-rata = $\frac{(0,49+0,46+1,78+0,42+0,40)\%}{5}$

= 0,71%