

“Breads With Date Fiber”



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Date Palm

- The date palm (**Phoenix Dactylifera**) is native to desert regions of Northern Africa
- The date palm is a specie with male and female flowers produced on separate trees.
- Dates are naturally wind pollinated, but humans have assisted in this pollen transfer since great antiquity
- As early as 2300 B.C., people had learned to hang a male inflorescence in a female tree to enhance pollination
- Modern machines now blow pollen on female flowers when the stigmas are receptive, although many traditional date growers still use hand pollination



The Fruit

- Dates grow in clusters below the fronds on a date palm tree. A single cluster can hold 600 to 1,700 dates
- Date palms can grow as tall as 100 feet and stay in production for over 60 years.
- The fronds of the date palm are featherlike and 10 to 20 feet long
- They are oval-cylindrical, 3-7 cm long, and 2-3 cm diameter, yellow-brown in color, and contain a single seed about 2-2.5 cm long and 6-8 mm thick
- Date skin is wrinkled and coated with a sticky, waxy film



The Fruit Stages

- **Hababik:** Size of the fruit is small (kernel size) having a circular shape
- **Kamry:** Size is bigger (olive size) having green color
- **Baser:** Fruit reaches its final size & the color is yellow or red
- **Rutub:** At this stage at which the Baser changes color to deep brown or black
- **Tamer:** The final stage of growth

World Production

World production of dates was about 6,000,000 tonnes in 2005

The major producers are:

1. Egypt: 1,102,000 MT (18%)
2. Iran: 900,000 MT (15%)
3. Saudi Arabia: 712,000 MT (12%)
4. Pakistan: 600,000 MT (10%)
5. Iraq: 400,000 MT (7%)
6. Algeria: 370,000 MT (6%)
7. UAE: 318,000 MT (5%)
8. Oman: 260,000 MT (4%)
9. Sudan: 177,000 MT (3%)
10. Morocco: 32,000 MT (1%)
11. Others: 1,179,000 MT (19%)



Uses

- Dry or soft dates are eaten out-of-hand, or may be seeded and stuffed, or chopped and used in a great variety of ways: on cereal, in pudding, cakes, cookies, ice cream, or candy bars
- The pitting may be done in factories either by crushing and sieving the fruits or, with more sophistication, by piercing the seed out, leaving the fruit whole
- The calyces may be mechanically removed
- Surplus dates are made into cubes, paste, spread, powder (date sugar), jam, jelly, juice, syrup, vinegar or alcohol
- Discolored and filtered date juice yields a clear invert sugar solution



Uses

- Cull fruits are dehydrated, ground and mixed with grain to form a very nutritious stock feed
- Dates and peppers added to the native beer are believed to make it less intoxicating
- Date palms are tapped for the sweet sap which is converted into palm sugar, molasses or alcoholic beverages
- Fresh spathes, by distillation, yield an aromatic fluid
- A viscous, thick syrup made from the ripe fruits, is employed as a coating for leather bags and pipes to prevent leaking



Food Value

Parameter	U	Fresh	Dried
Calories	-	142	274-293
Moisture	%	31.9-78.5	7.0-26.1
Protein	%	0.9-2.6	1.7-3.9
Fat	%	0.6-1.5	0.1-1.2
Carbohydrates	%	36.6	72.9-77.6
Fiber	%	2.6-4.5	2.0-8.5
Ash	%	0.5-2.8	0.5-2.7

Date Fiber Values

Parameter	Value
Moisture%	6.9
Ash%	2.5
Protein%	0.7
Fat%	0.6
Soluble Dietary Fiber	5
Insoluble Dietary Fiber	45

Minerals Content (mg/kg)

Mineral	Mixed	Bran
Al	101.95	32.58
As	0.00	0.06
Ba	0.77	3.99
Ca	1713.80	778.71
Cr	2.42	0.40
Cu	15.37	11.21
Fe	210.89	130.02
K	4798.20	11247.00
Mg	1672.70	4182.05
Mn	22.67	88.59
Mo	5.20	1.86
Na	328.58	137.32
Ni	2.05	0.43
P	1741.10	10845.00
Pb	0.27	0.00
Sr	49.34	11.06
V	0.24	0.10
Zn	24.34	85.83

Innovation

Due to the popularity of Dates in the Middle East, it was decided to add dried **Date Fiber** (powder) in wheat flour at different ratios to produce Arabic & Pan breads.

