

## **THE OBTAINING OF THE PUDDING/JELLY TYPE FUNCTIONAL FOOD USING ALFRED'S L. WOLFF *QUICK* FIBRE PRODUCT**

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### **Abstract**

*The possibility of obtaining the functional food using the addition of the soluble fiber from acacia like Alfred L. Wolff Company's **Quick Fiber** product was studied. The addition was in the premix of the dry ingredients and sugar which was used for preparation of pudding and jellies either if is a cold or a boiling process. The ratio of the addition of the soluble fiber was between 20 and 100 percent compare to the premix of the dry ingredients and sugar (weight/weight). The obtained samples were subjected to the sensorial evaluation by comparing with the control sample. The sensorial evaluation was performed by 15 students using the criteria which were considered as being meaningful for the outcome product's quality. We concluded that the addition of the Quick Fiber product in the premix used for preparation of pudding and jellies is an optimum way to transform a very agreeable dessert product into a pleasant and healthy product. The optimum proportion for **Quick Fiber** addition is variable in accordance with initial characteristic of the product (flavor, the liquid which was used for preparation, manufacturer and the type of the product).*

**Keywords:** *Quick Fiber, soluble dietary fiber, functional foods, acacia, dessert premix*

### **Introduction**

The consumer's interest for functional food is greater and greater. There is no a definition for functional foods which was unanimously accepted.

International Food Information Council - IFIC) defines *functional foods* as foods that provide health benefits beyond basic nutrition (www.ific.org). This definition is similar to that of, the International Life Sciences Institute of North America - ILSI which has defined

*functional foods* (functional food) as foods that, by virtue of physiologically active food components, provide health benefits beyond basic nutrition (www.ilsa.org). Health Canada defines *functional foods* as “similar in appearance to a conventional food, consumed as part of the usual diet, with demonstrated physiological benefits, and/or to reduce the risk of chronic disease beyond basic nutritional functions” (www.hc-sc.gc.ca). The Institute of Medicine of the National Academy of Sciences limits functional foods (functional food) to those in which the concentrations of one or more ingredients have been manipulated or modified to enhance their contribution to a healthful diet (www.iom.edu).

In the Table 1 it can be seen some examples of the functional components of the food and their potential healthy properties. FDA approved health claim established for those components which are in fields colored in grey.

**Table 1.** Examples of functional components of food (www.ific.org)

Class	Component	Potential Benefit
Carotenoids	Beta-carotene	- neutralizes free radicals which may damage cells - bolsters cellular antioxidant defenses
	Lutein, Zeaxanthin	- may contribute to maintenance of healthy vision
	Lycopene	
Dietary (functional and total) fiber	Insoluble fiber	may contribute to maintenance of a healthy digestive tract
	Beta glucan	- may reduce risk of coronary heart disease (CHD)
	Soluble fiber	- may reduce risk of CHD
	Whole grains	- may reduce risk of CHD and cancer; - may contribute to maintenance of healthy blood glucose levels
Fatty acids	Monounsaturated fatty acids (MUFAs)	- may reduce risk of CHD
	Alfa linoleic acid	- may contribute to maintenance of mental and visual function
	Eicosapentanoic acid	- may reduce risk of CHD
	Docosahexanoic acid	- may contribute to maintenance of mental and visual function

Flavonoids	Anthocyanidins	- bolster cellular antioxidant defenses - may contribute to maintenance of brain function
	Flavanols	- may contribute to maintenance of heart health
	Catechins	
	Epicatechins	
	Flavanones	- neutralize free radicals which may damage cells
	Flavonols	- bolster cellular antioxidant defenses
Proanthocyanidins	- may contribute to maintenance of urinary tract health and heart health	
Isothiocyanates	Sulforaphane	- may enhance detoxification of undesirable compounds and bolster cellular antioxidant defenses
Phenols	Caffeic acid	- may bolster cellular antioxidant defenses
	Ferulic acid	- may contribute to maintenance of healthy vision and heart health
Plant stanols/sterols	Free Stanols	- may reduce risk of CHD
	Free Sterols	
	Stanol esters	
	Sterol esters	
Polyols	Xylitol	- may reduce risk of dental caries
	Sorbitol	
	Mannitol	
	Lactitol	
Prebiotic	Inulin	- may improve gastrointestinal health - may improve calcium absorption
	Fructo-oligosaccharides	
	Polydextrose	
Probiotic	Lactobacilli	- may improve gastrointestinal health and systemic immunity
	Bifidobacteria	
Phytoestrogens	Isoflavones	- may contribute to maintenance of bone health, healthy brain and immune function;
	Lignans	- may contribute to maintenance of heart health and healthy immune function
Soy protein	Soy Protein	- may reduce risk of CHD
Sulfides/thiols	Diallyl sulfide	- may enhance detoxification of undesirable compounds
	Allyl methyl trisulfide	- may contribute to maintenance of heart health and healthy immune function
	Dithiolthiones	- contribute to maintenance of healthy immune function

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From Table 1 it can be seen that the soluble fiber are functional components of foods which was recognized by FDA for its health benefit.

