PRODUCTION AND EVALUATION OF SOME SPECIAL FOOD FORMULAS

By

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M.Sc. Agric. Sc. (Food Science and Technology), Ain Shams University, 2007

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ABSTRACT

Doaa Bayoumi El-Sayed Bayoumi: Production and Evaluation of Some Special Food Formulas. Unpublished Ph.D. Thesis, Department of Food Science, Faculty of Agriculture, Ain Shams University, 2010.

Breast-feeding is the golden standard for infant feeding. However, the majority of a few months old infants are fed with a second choice infant feeding, complementary formula. Prebiotics have the potential to promote immediate and long-term effects on the health and well-being of infants. Preparation and evaluation of four complementary weaning food formulas containing prebiotic ingredients, mainly inulin were studied. Formula 1 contained 20% Globe artichoke; Formula 2 contained 20% Jerusalem artichoke; Formula 3 contained 10% Globe artichoke and 10% Jerusalem artichoke; and Formula 4 contained 10% Inulin powder extracted from Jerusalem artichoke. The selected formulations were nutritionally evaluated comparing with Cerelac. Inulin content was determined using HPLC methodology; Jerusalem artichoke tuber had 65.74 g/100g Inulin; whereas, globe artichoke bracts had 20.41 g/100g Inulin on dry weight. The highest amounts of Inulin was found in formula 2 contained (10.35 g/100g dry weight); while Inulin content in formula 1 and 3 were (4.18 and 8.72 g/100g dry weight), respectively. Inulin powder extracted from Jerusalem artichoke was added to formula 4 which was (10.06 g/100g dry weight). The results indicated also, that all mixtures were rich in protein, and carbohydrate. Also, all mixtures had compositions and properties comparable to those of Cerelac and the levels recommended by Egyptian standard hence have a good potential for use as weaning foods.

Inulin may have potential benefits, since they exhibit many soluble dietary fibre-like properties. Our present objective was to study the effect of extracted Inulin from Jerusalem artichoke and Globe artichoke on bioavailability of some minerals (Fe, Ca, Zn and Mg). As

expected, inulin intake increased minerals absorption in all rat groups. Absorption of (Fe, Ca, Zn and Mg) was significantly higher in the groups fed on Inulin extracted from Jerusalem than groups fed on the same levels of Globe artichoke. However, inulin had a numerically greater effect on minerals absorption in rats group fed on diet contained 6% Inulin extracted from Jerusalem artichoke than rats groups fed on diet contained 6% Inulin extracted from Globe artichoke. The extent of the stimulatory effect of inulin on absorption of minerals may differ according to source of Inulin. In conclusion, Inulin extracted from Jerusalem artichoke led to more increase on bioavailability of studied minerals than Inulin extracted from Globe artichoke.

Key Words: Functional food, Prebiotic, Inulin, minerals bioavailability, Weaning foods formulas.

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CONTENTS

LIST OF ABBREVIATIONS

%	Percent
µg	Microgram
A. A. S.	Amino acid score
A. O. A. C.	Official methods of Analysis
BV	Biological value
Ca	Calcium
cm	Centimeter
conc.	Concentration
DC	Digestibility coefficient
DP_{av}	Degree of polymerization average
EAAs	Essential amino acids
FAO	Food and agriculture organization
Fe	Iron
G. A.	Globe artichoke
g	Gram
HP	high polymer
HPLC	High performance liquid chromatography
hr	Hour
IN	Inulin
J.A.	Jerusalem artichoke
Kcal	Kilocalorie
Kg	Kilogram
Mg	Magnesium
mg	Milligram
min	Minute
ml	Milliliter
nm	Nanometer
N	Neiotn
NPU	Net protein utilization
NRC	National Research Council
^{o}C	Degree centigrade
PER	Protein efficiency ratio
Sc-FOS	short-chain fructooligosaccharides
sec.	Second
UNU	UNICEF
WHO	World health organization
Wk	Week
Zn	Zinc

LIST OF TABLES