Ratios

5%

10%

15%

20%

25%

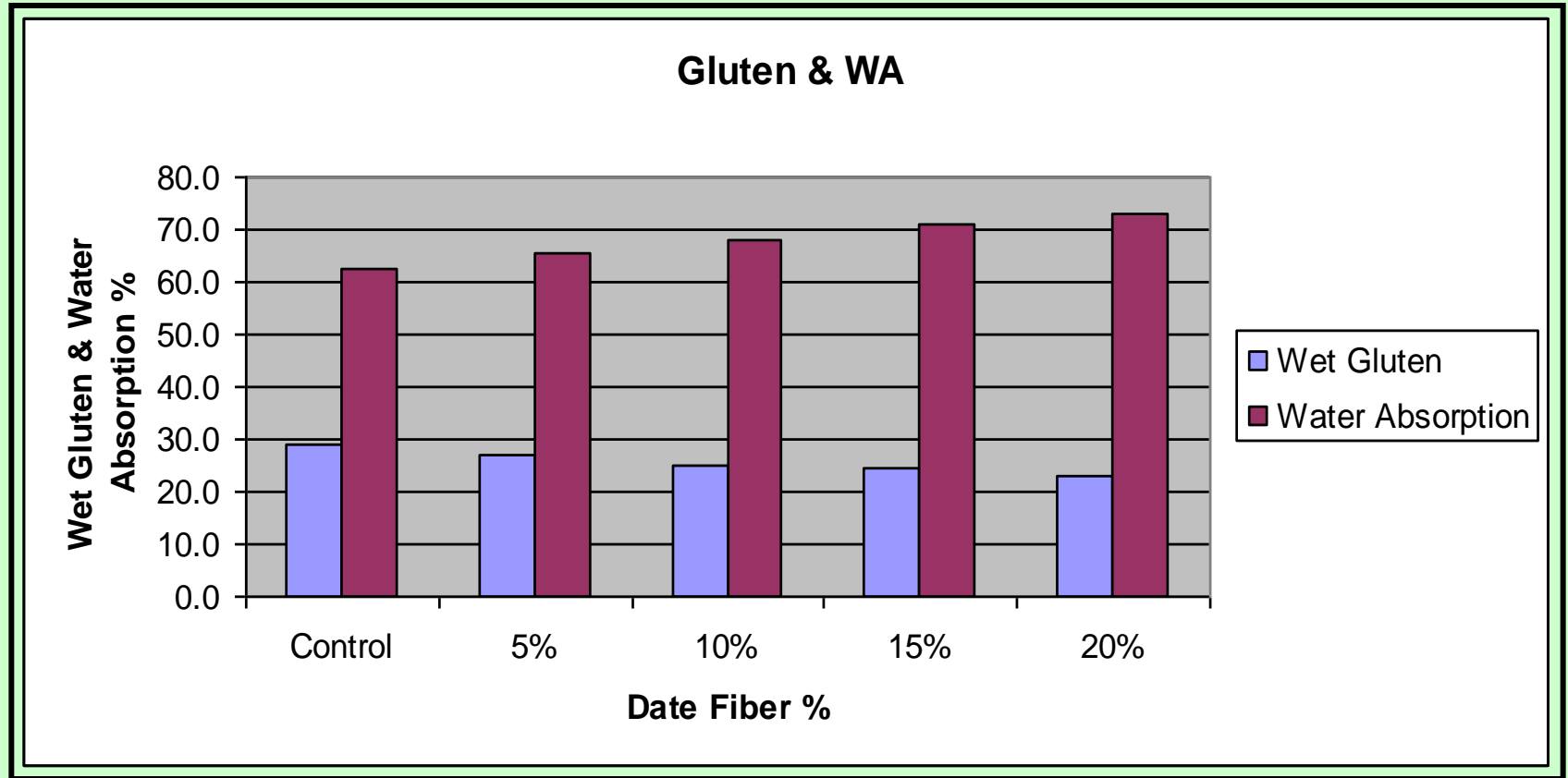
30%



Test Results

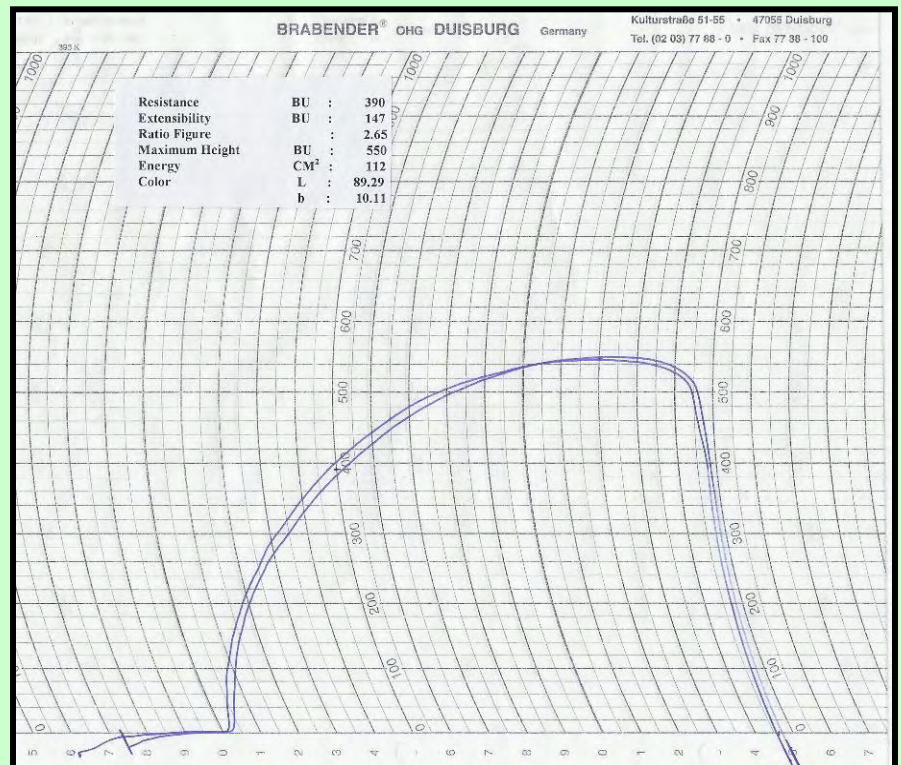
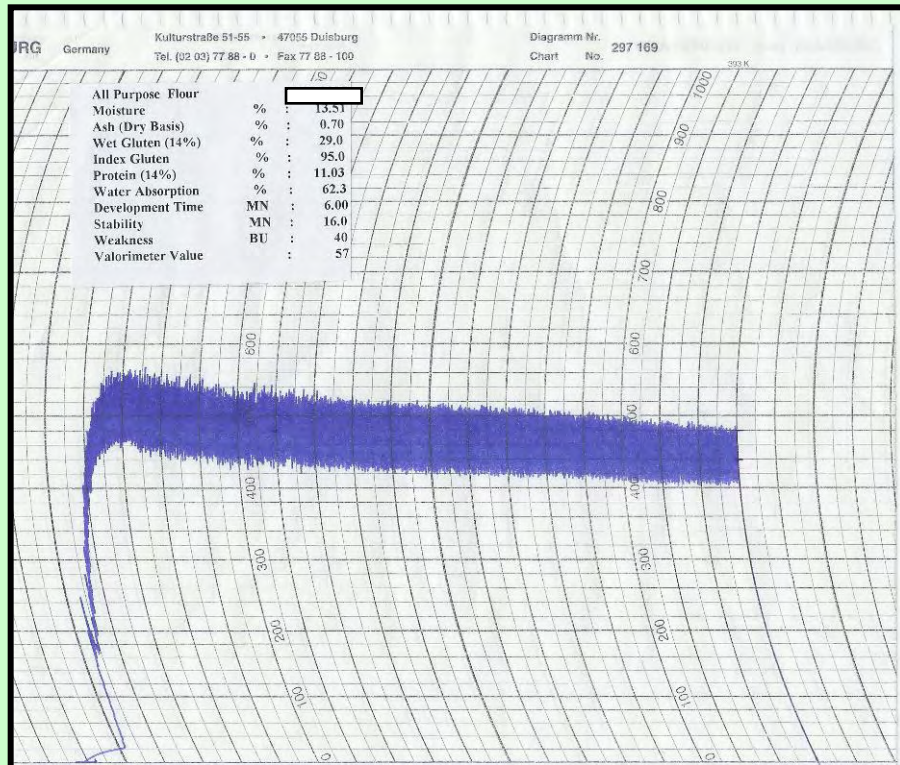
Parameter/DF Addition	Control	5%	10%	15%	20%
% Moisture	13.5	13.5	13.5	13.5	13.5
Wet Gluten(14%)	29.0	27.2	25.9	24.6	23.2
Gluten Index	97	96	96	95	94
%Ash (db)	0.70	0.81	0.92	1.04	1.16
Protein (14%)	11.1	11.0	10.8	10.6	10.4
Water Absorption(%)	62.3	65.5	68.0	70.8	73.0
Development time(MN)	6	9	12	*	*
Stability(MN)	16	>20	16.5	*	*
Weakness(BU)	40	20	50	*	*
Valorimeter Value	57	67	85	*	*
Resistance	390	605	710	850	990
Extensibility	147	102	112	80	62
Ratio Figure	2.7	5.9	6.3	10.6	16.0
Maximum Height	550	690	860	885	990
Energy	112	98	131	100	82
L(Brithness)	89.29	82.87	80.3	77.68	75.78
B(Yellowishness)	10.11	10.15	10.42	11.02	11.52