### Experimental

The properties of the raw materials used in this experiment are shown in the Table 2. The Alfred L. Wolff Company's product - **Quick Fiber**, is soluble fiber made from acacia tree. Theirs features are given in Table 2.

**Table 2.** The properties of the raw materials which were used

Raw material	Properties	
<b>Quick Fiber</b> and soluble fiber from acacia	Manufacturer	German Company ALFRED L. WOLFF
	Fiber content	80-85%
	Minerals	3%
	Proteins	2%
	Humidity	10%
	Origin	100% natural, physically dried and not chemically modified plant exudates
	Solubility	High solubility in water
	Taste	no
	Smell	no
	Caloric value	1.5 kcal/g
	Statute	E 414 in the European list of approved additives
	ADI	Non specified (no limitation of acceptable daily intake) <i>quantum satis</i> (as much as is the processing needs)
	GRAS	Generally Recognized As Safe by the Food and Drug Administration (FDA)
	Suitable for Vegan diet	Yes
Kosher certificat	Yes	
Halal certificat	Yes	
<b>Grandiso</b> – vanilla flavor pudding, boiling preparation method	Manufacturer	Produced in UE for PLUS supermarket
	Ingredients	Starch, salt, flavor, colorings
	Manufacturer's preparation method	Blend together the pudding premix with 40 grams of sugar and 4-6 spoon of the cold milk. Boil the milk which remains. When is boiling add the pudding blend and keep stirring while the composition increase in thickness

<b>Pudding</b> – chocolate pudding, boiling preparation method	Manufacturer	RUF Lebensmittelwerk KG
	Ingredients	Starch, cocoa 18%, flavor
	Manufacturer's preparation method	Add to the content of the pack 50 grams of sugar and 5 spoons of milk and then blend it together. Boil the remainder milk and add the pudding blend and keep stirring while the composition increases in thickness.
<b>Crème Olé</b> strawberry – pudding, cold preparation method	Manufacturer	Dr. Oetker RO SRL
	Ingredients	Powder sugar, modified corn starch, pieces of dried strawberry 2%, strawberry flavor, carboximethylcellulose, colorings
	Manufacturer's preparation method	Mix 400 ml of cold milk with the content of the package with blender. Use first a low speed and then mix 3 minutes with high speed.
<b>Dr. Oetker</b> Orange Jelly	Manufacturer	Dr. Oetker RO SRL
	Ingredients	sugar, gelatin, citric acid, flavor, colorings
	Manufacturer's preparation method	Boil 400 ml of water and then take it away from the fire. Pour the content of the package into boiled water and stir very well for 2 minutes until all is dissolved. Do not boil!
<b>Milk Milli</b>	Manufacturer	SCIL Mures S.A., Romania
	Caloric content	46 kcal/100 g
	Proteins	3 %
	Carbohydrates	4.5%
	Lipids	1.8%

Because we want that the results of this experiment to be as much as possible complex and revealing, we considered:

- different kinds of premixes: cold or boiling preparing method; various flavor; pudding and jelly type
- varied possibilities for soluble fiber adding: as dry ingredient into initial premix; as ingredient which was solubilized first in water or milk

The preparation method recommended by the manufacturer was followed. We made some little changes in some situations in order to obtain comparable results:

- the manufacturer's recommendations about the premix/milk ratio was followed

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- the quantities of sugar added into the premixes which were without sugar was kept constant: 8 grams of sugar for 7 grams of premix pudding (only for puddings which have boiling preparation method - see Table 3)
- for the products which have boiling preparation method, the boiling was stopped after the first bubbling while stirring (only for puddings which have boiling preparation method)
- in order to have as few as it is possible parameters which can influence the results of experiments and because we want to have the most correct interpretation, we performed two series of experiments for the same product, one with milk and one with water (only in need).

The composition of the samples and the control samples are shown in the Table 3. The appearance of the control samples and the samples can be seen in the Sensorial evaluation of the outcomes product compared with the control samples was performed by 15 food science students. The criteria established to evaluate the sensorial features were considered meaningful for the characterization of the outcome products.

### **Results and Discussions**

There isn't any problem about the omogenisation or the solubilisation of the *Quick Fiber* product added as a dry ingredient into the pudding premix. When the liquid was added in order to homogenize the composition before boiling, no lump appeared.

