

# BRILLIANT YELLOW TEST PAPER—ITS USES AND ADVANTAGES.

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Brilliant Yellow is a tetrazotised diaminostilbenedisulphonic acid, coupled to phenol and having two free hydroxyl groups. It is a very sensitive indicator to alkalis and even carbonates and ammonia.

This dye has been used at Amatikulu with good results during the past season.

The advantages claimed for it are:—

1. A single colour change easily detected in any light.
2. A positive narrow band of sensitivity 7.3—7.4 pH.
3. It bridges the pH range between litmus and phenolphthalein.
4. The pH changes from 7.3 to 8.0 are easily appreciated by the depth of colour.

Because of these characteristics tempering is more precise, and hence the increase in ash from mixed to clarified juice is avoided. Further, there is less loss in alkalinity, reducing sugar and purity during the concentration of the clarified juice to syrup.

These facts were demonstrated in the following experiments and records.

Method of juice clarification:—

Juice heated to 140—150° F.

Limed continuously.

Sulphited by percolation to 3—4 grammes SO<sub>2</sub> per litre.

Re-limed to slight varying alkalinity to phenolphthalein 8.4—8.8 pH.

Corrected with phosphoric acid (double super) to requisite precipitation point.

Before the introduction of Brilliant Yellow the operator, Native or Indian, experienced great difficulty in keeping a steady reaction, and although the arithmetical average of the hourly tests was in the vicinity of the desired reaction, the hourly tests varied considerably amongst themselves, and were generally on the high side so as to guard against high sulphite content in the sugar. Since the introduction of this paper, it has been found possible with the same class of labour to have 98% or more tests within 0.1 of the desired reaction, and hence a reduced possibility of subsequent ash formation.

This is illustrated by the four following parallel tests, each test being on the same juice before and after pre-evaporation:—

	pH.	Temperature.	Purity.	Reducing Sugar ratio.	SO <sub>2</sub> p.p. million Brix.
1. Clarified juice	8.0	214°F.	86.2	3.69	390
Pre-evaporated juice	7.4	225 „	85.9	2.62	240

	pH.	Temperature.	Purity	Reducing Sugar ratio.	SO <sub>2</sub> p.p. million Brix.
2. Clarified juice	7.3	214°F.	85.8	3.77	450
Pre-evaporated juice	7.2	223 „	85.7	3.58	385
3. Clarified juice	7.2	214°F.	85.9	3.02	502
Pre-evaporated juice	7.2	228 „	85.8	2.99	491
4. Clarified juice	7.6	228°F.	86.0	3.34	356
Pre-evaporated juice	7.1	232 „	85.2	2.82	288

The following figures are extracted from records of weekly averages. Group I. represents periods of great variations, Group II. of small variations after introduction of Brilliant Yellow:—

	pH.	Ash ratio, Mixed Juice.	Ash ratio, Clarified Juice.	Increase Ash, Mixed to Clarified Juice.
GROUP I.:	7.56	3.24	3.97	22.5%
	7.57	3.14	4.11	31.0%
	7.62	2.96	4.06	37.0%
	7.54	3.12	4.10	32.0%
Average	7.57	3.11	4.06	30.6%
GROUP II.:	7.30	3.03	3.45	13.8%
	7.27	2.98	3.44	15.5%
	7.25	2.93	3.39	15.7%
	7.24	3.14	3.57	13.7%
Average	7.26	3.02	3.46	14.6%

The above comparisons do not require any comments, and can be taken as an illustration of the combined effects of varying high alkalinities and high evaporation temperatures, coupled perhaps with long evaporation periods.

CHAIRMAN: Mr. Bechard has given us a paper that is of practical value. Mr. Bijoux has asked me to tell you of results of certain tests carried out at Darnall on the use of the same paper. He found at the beginning of the season, when juices were very difficult to clarify, that the usual procedure of liming to 8.7 with phenolphthalein paper and adding a fixed quantity of phosphoric paste, thereby reducing the pH in clarified juice to 7.4 or 7.6, gave a very muddy, dark-coloured juice. By the use of this paper he was able to reduce the lime and work to a pH of about 8.4. Then by adding the same quantity of phosphoric paste the pH of clarified juice was from 7.1 to 7.2, and he obtained a brilliant

clear juice, which was not possible under the old methods of using phenolphthalein paper. Mr. Bijoux asked me to tell you this as an illustration of the practical value of this paper in use in the factory.

At the request of the Chairman, Mr. Bechard outlined the difference in the use of brilliant yellow paper as against litmus and phenolphthalein. He stated that instead of using a gross and a half of phenolphthalein and a gross and a half of litmus, he has used about three-quarters of a gross of this yellow paper in the season.

Mr. DODDS: I have noticed brilliant yellow paper listed in several different laboratory suppliers' lists. I would like to know whether Mr. Bechard has tried the papers from various sources and whether they vary much in reaction or sensitiveness. I believe it is usually quoted in the lists at 1s. 6d. per dozen books.

Mr. BECHARD: I have not tried any samples, but they were not listed at the time I got into communication with the firm I dealt with. Brilliant yellow is a very loose term, and I cannot say whether the brilliant yellow advertised now is the same as the one which I am talking about.

Dr. HEDLEY: I would like to draw Mr. Bechard's attention to the fact that brilliant yellow has been listed by British Drug Houses for at least four years. You can find it in the catalogues at 1s. 6d. for twelve books. In what way has this brilliant yellow been treated in order to make it something specific? I presume it is not a secret; if it is a secret it becomes of little value. If it is something we can all use it becomes very useful. Why, in any case, is brilliant yellow chosen as against bromthymol blue? At Umfolosi they have been using bromthymol blue for the last season, with perfectly satisfactory results. That has got practically four colour changes and it is very sensitive round about

neutrality, changing from yellow to green, from light blue to dark blue, and I think you can get a 7 pH very well with that. Certainly Umfolosi have found so. When I was in Hulett's I used it at Felixton, and though they have not carried on with it we were satisfied with the results then, but they abandoned it afterwards, I understand. I certainly would like to know more about this brilliant yellow than is given in the paper. It does not say anything here as to how it is prepared, if preparation is required.

Mr. BECHARD: Dr. Hedley has seen a bit more of this paper than the Congress. I gave you the theoretical method of preparation. We thought it rather involved and left it out. There is nothing special about making it, except that it has been established by the firm in question. I do not for a moment say they are the only people that can make the paper; probably the British Drug Houses are just as good. The reason why brilliant yellow was chosen was because I had already tried bromthymol blue, which was not found suitable because it is too sensitive for use in factory operations; the paper has to be prepared continually, as it will not keep for use in the factory. When you have to temper the juice in the vicinity of a sulphur dioxide furnace, bromthymol blue becomes still more useless. It is too sensitive for the purpose. Another point is that the bromthymol blue limit is 7.6; I cannot find any difference between 7.4 and 7.6. We want a paper that will give us a range about that figure. Probably the third point is that you will find that brilliant yellow is more precise in artificial light than bromthymol blue.

CHAIRMAN: Mr. Bechard has given us practical reasons why such paper should be tried out in other factories. I can vouch for the fact that it is a very practical paper, and the special point about it he emphasises is that it gives you a pH range above that of bromthymol blue.