Test Results



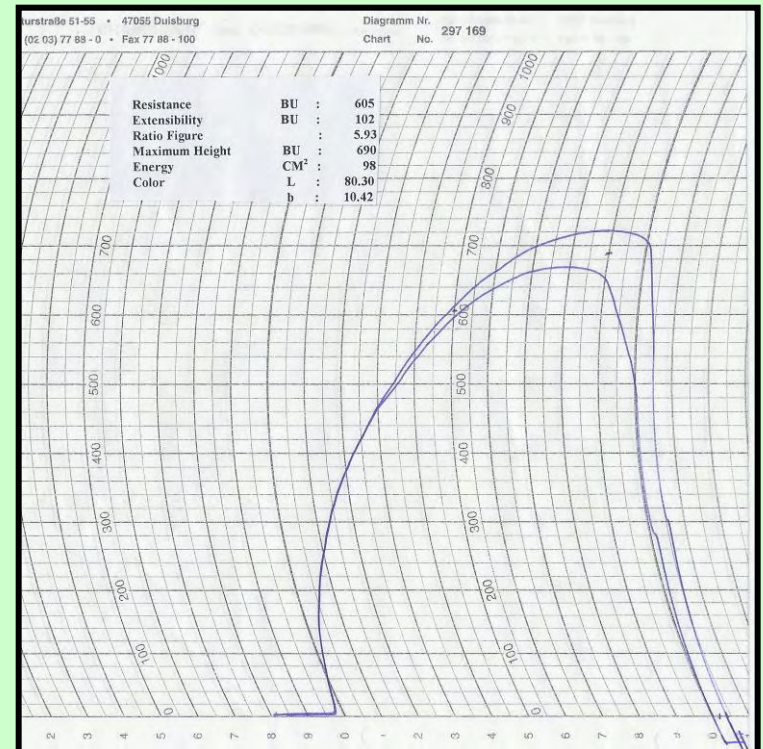
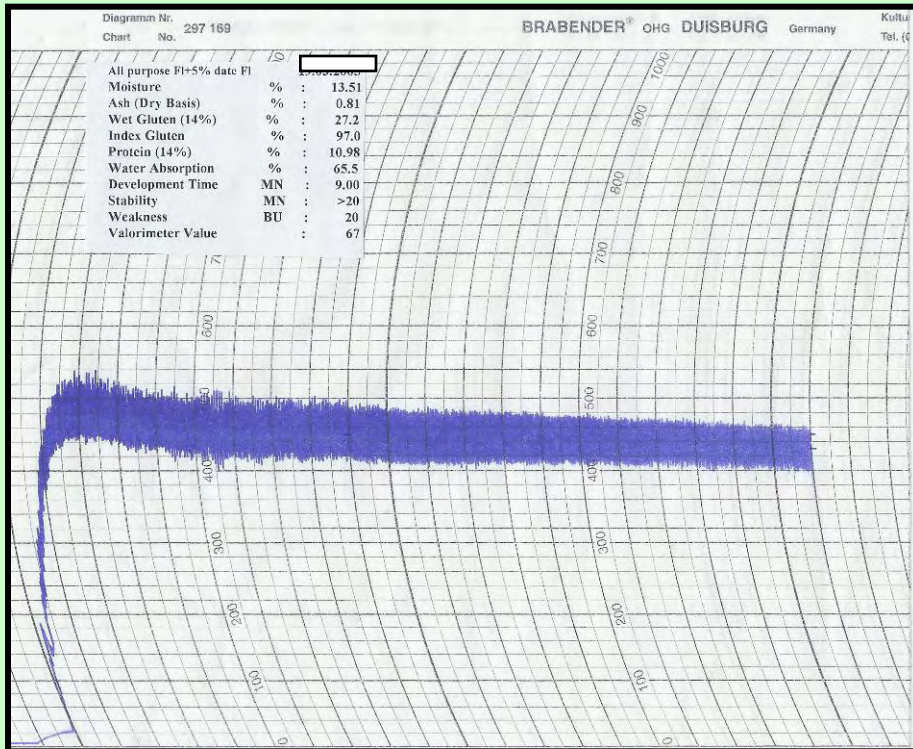
Farino/Extensograms