Regarding the puddings with the boiling preparation method, regardless of the flavor and the manufacturer, the panelists remarked meaningful differences in the moment and the way of adding the fiber. First of all, the fiber was added as dry ingredient into the pudding premix alongside the sugar. Then the composition was mixed with the liquid (milk or water). In all this situations (SPvBM 3, SPvBM 5, SPvBM 7.5, SPvBW 3, SPvBW 5, SPvBW 7.5, SPcBM 3, SPcBM 5, SPcBM 7.5) the consistency of the outcomes products was similar to that of the breaks down composition. These samples are not homogeneous and smooth because in their structure it can be felt very tiny particles. These particles have a different consistency compare to that of the surroundings medium. The sensation is alike sensing sand.

This sanding sensation is positively correlated with the quantity of the fiber added. The cohesion of the outcomes products decreased with the increasing quantity of the fiber added.

**Table 3.** Control samples and samples composition, information about their preparation method

Code	premix		Sugar (g)	Quick Fibre (g)	Milk (ml)	Water (ml)	
	type	g					
CSPvBM	Vanilla pudding, boiling preparation method with milk or water	7	8	-	100	-	
SPvBM 3		7	8	3	100	-	
SPvBM 5		7	8	5	100	-	
SPvBM 7.5		7	8	7.5	100	-	
<b>SPvBM 7.5</b>		7	8	7.5	100	-	
CSPvBW		7	8	-	-	100	
SPvBW 3		7	8	3	-	100	
SPvBW 5		7	8	5	-	100	
SPvBW 7.5		7	8	7.5	-	100	
<b>SPvBW 3</b>		7	8	3	-	100	
<b>SPvBW 5</b>		7	8	5	-	100	
<b>SPvBW 7.5</b>		7	8	7.5	-	100	
CSPcBM		Chocolate pudding, boiling preparation method with milk or water	7	8	-	100	-
SPcBM 3			7	8	3	100	-
SPcBM 5	7		8	5	100	-	
SPcBM 7.5	7		8	7.5	100	-	
CSPsCM	Strawberry pudding, cold preparation method with milk	15	-	-	80	-	
SPsCL 3		15	-	3	80	-	
SPsCL 5		15	-	5	80	-	
SPsCL 7.5		15	-	7.5	80	-	
<b>SPsCL 7.5</b>		15	-	7.5	80	-	
CSJCW	Orange jelly, cold preparation method with water	15	-	-	-	66.6	
SJCW 3		15	-	3	-	66.6	
SJCW 5		15	-	5	-	66.6	
SJCW 7.5		15	-	7.5	-	66.6	
SJCW 10		15	-	10	-	66.6	
SJCW 15		15	-	15	-	66.6	

CS – control sample  
 S – sample  
 Pv – pudding vanilla  
 Pc – pudding chocolate  
 Ps – pudding strawberry  
 J – jelly  
 B – boiling preparation method  
 C – cold preparation method

M – milk (prepared with milk)  
 W – water (prepared with water)  
 3, 5, 7.5, 10, 15 – the quantity of the fibre which was added (grams)  
 the grey and bold fields are samples which the fiber was added as solubled ingredient in milk or water

Because we want to know what the cause for this problem is, we proceed to solubilize the **Quick Fiber** product before the addition into the pudding premixes (sample SPvBM 7.5). The results were identically to the situation when the soluble fiber was added as dry ingredient. In the next essay the fiber was added as ingredient which was solubled first in water – so we replaced milk with water. We obtained a series of samples SPvBW 3, SPvBW 5 and SPvBW 7.5 with no problem. The samples are as smooth as the control sample, but their color are little changed compared to that of the control sample. The sample with 20% fiber added (SPvBM 3) has the same color with reddish nuance. The reddish nuance of the sample with 33.33% fibre added (SPvBM 5) is more intense compare to that of the sample SPvBM 3. The sample with 50% fiber added (SPvBM 7.5) has no reddish nuance. In this case the color is a little darker than that of the control sample.

The panelist evaluated that the viscosity and the cohesion of these samples (SPvBW 3, SPvBW 5 and SPvBW 7.5) is the same with that of the control sample.

When in the pudding with cold method preparing the fiber was added as dry ingredient into the pudding premix, the consistency of the outcome product was not good. The greater quantity of fiber added, means that the consistency goes worsen (samples SPsCM 3, SPsCM 5 and SPsCM 7.5). These samples have no cohesiveness and their viscosity is low. If the **Quick Fiber** product is added as in milk solubled ingredient (sample SPsCM 7.5) the smoothness of the sample is the same as that of the control sample. The cohesiveness of this sample is better than that of the control sample. The panelists think that the sensorial properties of this sample (SPsCM 7.5) are even better than that of the control sample. They find that the sample with 50% **Quick Fiber** product added has more pleasant consistency, smoothness and bodyness than that of the control sample.

