



Yayasan Kegizian  
Pengembangan Fortifikasi  
Pangan Indonesia

## THE IMPORTANCE OF TANDEM WHEAT FLOUR FORTIFICATION AND RICE FORTIFICATION PROGRAMS IN ADDRESSING ANEMIA AND ZINC DEFICIENCY IN INDONESIA

### BACKGROUND

For most Indonesians, wheat flour is the second staple food after rice. This condition, plus several other advantages such as the affordable and stable price of wheat flour, the availability of established fortification technology, the small number of industries that facilitate quality assurance and supervision, and the relatively low cost of fortification, make wheat flour a commodity that qualifies to be a vehicle for food fortification to overcome the problem of micronutrient deficiencies in Indonesia.

Since 1998, through Minister of Health Decree No. 632/MENKES/SK/VI/98 and Director General of IKAH Decree No. 03/DIRJEN-IKAH/SK/II/2002, the Indonesian government has made fortification of wheat flour with iron, zinc, vitamin B1, vitamin B2, and folic acid mandatory. 2004, the mandatory SNI for wheat flour was issued, although its implementation experienced various dynamics. After several years, the mandatory SNI for wheat flour was revoked in February 2008 due to an increase in world food prices at that time, when wheat prices doubled and allegations that wheat fortification was an instrument of international trade barriers that prevented the entry of non-fortified wheat flour into Indonesia (Sapuan, 2009). However, thanks to advocacy from KFI and APTINDO, the

fortification was reinstated in August 2008. The dynamics of wheat fortification occurred again due to the COVID-19 pandemic; the mandatory implementation of SNI wheat flour was re-enforced in March 2020 on December 31, 2020. In August 2018, the latest SNI for wheat flour was issued (SNI 3751:2018). This SNI regulates the replacement of the iron compound used for flour fortification. In this latest SNI, Fe-Fumarate/FeSO<sub>4</sub>/Fe-Na-EDTA replacing Fe-elemental was published and started to be applied. With the implementation of this new SNI, the type of iron used has high bioavailability, so it is expected to have a more significant impact, especially for people with low incomes.

Although the implementation of mandatory fortification of wheat flour has been implemented for two decades, even the change of iron type has also been carried out; until now, monitoring and evaluation of the impact of wheat fortification have not been carried out systematically as part of the food fortification program in Indonesia. BPOM and the Ministry of Industry have indeed supervised the quality of flour produced and circulated. However, consumption and its impact on nutritional status have yet to be carried out in an integrated manner.



## WHEAT FLOUR CONSUMPTION IN INDONESIA

Two data sources can be used to evaluate the national intake of wheat flour: SUSENAS data issued by the Central Statistics Agency (BPS) and Individual Food Consumption Survey (SKMI) data collected by the Ministry of Health. SUSENAS data is collected regularly every year, while SKMI data is collected periodically, but the latest data available is SKMI 2014.

SUSENAS data, basically household expenditure data, can provide information on the consumption of wheat flour and processed products by socioeconomic status and areas (rural and urban) but cannot provide information on individual flour intake. SKMI data, basically individual consumption data, can provide detailed information on what each age group consumes.

The following briefly describes wheat flour consumption data using SKMI data; in addition to gram consumption, data on micronutrient intake for substances added during wheat fortification are also presented. The results of the analysis of

SKMI 2014 data show that wheat flour consumption in Indonesia ranges from  $43.17 \pm 72.78$  g/cap/day, showing high variation between individuals. The highest flour consumption was in the children age group (6-12 years), which was  $64.72 \pm 84.20$  g/cap/day, followed by the adolescent age group (13-18 years), which amounted to  $61.65 \pm 90.69$  g/cap/day. Pregnant women's average wheat flour consumption ranged from  $49.35 \pm 70.96$  g/cap/day. However, this consumption still does not reach the minimum level of wheat flour consumption that WHO (2016) estimates can have a real impact, which is at least 75g/cap/day. Only 10-30% of the Indonesian population consumes more than 75g/cap/day of wheat. Wheat consumption increases as income quintiles increase. The average wheat consumption of the fifth quintile population is twice that of the first quintile population (Figure 1). There is a significant difference between wheat intake in urban and rural areas where urban consumption is higher than rural consumption.