Control Flour



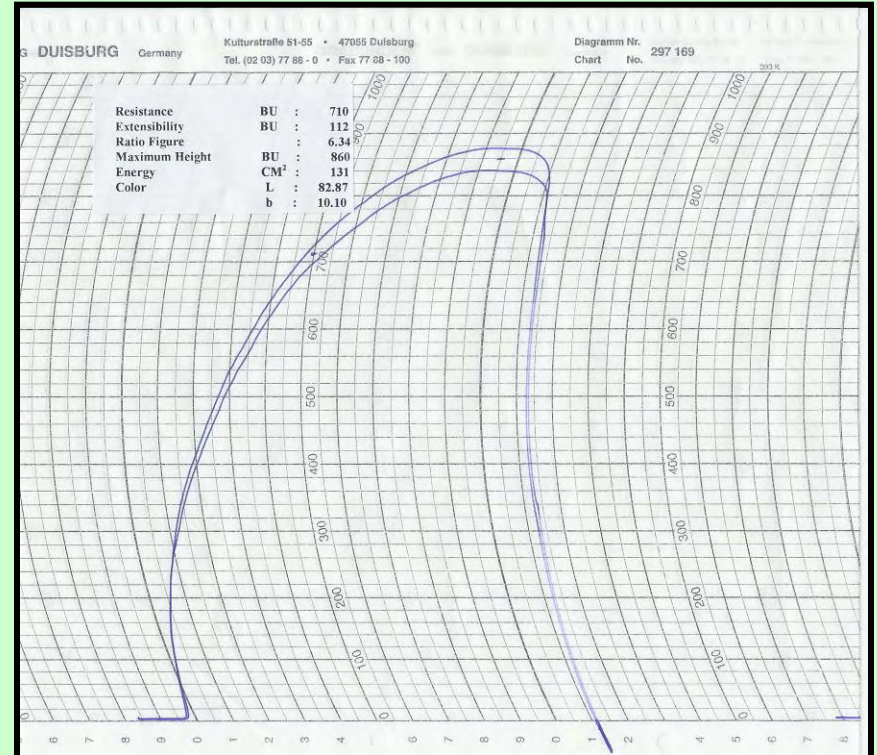
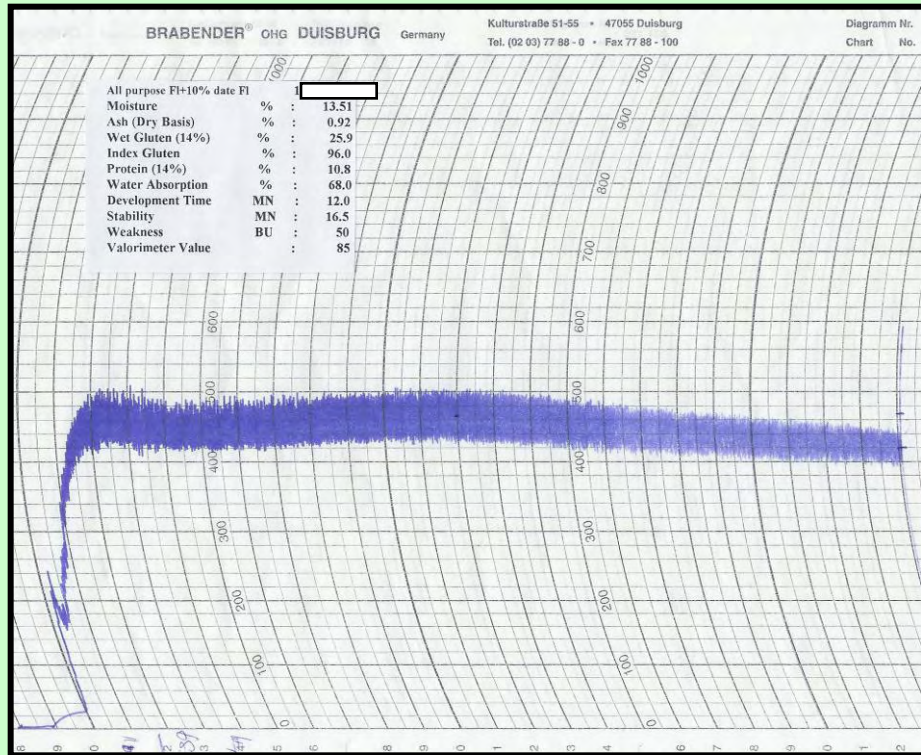
Farino/Extensograms

With 5% Date Fiber



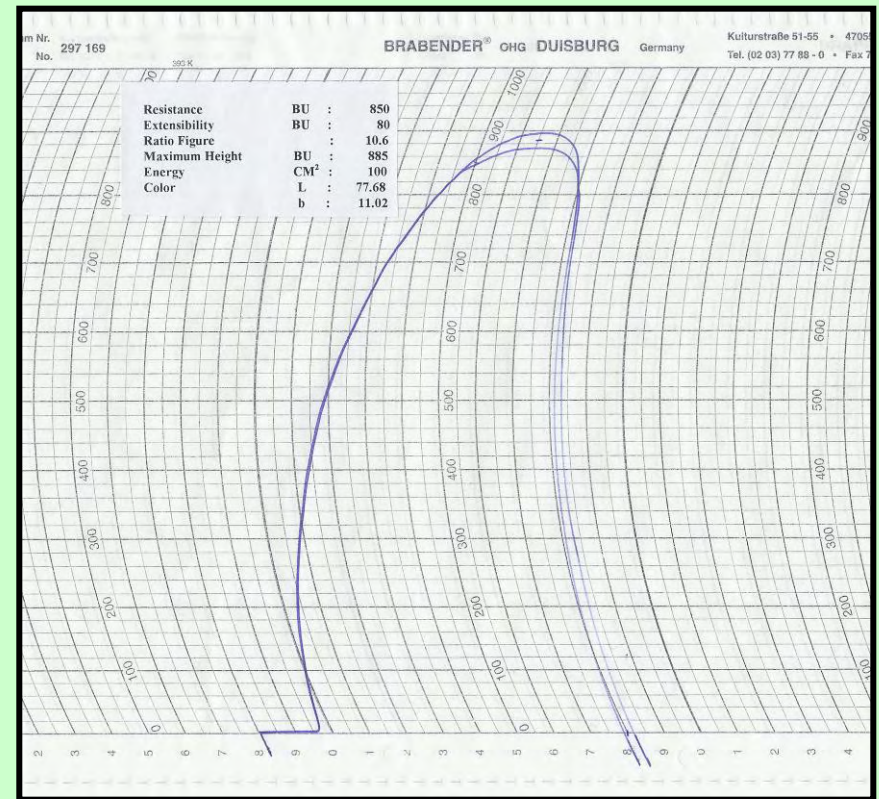
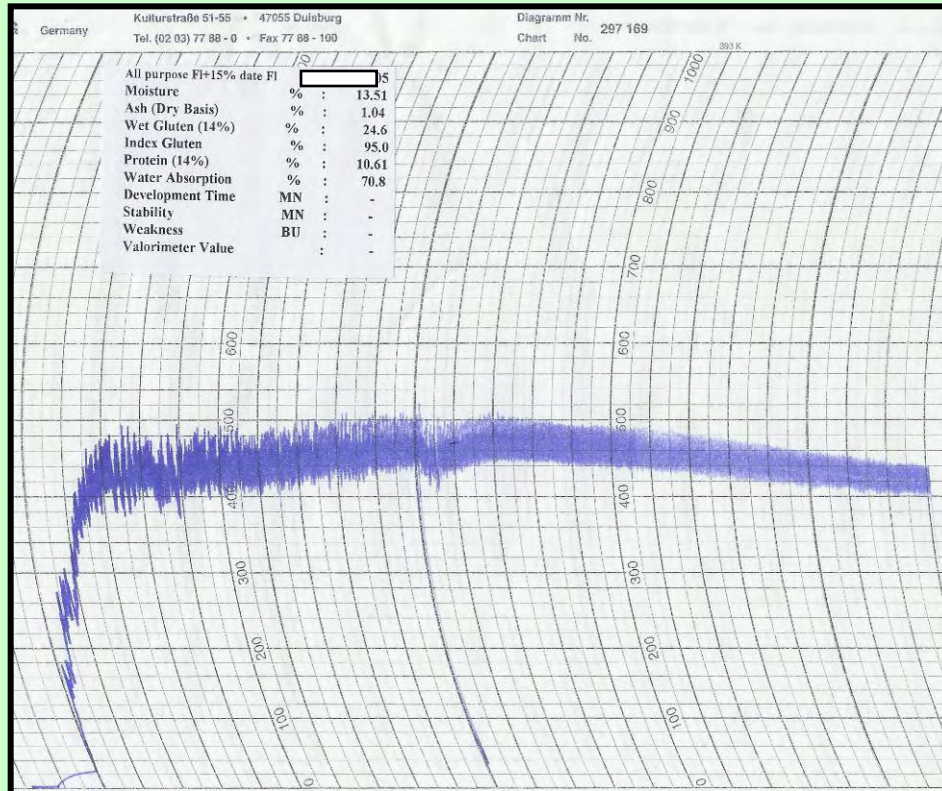
Farino/Extensograms