Jelly's samples modified the color and the transparency when the fibers were added. The appearance of the control sample (CSJCW) is orange and crystal like transparency. The sample with 20% fiber added (SJCW 3) has the same color as that of the control sample but some opalescence appears. For the sample with 33.3% fiber added (SJCW 5) this opalescence goes intense. Starting with the sample which has 50%

**Quick Fiber** product added it can be seen a gradually clarifying process. The sample with 100% **Quick Fiber** added (SJCW 15) is transparent but the color is a little darker compare to that of the control sample. The transparency of this sample is not as good as that of the control sample but the opalescence disappears.

The panelist remarked that the samples with 20% (SJCW 3) and 33.3% (SJCW 5) **Quick Fiber** product added opposites a little lower resistance to the tongue break down process compare to that of the control sample.

All the samples in which the **Quick Fiber** product was added created after their consumption a persistent sensation of satiety and fullness at the stomach level. For all the puddings which were obtained with **Quick Fiber** product added, the panelists observed an intensification of the sensation of creaminess, bodyness and unctuousness.

We also remarked that the characteristics of the outcomes products for all the puddings which were obtained with the **Quick Fiber** product added remains unchanged in time of 24 hours if there are kept in the refrigerator. Neither of the control samples remains unchanged during this period in the same conditions. At the control samples of the puddings, in time of 24 hours, even if they are kept in the refrigerator, the process of syneresis appears.

## Conclusions

Very good results were obtained for the puddings with boiling preparation method when the water was the liquid used but only when the fiber was added as in water solubled ingredient. Our work team found for the consistency and breaks down problems two kinds of explication:

- when the fiber are added as dry ingredient into the pudding premix alongside with sugar, there is no enough time for the solubilization until boiling starts. In this case the lack of the cohesion and homogeneity of the composition is due to the particles of the insoluble fiber.
- if the fiber were added as in milk solubled ingredient the lack of the cohesion and homogeneity of the composition is due to

the little particles of precipitate which appears. The medium acidifies after the fiber addition. Some milk's proteins are denatured when the mixture gets warmer. Tiny conglomerates forms. These conglomerates which are denatured proteins destroy the cohesion of the outcome composition and produce the sandy sensation.

Our team thinks that it's possible to obtain functional pudding with boiling preparation method using **Quick Fiber** product if the fiber will be separately wrapped and sold in the same pack with the pudding premix. The fiber will be added as in milk solubled ingredient into the pudding premix. Also the manufacturer will neutralized the acidity of the fiber.

There is an optimum solution for the obtaining functional pudding with cold method preparation using **Quick Fiber** product. The fiber must be separately packed. Thus the fiber will be added as in milk solubilized ingredient into the pudding premix. Using milk in this situation will not generate any problem if the milk will be not wormed.

We also think that is very easy to obtain functional jelly using **Quick Fiber** product. The fiber can be added as dry ingredient during manufacturing the jelly premix. No matter what quantity of **Quick Fiber** is added. The features of the product are excellent. We concluded that for these kinds of product there is no need to modify the manufacturer's preparing indications. For all types of products which were tested there are the possibilities to sell them in „ready to eat” way.

From a technologically point of view using the **Quick Fiber** product offers some advantages:

- the products which are obtained with **Quick Fiber** product have a better creaminess and consistency; these features are very important when there is the intention to make food for obese/overweight people
- the stability of the puddings which were obtained with **Quick Fiber** product added increases. The consistency of these samples after 48 hours of preservation are as good as that one of the puddings just prepared. The syneresis process which appears at the control sample pudding doesn't appear any more.

- the taste and the smell of the product is no changed by adding the **Quick Fiber** product indifferently in what quantity the fiber are used. No even a light sensation of diminishing of aroma can be remarked. The intensity of the sweet sensation is not attenuate
- the **Quick Fiber** product harmonizes very well no matter what's the flavor of the product

Our team considers that starting from our conclusion it can be create many lines of healthy desserts (like pudding and jelly) using **Quick Fiber**. These pleasant desserts will supply the daily RDA for fiber. It can be create a jelly which provides by eating only one portion the entire quantity of fiber daily needed. Because the soluble fibers are recognized by the FDA as functional components of foods such products as we obtained can be recognized as functional foods.

Eating dessert products (pudding and jelly) obtained with **Quick Fiber** added is followed by a sensation of fullness. As a result, the appetite will be diminishing. This property makes these products suitable for the consumption by the people concerned in weight management.

As direction for future study our team wants to formulate low calories functional pudding and jelly using: nonnutritive sweetener; low fat milk; gelling agents with high binding water capacity and low or no caloric value (replacing the starch with carboximethylcellulose); **Quick Fiber** product as ingredient for providing the sensation of fullness, bodyness and consistency

We want to make accessible these kinds of desserts for those who have problems about the weight management.

### **Acknowledgments**

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