Water Activity Of Tea Concentrates

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ABSTRACT

Water activity (A_w) is an important physical characteristic of a product. One of the reasons it is important is that microorganisms will only grow if the water activity is acceptable. For example, many microorganisms cannot grow if the water activity is below 0.9, most molds require a water activity above 0.8, and a water activity below 0.6 will inhibit all microbial growth. The water activity of various tea concentrates were measured and analyzed as compared to their °Brix reading. The °Brix ranged from approximately 46°B to 80°B with the Aw ranging from 0.96 to 0.75. Data is presented along with a best fit curve for estimating Aw from a tea concentration with a known °Brix.

INTRODUCTION

Water activity (A_w) is a unitless measure of the energy of the water in a sample. It is often described as measuring the "available" water in a system. This description is often used to explain the situation where two products have the same water content, but different water activity, or different moisture content and the same water activity. For example, pasta with a moisture content of 12% could have a A_w of 0.50 while rolled oats with 10% moisture could have a A_w of 0.7. Knowing and understanding the water activity of tea concentrates is important information when deciding how to store or preserve a product.

MATERIALS AND METHODS

A Rotronic AwQuick A2101 (Bassersdorf, Switzerland) water activity meter was using for this analysis. It was used in the standard mode and properly calibrated. Samples were allowed to equilibrate to room temperature for approximately 30min prior to analysis. Tea concentrates were obtained from inventory for analysis and are labeled numerically for simplicity. A Reichert AR200 refractometer (Depew, NY) was used to determine the °Brix levels of the tea concentrates.

RESULTS AND DISCUSSION

The water activity of various tea concentrates are listed in Table 1. One will notice the very good agreement of the water activities for sample 2-6. Sample 1 had the largest variation, which isn't

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surprising as the instrument manual stated that water activities over 0.95 were more difficult to determine and required longer equilibration than lower water activities. Plotting the values from Table 1 in Figure 1 and fitting the data with a quadratic equation provides a very good fit (R^2=0.9997) and would enable Sensus to predict the water activity of various tea concentrates based upon the concentration as measured in °Brix.

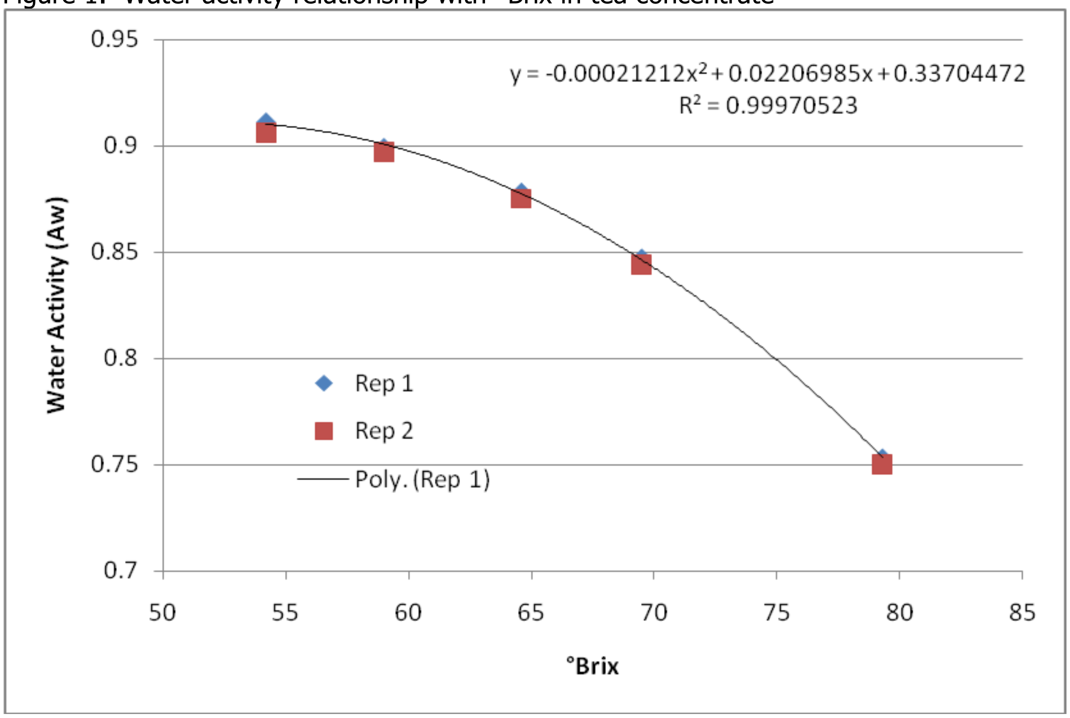
Tables

Table 1. Products, °Brix, Water activity

Product	°Brix	Aw (rep 1)	Aw (Rep 2)
1	46.5	0.970	0.953
2	54.2	0.911	0.906
3	59.0	0.899	0.897
4	64.6	0.878	0.875
5	69.5	0.847	0.844
6	79.3	0.753	0.750

Figures

Figure 1. Water activity relationship with °Brix in tea concentrate



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