With 10% Date Fiber



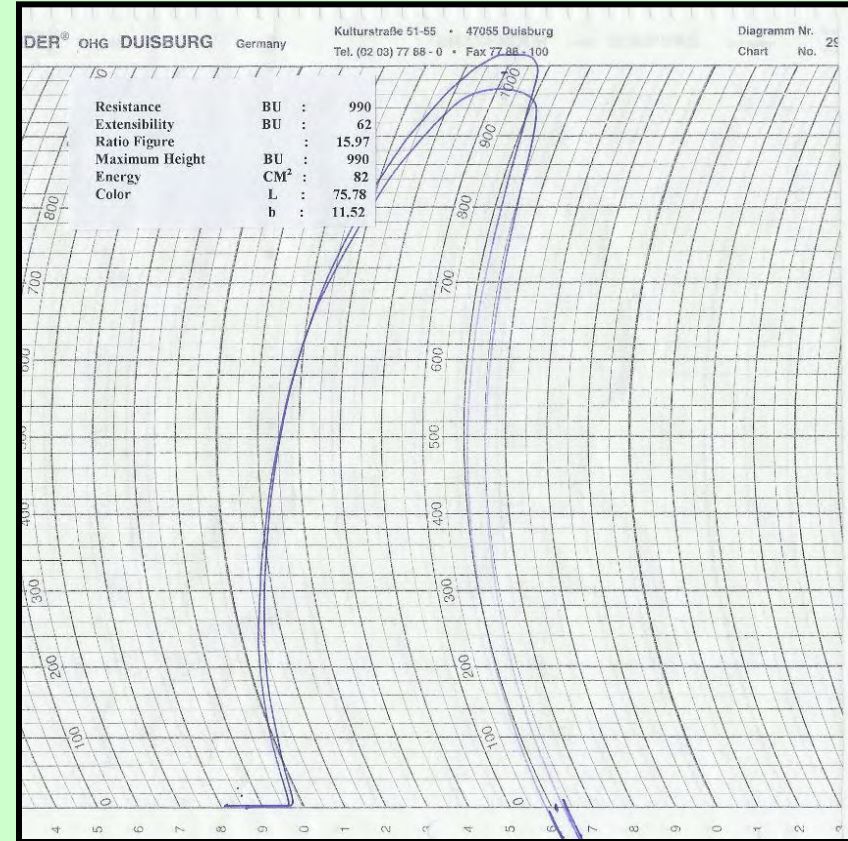
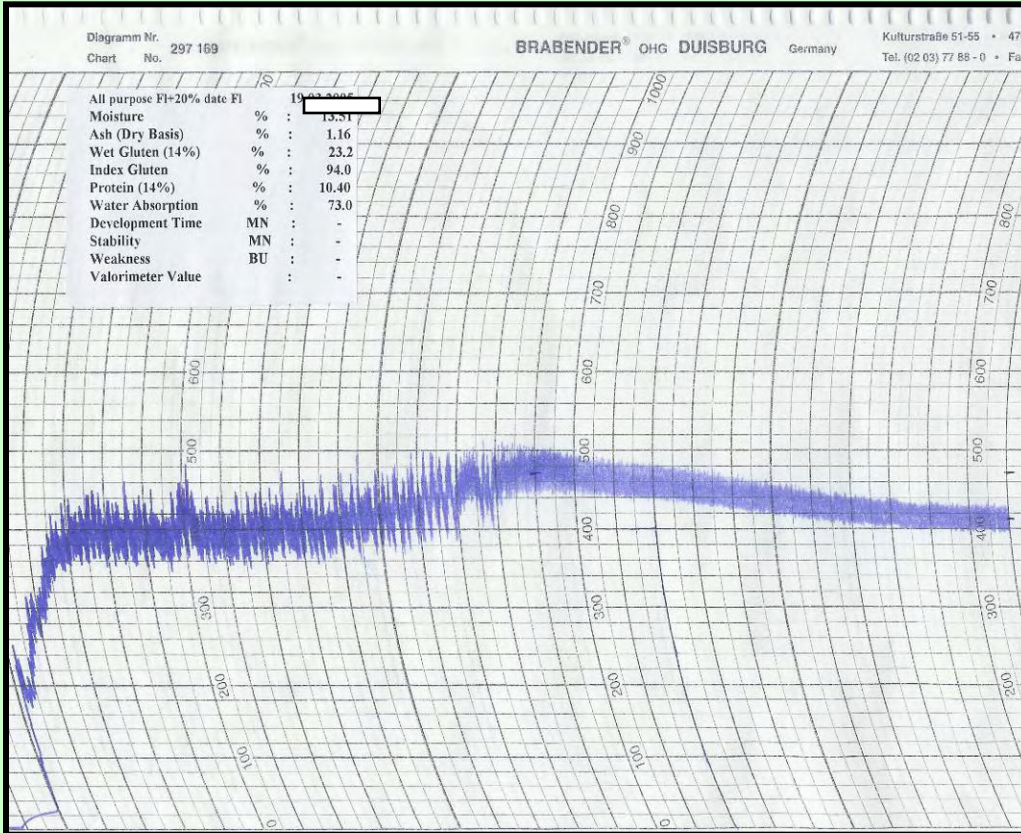
Farino/Extensograms