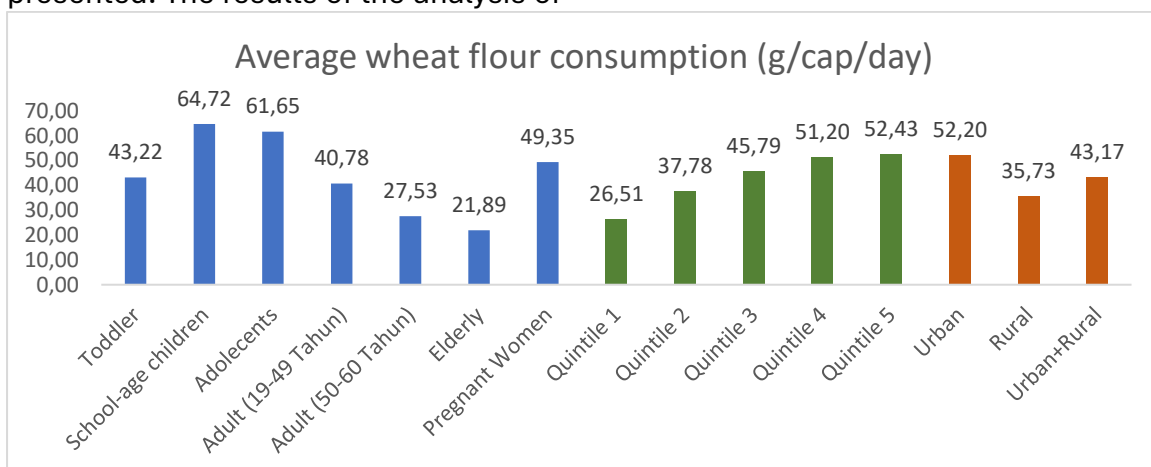


Figure 1. Average wheat flour consumption (g/cap/day)



Although the current average wheat flour consumption does not meet the minimum consumption rate that can positively impact staple food fortification (75g/cap/day), the potential effectiveness of wheat flour fortification in the future is expected to be even higher. This statement is supported by the results of the SUSENAS data analysis, which shows that the wheat flour consumption of the Indonesian

population has increased from 2016 to 2021 (Table 1). In addition, the results of the analysis of the National Socio-Economic Survey (SUSENAS) data show that there was also an increase in the ratio of wheat flour consumption to rice from 13.9% in 2016 to 17.9% in 2021 (Martianto, 2022). This analysis shows the potential to increase the effectiveness of wheat flour fortification in the future.

Table 1. Trends in Wheat Flour Consumption 2016-2021 in Indonesia (g/cap/day)

Year	Wheat Flour Consumption (g/cap/day)		
	Urban + Rural	Urban	Rural
2016	37,81	40,82	34,79
2017	38,36	40,00	36,16
2018	49,86	53,97	44,66
2019	48,77	52,60	43,84
2020	46,85	50,41	42,19
2021	46,30	49,86	41,92

Source: Directory of Food Consumption Development 2021, in Martianto, 2022

## CONTRIBUTION OF WHEAT FLOUR CONSUMPTION TO ADEQUATE IRON, ZINC, AND FOLIC ACID INTAKE

Based on the analysis of SKMI data, it is known that the community's wheat flour consumption <75g/day contributes to  $1.66 \pm 3.03\%$  of the RDA of Fe,  $4.78 \pm 8.02\%$  of the RDA of Zn,  $0.98 \pm 1.63\%$  of the RDA of folic acid. Meanwhile, in the group of people with wheat consumption  $\geq 75\text{g/day}$ , the contribution of Fe intake was  $20.35 \pm 11.96\%$  of the RDA of Fe,  $57.52 \pm 32.73\%$  of the RDA of Zn,  $12.01 \pm 6.45\%$  of the RDA of folic acid.

As most Indonesians (70-90%) still consume <75g/day of flour, the average intake of Fe, Zn, and folic acid from flour is still low. Therefore, sustainable efforts

are needed so that the objectives of the flour fortification program as a strategy to overcome micronutrient deficiencies can be achieved.

Based on the flour fortification monitoring guidelines issued by WHO (2021), routine monitoring of wheat flour consumption at the household level or individual consumption needs to be carried out to formulate measures to improve the effectiveness of wheat flour fortification programs in the future. This aims to ensure that the coverage and health benefits of fortified wheat flour and nutrient intake from fortified wheat flour are as expected. The indicators that



need to be considered in monitoring the consumption of fortified wheat flour include wheat flour fortification coverage, micronutrient content of fortified wheat flour, consumption of fortified wheat flour, and micronutrient intake from fortified wheat flour (WHO,

## RECOMMENDATIONS

1. The 2014 SKMI data is the only complete and up-to-date individual food consumption data to analyze wheat flour fortification's effectiveness comprehensively. However, this data is quite old, and data has been collected just now. The food fortification program requires monitoring and evaluation to monitor its effectiveness and requires corrective action if the monitoring results still do not meet the program objectives. Therefore, routine monitoring of wheat flour fortification consumption is needed to evaluate the impact of wheat fortification in reducing micronutrient deficiencies in Indonesia. The Indonesian Food Consumption Survey (SKMI) needs to be conducted now and regularly, at least once every five years in the

2021). This flour fortification program monitoring guide can be a reference for the government in preparing and implementing routine consumption monitoring of the fortification program and refining mandatory food fortification policies in the future.

future so that the development of wheat flour consumption and its contribution to overcoming the problem of iron deficiency anemia can be continuously monitored and the improvement of mandatory food fortification policies in the future.

2. The contribution of micronutrient intake of iron, zinc, and folic acid based on SKMI 2014 data is still relatively low but very helpful, especially for the lower middle class (income quintiles 1 and 2). Therefore, plans to fortify rice, especially medium rice, are needed for social assistance schemes and other schemes. Tandem fortification of iron, zinc, and folic acid in flour and rice will accelerate iron deficiency anemia prevention in Indonesia.

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