Determination Of Antioxidant Capacity Of Sensus Products Using ORAC Assay

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ABSTRACT

The antioxidant capacity of Sensus products was determined using the ORAC (Oxygen Radical Absorbance Capacity) assay. It was highest in tea and coffee concentrates due to the presence of phenolic compounds including catechins and caffeoylquinic acids.

INTRODUCTION

The Folin-Ciocalteau assay used for total soluble phenolics is an ET (electron transfer) based assay which quantifies the reducing capacity of antioxidants in samples based on measuring color changes when oxidants are reduced. Since the Folin-Ciocalteau assay was developed for protein analysis and later modified for measuring total phenol in wine, the assay is not limited to measuring "total soluble phenolics" but can also measure total reducing capacity of any compounds that has reducing power in a sample. The correlation between total soluble phenolics and polyphenolics is highly dependent on the type of samples and constituents in a sample. The assays for measurement of antioxidant capacity of a sample are generally divided into two categories based on their principle chemistry. ET-based assay generally includes a redox reaction using an oxidant probe to monitor the reaction to an endpoint and to indicate the endpoint of the reaction. The ET-based assays include Folin-Ciocalteau assay, TEAC (Trolox equivalent antioxidant capacity), FRAP (ferric ion reducing antioxidant parameter) and DPPH (diphenyl-1-picrylhydrazyl copper (II) reduction capacity). Another basic assay used to measure antioxidant capacity is HAT (hydrogen atom transfer) which operates on the basis of measuring the inhibitory capacity of antioxidants against thermally generated peroxyl free radicals by hydrogen donation. The antioxidant assays sharing this mechanism are ORAC (oxygen radical absorbance capacity), TRAP (total radical trapping antioxidant parameters), Crocin bleaching assay, IOU (inhibited oxygen intake), inhibition of linoleic acid oxidation, and inhibition of LDL oxidation.

MATERIALS AND METHODS

Antioxidant capacity of each tea infusion was measured using the ORAC (Oxygen Radical Absorbance Capacity) method and adapted to work with a 96-well BMG Labtech FLUOSTAR Optima microplate reader (Offenburg, Germany). This method is based on the principle inhibiting the decay of fluorescence in the presence of the peroxyl radical generator 2,2'-azobis (2-amidinopropane) dihydrochloride. The rate of

fluorescence decay was monitored every 2 min for 70 min by calculating the area under the decay curve. Antioxidant capacity was quantified by using a standard curve of Trolox (6–Hydroxy–2, 5, 7, 8–tetramethylchroman–2–carboxylic acid) that is a cell-permeable, water soluble analog of vitamin E with potent antioxidant properties. Each sample was suitably diluted (400X) in pH 7.0 phosphate buffer before pipetting into a 96-well microplate.
Data was represented in micromoles of Trolox equivalents per mL of infusion (µmol TE/mL).

Sensus products used for this study were displayed in Table 1.

Sample No.	Same code	Description
1	WTC-111	White tea concentrate
2	GTBC-350	High clarity green tea concentrate
3	GTC-350	Green tea concentrate
4	TBC-250	Medium clarity black tea concentrate
5	TBC-350	High clarity black tea concentrate
6	CBC-250	Medium clarity coffee concentrate
7	CC-350	Coffee concentrate
8	CBC-350	High clarity coffee concentrate
9	CC-205	Coffee concentrate
10	SEN-426	Custom coffee concentrate
11	RBC-111	Rooibos concentrate
12	RBBC-101	Rooibos concentrate

RESULTS AND DISCUSSION

According to the antioxidant capacity value determined by the ORAC assay, antioxidant capacity was highest in TBC 250 which is medium clarity black tea concentrate followed by medium clarity green tea concentrate (Table 2).

Table 2. Antioxidant capacity (µmol TE/mL) of 12 Sensus products determined by ORAC (Oxygen Radical Absorbance Capacity) method.

	1. WTC111	2. GTBC 350	3. GTC 350	4. TBC 250	5. TBC 350	6. CBC 250	7. CC 350	8. CBC 350	9. CC 205	10. SEN 426	11. RBC 111	12. RBBC 101
ORAC Value[1]	1001.59	1304.37	1255.14	1343.17	1271.72	1277.50	1182.31	1279.66	858.04	823.66	295.37	1116.52

1. ORAC value was expressed in micromoles of Trolox equivalents per mL of infusion (µmol TE/mL).

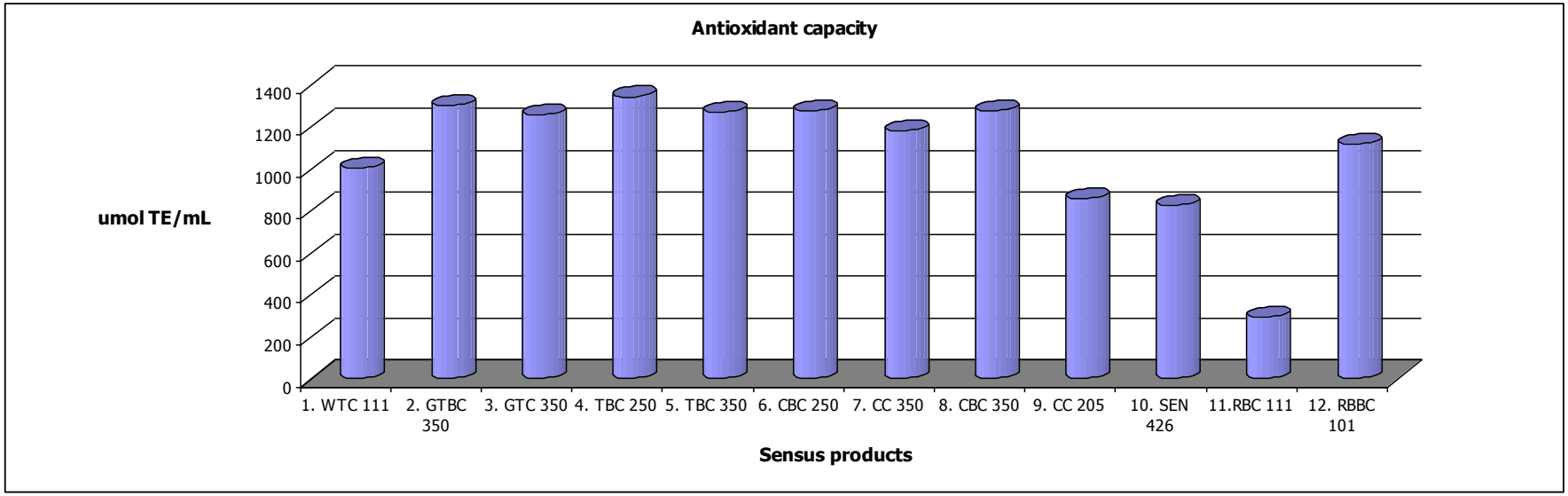

Figure 1. Graphed values of antioxidant capacity of 12 Sensus products. ORAC values were expressed in micromoles of Trolox equivalents per mL of infusion (µmol TE/mL).

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