With 15% Date Fiber



Farino/Extensograms

With 20% Date Fiber

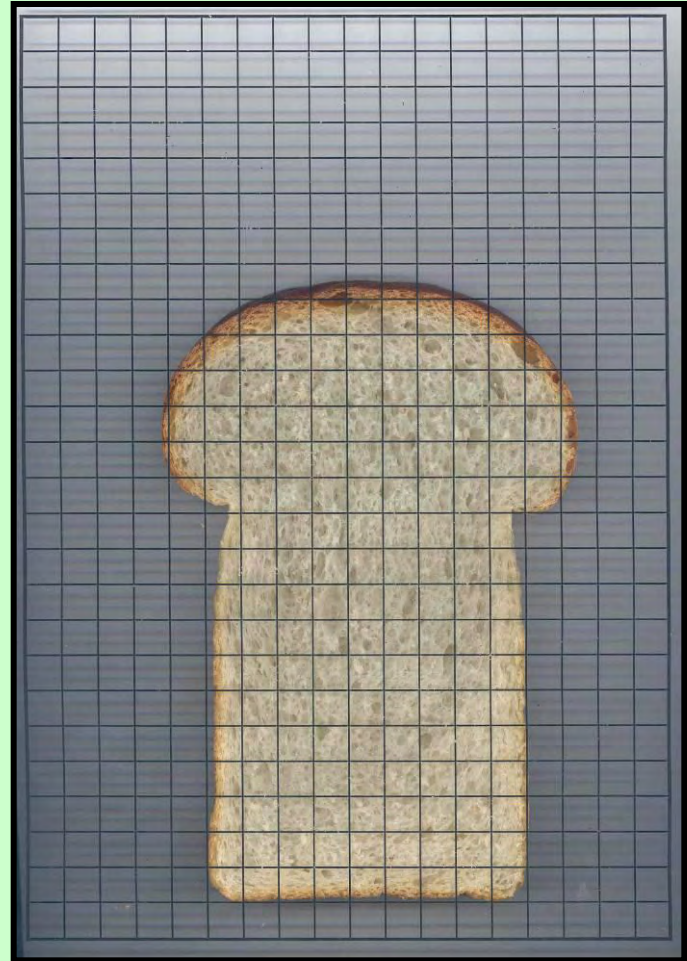


Observations

- **Decrease in:**
 - Protein
 - Gluten
 - Dough Strength
 - Color
- **Increase in:**
 - Water Absorption
 - Ash Value
 - Weakness

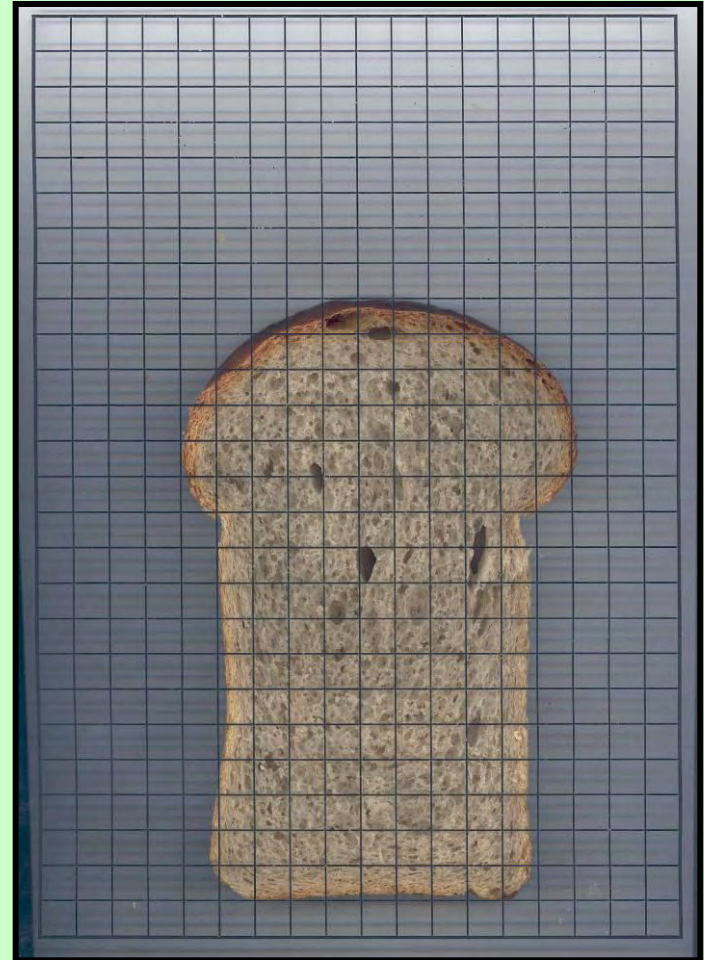
Pan Bread

Control Flour



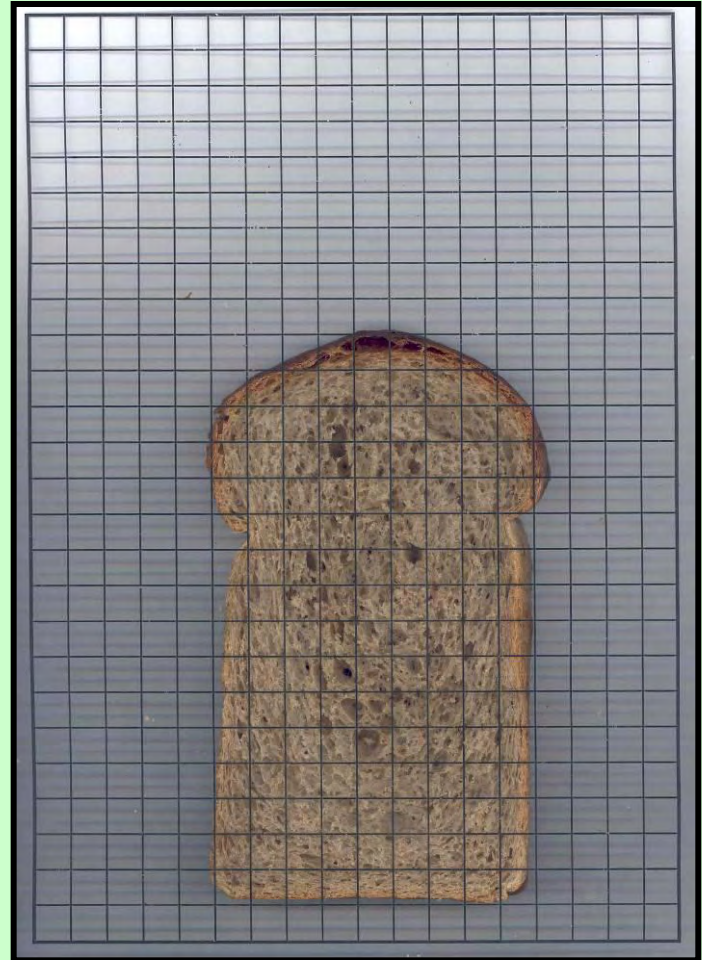
Pan Bread

With 5% Date Fiber



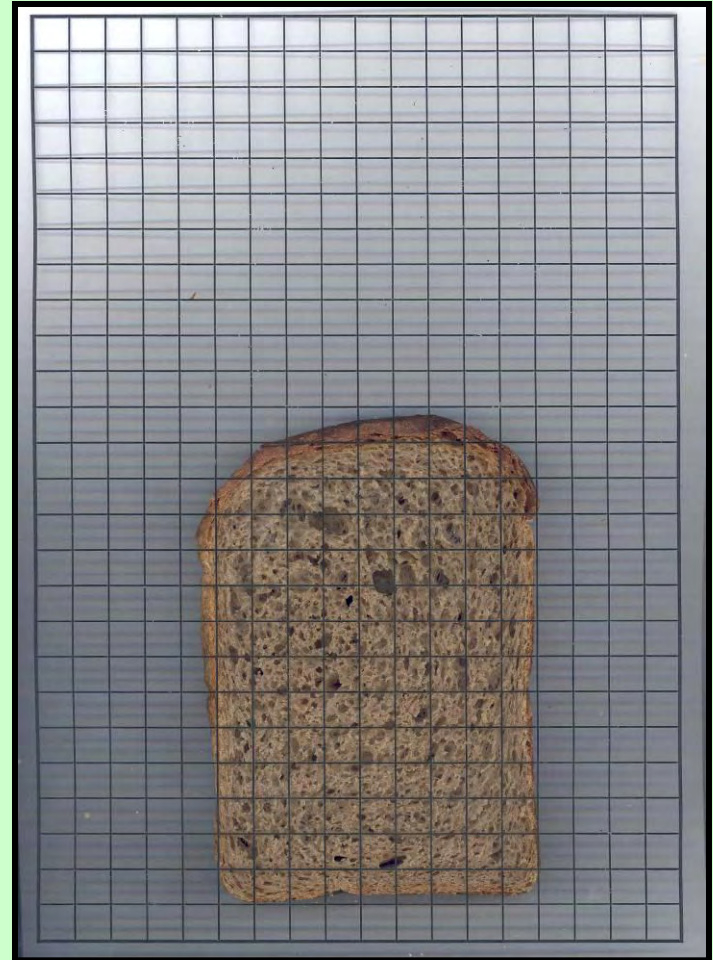
Pan Bread

With 10% Date Fiber



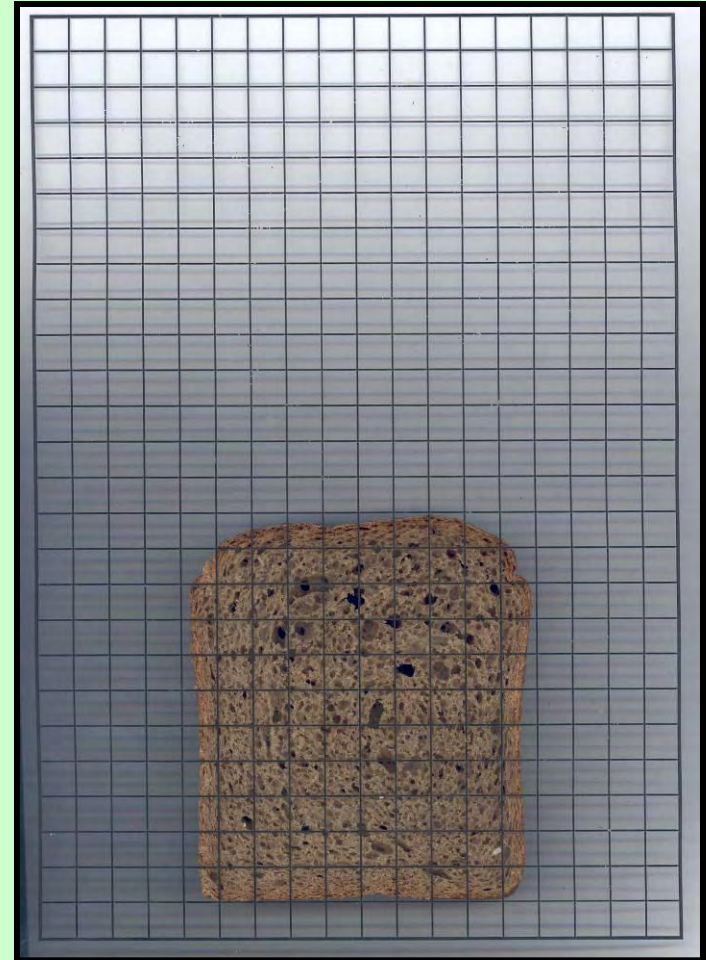
Pan Bread

With 15% Date Fiber



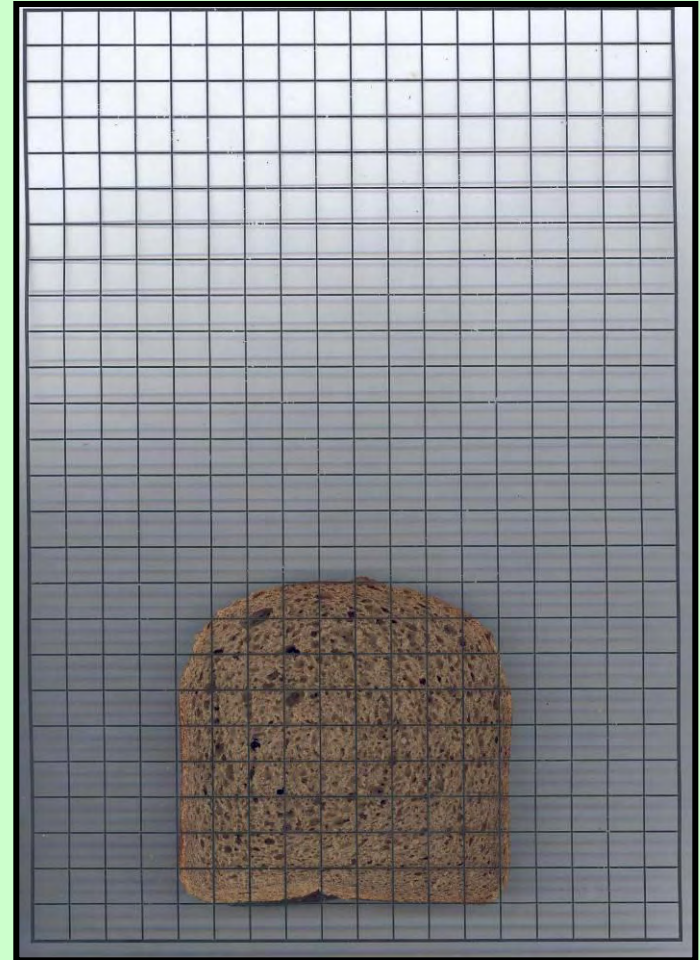
Pan Bread

With 20% Date Fiber



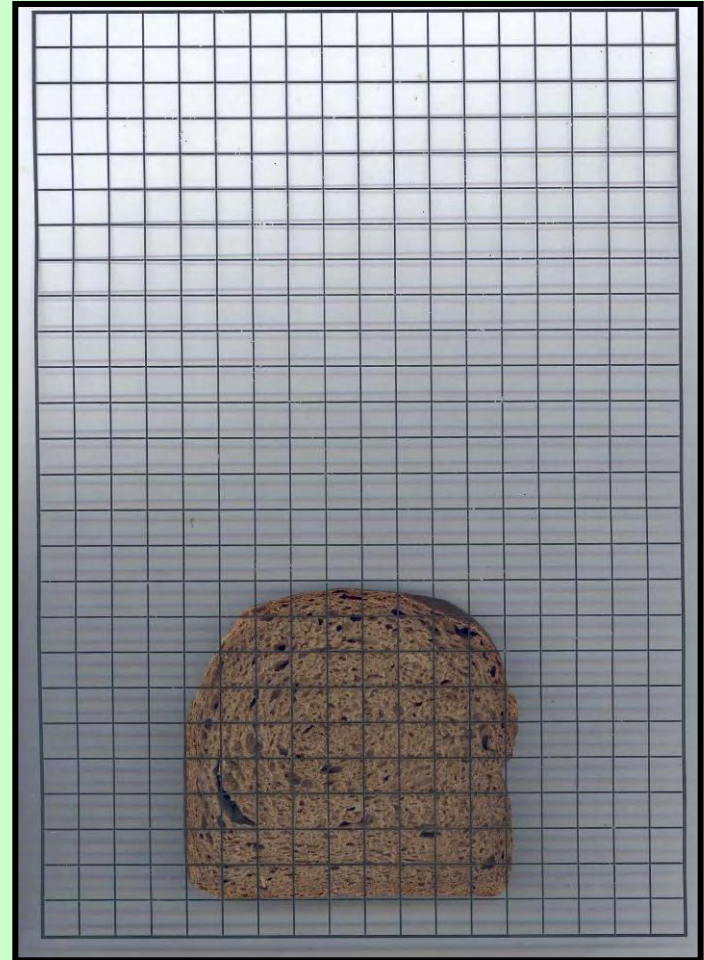
Pan Bread

With 25% Date Fiber



Pan Bread

With 30% Date Fiber



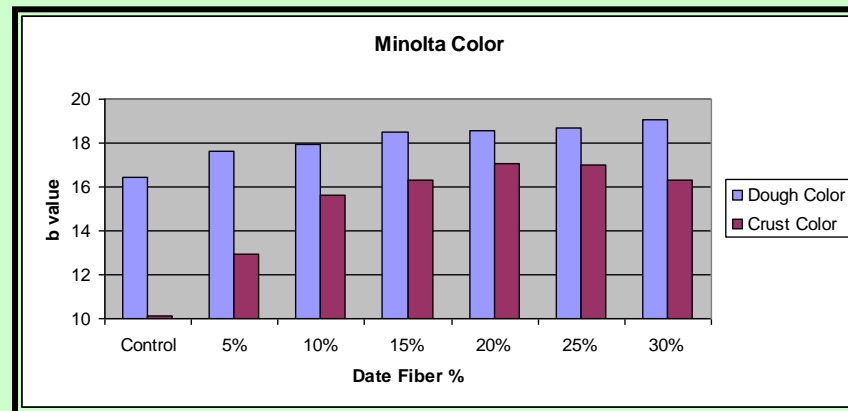
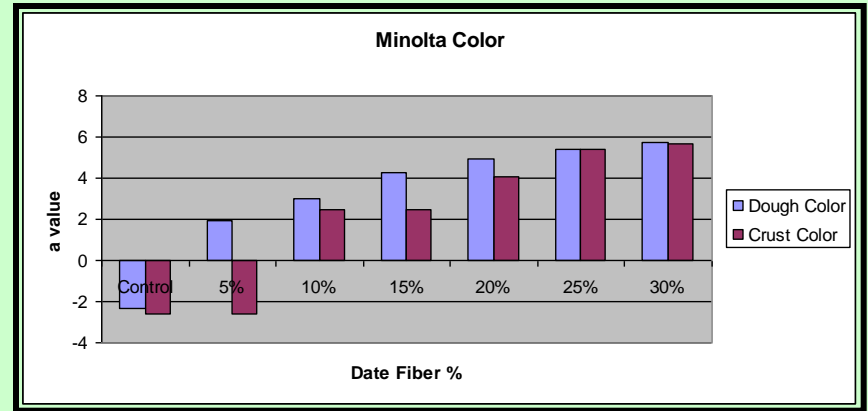
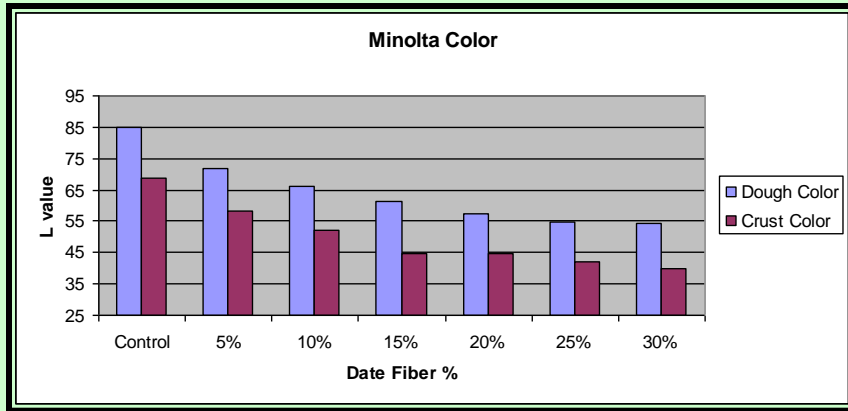
Pan Bread

Color Comparison

Dough Color			
Sample	L	a	b
Control	84.89	-2.36	16.41
5%	71.96	1.95	17.63
10%	66.25	2.99	17.96
15%	61.15	4.28	18.50
20%	57.53	4.96	18.58
25%	54.82	5.41	18.69
30%	54.51	5.75	19.07

Crumb Color			
Sample	L	a	b
Control	68.75	-2.57	10.15
5%	58.21	2.50	12.94
10%	52.26	2.47	15.63
15%	44.70	4.08	16.32
20%	44.53	4.68	17.08
25%	41.86	5.41	16.98
30%	39.87	5.69	16.30

Pan Bread Color Comparison



Arabic Bread

With 5% Date Fiber



Arabic Bread

With 10% Date Fiber



Arabic Bread

With 15 % Date Fiber



Conclusion

Arabic Breads

- 20-30% date fiber breads could not be test baked as even at 15% date fiber addition, breads tend to become hard to bite, very dark in color & blisters appeared on the crust, thus up to 5% addition of date fiber is acceptable

Pan Breads

- It was observed that upon adding 10% date fiber the quality of breads is acceptable as a replacement to the normal brown breads. However no date aroma/taste was observed
- Date aroma/taste was observed over 25% addition & these breads can be marketed as specialty product